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THE

ENCYCLOPÆDIA BRITANNICA,

OR

DICTIONARY

OF

ARTS, SCIENCES, AND GENERAL LITERATURE.

EIGHTH EDITION.

WITH EXTENSIVE IMPROVEMENTS AND ADDITIONS;
AND NUMEROUS ENGRAVINGS.

VOLUME XI.

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ENCYCLOPÆDIA BRITANNICA.

GRANVILLE, the ancient *Grannonum*, a fortified seaport town of France, department of La Manche, at the foot of a steep, rocky promontory projecting into the English Channel, 30 miles S.W. of St Lô. It is surrounded by strong walls, and the streets are narrow and steep. The only remarkable building is the parish church, a venerable Gothic edifice. The harbour is spacious and secure, but dry at low water. Works, however, are now in progress for the improvement of the harbour generally, and for the construction of wet docks. The inhabitants are chiefly engaged in the coasting trade, or in the cod and oyster fisheries. Ship-building is also carried on. It has a tribunal of commerce, an hospital, public baths, and a naval school. Granville was bombarded and burned by the English in 1695, and partly destroyed by the Vendean troops in 1793. Pop. 8347.

GRAO, a seaport town of Spain, prov. of Valencia, and four miles E. of that town. It is situated at the mouth of the Guadalviar or Turia; and it has a town-house, prison, parish church, and two schools. Pop. about 3000, chiefly fishermen.

GRAPE, the fruit of the vine. See HORTICULTURE, and WINE-MAKING.

GRAPE-SHOT, in *Artillery*, consists of a quantity of shot piled round an iron spike which is placed in a strong canvas bag, the whole being firmly corded together so as to form a cylinder adapted to the calibre of the cannon. It differs from canister or case-shot in that the latter kind is composed of balls packed into a tin canister with a wooden bottom.

GRAPHITE (γράφω, I write), otherwise called *plumbago*, and often improperly *black lead*, is a mineral carbon with a slight admixture of iron. It may be made artificially by exposing iron with excess of carbon to a violent heat for a considerable length of time, when a real carburet of iron will be formed; whereas in the native specimens the iron and charcoal are only mechanically combined. The finest graphite occurs at Borrodale in Cumberland, and is appropriated exclusively to the manufacture of pencils. The coarser varieties are used for making crucibles and portable furnaces, for which purposes this substance is peculiarly fitted from its infusibility; and it is also much used for giving a gloss to the surface of cast-iron goods, as well as to diminish friction between rubbing surfaces of metal or wood in machinery. The properties and geographical distribution of graphite are more particularly noticed under MINERALOGY.

GRAPHOMETER, a mathematical instrument, otherwise called a *semicircle*, used in land-surveying to observe any angle the vertex of which is at the centre of the instrument in any plane, and to find how many degrees it contains.

GRAPNEL, or GRAPLING, a kind of small anchor with four or five flukes or claws, chiefly used to secure small boats.

GRASMERE, a village of England, county of Westmoreland, picturesquely situated at the head of the lake of the same name, 4 miles N.W. of Ambleside. In the burial ground adjoining the parish church are interred the remains of the poet Wordsworth. The lake of Grasmere is about a mile in length by half a mile in breadth, and is surrounded by mountains presenting beautiful scenery.

GRASS. See *Gramineæ* in index to BOTANY, and AGRICULTURE.

GRASSE, LA, a town of France, capital of a cognominal arrondissement in the department of Var, 23 miles E.N.E. of Draguignan. It occupies a highly picturesque situation on the southern declivity of a hill, facing the Mediterranean, from which it is about seven miles distant. The streets are narrow, steep, and winding, but the houses are generally well built. The climate is salubrious, and the town is well supplied with water from a rivulet which rises above it. It has a large Gothic church of ungainly appearance, three hospitals, town-hall, exchange, theatre, communal college, and public library. Next to Paris it carries on the largest manufactures of perfumery in France. The vicinity abounds in citrons, oranges, lemons, figs, and pomegranates, and in flowers used by the perfumers. Fine marble and alabaster are also found in the vicinity. Pop. (1851) 11,540.

GRASSHOPPER. See index to ENTOMOLOGY.

GRATIANUS, AUGUSTUS, son of Valentinian I., succeeded to a share of the Western Empire on the death of his father in A.D. 375. After a reign of eight years he was murdered by the partizans of a rebel aspirant to the imperial throne. Though only twenty-four at the time of his death, he had given proof of possessing many excellent qualities. He was just and gentle, zealous for the public good, and a true friend of Christianity.

GRATIANUS, a Benedictine of the twelfth century, is said to have been born at Chiusi in Tuscany, and to have resided at Bologna. His name has been preserved by his collection of the canons or decretals of the church, published at Mainz in 1472, under the title of *Decretum Gratiani*. This work was a great improvement upon its predecessors; but from the want of standard authorities and a sound principle of criticism many of the canons in it are quite apocryphal, and the text in many places very corrupt. Gratian, however, was himself well aware of the defects of his work, and warns his readers not to put too much faith either in his statements or his conclusions. He is often guilty of the most absurd self-contradictions in his endeavour to reconcile incongruous canons; and is accused by the Abbé Fleury of unwittingly extending the authority of the Pope, by his doctrine that the Pope was not himself subject to the canons. As Gratian's errors were leading to awkward results, an edition of his *Decretals* was published in 1582 by order of Gregory XIII.; in which the more flagrant mistakes were corrected. A treatise, *De Emendatione Gratiani*, by Antonius Augustinus, is an indispensable supplement to Gratian's own work.

GRATIUS, a Roman poet, whose real name has been almost supplanted by the epithet FALISCUS, added by a modern commentator. He was a contemporary of Virgil and Ovid, and wrote a book on hunting called *Cynegeticôn Liber*, which seems to have fallen wholly into oblivion before the time of Caracalla. At least, we find in the reign of that emperor the Greek Oppian writing on a cognate subject, and boasting of having struck out an entirely new path for himself. There is only one MS. of the *Cynegetica* extant, and even it is very corrupt. This, added to the arbitrary use of many individual words, the forced constructions, and a general haze that hangs over the whole poem, makes it very difficult to be understood. The work professes to describe the various kinds of game, the means to be employed for their pursuit and capture, the best breeds of horses and dogs, &c. The facts on which the poem is based are derived chiefly from Xenophon. The best editions of Gratius are those of Burmann and Wernsdorf. There is an English verse translation of the poem by Christopher Wase, London, 1654; and a German one by S. Perlet, Leipzig, 1826.

GRATTAN, HENRY, an illustrious Irish orator and statesman, was born at Dublin in the year 1750. His father was a barrister, and, though not remarkable for brilliant qualities, was industrious and prudent. Being a Protestant, the corporation of Dublin extended to him its patronage, in consequence of which he was elected as representative of the city in parliament, and made recorder. After passing through the usual course of scholastic discipline, which he did with much *éclât*, young Grattan was entered as a fellow-commoner in Trinity College, Dublin. Here also he greatly distinguished himself amongst contemporaries who afterwards became the chief ornaments of the senate and the bar. His original intention was to have studied for a fellowship, but the persuasions of his relatives induced him to remove to England, where he entered himself as a student of the Middle Temple. When the requisite number of terms had expired, he returned to his native country, and in the year 1772 was called to the Irish bar. His practice seems to have been small; but that his talents had already begun to make an impression, is proved by the fact, that in 1775 he was brought into the Irish parliament under the auspices of Lord Charlemont. From this period the life of Grattan became a portion, and a very conspicuous one, of the history of his country. He joined the ranks of the opposition, and the accession of strength which it thereby acquired soon became apparent. The effect of his commanding eloquence was not confined to those who listened to it in the house. He infused the patriotic spirit with which he was himself actuated into the country at large. It is allowed, indeed, that the volunteer bands, who had begun to assemble in the various parts of Ireland, acquired new confidence from the bold uncompromising tone assumed by the young speaker; and in the course of a few years their ranks swelled to the number of 80,000 men, armed, disciplined, and prepared for the field. The menacing attitude which Ireland assumed at this critical period, and the boldness with which the members of the Irish opposition, particularly Grattan, contested the supremacy of the sister kingdom, induced the British legislature, in the year 1782, to repeal the statute of the 6th of George I. By this law it had been enacted that the crown of Ireland should be inseparably annexed to that of Great Britain; that Ireland should be bound by British acts of parliament, if named therein; that the Irish House of Lords should have no appellate jurisdiction; and that the last appeal, in all cases of law and equity, should lie to the British House of Peers. For Grattan's exertions in getting this statute rescinded, his country was profuse in laudatory addresses to him; and the parliament rewarded his services by a grant of L.50,000. A more magnificent donation was intended, but Grattan declined to accept it. That bestowed was large enough to inspire envy and provoke misconstruction. The following sessions of parliament were stormy; and the young patriot had to contend, amongst others, with Mr Flood, an antagonist formidable alike by his acknowledged talents and the unscrupulous virulence of his attacks. The latter maintained that the act of repeal did not involve a renunciation of the British claims, and that therefore they might be resumed and exercised at any time. This sophistry found supporters in both houses of parliament, and the reputation of Grattan actually began to wane. But the energy and success with which he opposed Mr Ord's celebrated propositions, brought forward in 1785, fully re-established his fame. One of these was, that the Irish legislature should, from time to time, adopt and re-enact such statutes of the British parliament as related to the regulation of commerce. In opposing this proposal Grattan put forth all his powers, and from this period he began to be acknowledged as the leader of the country party, and as the head of the Irish Whig Club. The members of this association were reciprocally bound not to accept office under any administration which had not for its avowed principle the conceding of certain popular measures. These consisted of a bill to make the great officers of the crown responsible for their proceedings; a bill to prevent revenue officers from voting at elections; and a place and pension bill. Several other important subjects engaged the attention of Grattan at this period; and amongst these was the establishment of a provision for the clergy independent of tithes. He also brought in a bill to encourage the improvement of barren lands, by exempting reclaimed wastes from paying ecclesiastical dues during the space of seven years. But both these measures were rejected by the legislature, principally through the influence of the established church.

About the same period Grattan strenuously advocated an extension of civil rights to his Roman Catholic countrymen. That a Protestant statesman should exert himself in behalf of those who professed a religious creed different from his own, was, at the time when Catholic emancipation was at length conceded by the British parliament, a matter of such frequent occurrence, that no personal claim to distinction could be raised upon that ground: to entertain such sentiments was not considered as sufficient to subject the person entertaining them to public suspicion as one infected with pernicious opinions. But during the early career of Grattan the subject was viewed in another aspect, and through a different medium. In Ireland, whilst the heads of the Protestant church, with the majority of the Protestants, were arrayed in opposition to any concession to the Catholics, in England the tide of vulgar prejudice ran so strongly in the same direction, that a great civil convulsion had nearly arisen out of it. When these facts and circumstances are taken into consideration, the conduct of Grattan will appear in its true light, as that of a wise statesman, and a fearless patriot. His principal object was to obtain the elective franchise for the Catholics; but the administration of that day indignantly rejected the prayer of their petitions.

On the arrival of Earl Fitzwilliam, as lord-lieutenant, in 1795, Mr Grattan attached himself to that highly popular nobleman, and under his auspices originated many plans which had for their object to promote the peace and prosperity of his native land. But the recal of his lordship put a stop to all amelioration, and at the same time generated universal discontent, which was increased by the creation of new sinecures, and the lavish profusion of titles. The consequences were memorable and instructive. The society of United Irishmen, whose ostensible object was reform, but who really aimed at the independence of Ireland, acquired new courage from these dissensions, and some even proposed to establish a republic in that country. The triumph of the French Revolution had no doubt inspired these daring projectors with hopes of success. A large portion of the people adopted their principles; military associations were formed, and numbers disciplined and armed; whilst an intercourse was opened with France, by which succours and assistance were liberally promised. From the commencement of the rebellion which ensued, Mr Grattan advised measures of conciliation; and when he saw that there was no hope of stemming the general movement, he withdrew from parliament, and retired to his country residence.

But the grand project of Mr Pitt for effecting a union between Great Britain and Ireland summoned him from his retirement. He obtained a seat in parliament for the express purpose of opposing that measure, which, he maintained, would prove fatal to the best interests of Ireland. Its success did not, however, prevent him from accepting a seat in the imperial parliament, and there employing his talents and eloquence for the benefit of both countries. He was chosen, in 1805, to represent the small borough of Malton; and in the year following he was returned as one of the members for Dublin. Throughout the remainder of his career, his public conduct continued to evince the purest patriotism and the most undeviating consistency, illustrated by an eloquence fraught with the finest inspirations of genius and liberty. Notwithstanding the uniform and vehement opposition of the corporation of the city which he represented, he continued to advocate the Catholic claims with equal zeal and ability. Accordingly, towards the close of his life, we find him complying with an unanimous requisition on the part of the Catholics of Ireland, to present their petition to the British parliament, and to give it his support. Some of his friends represented the fulfilment of this duty as incompatible with his health, which had now begun to decline; but he nobly replied, that "he would be happy to die in the discharge of his duty." This event did actually take place; for he expired on the 14th of May 1820, soon after his arrival in London; and his remains were interred in Westminster Abbey.

It is comparatively easy for posterity to judge for themselves of the moral and political qualities of a statesman's character, because these can be dispassionately determined from the information afforded by history as to the course of conduct which he had pursued, and the measures which he had supported. If Mr Grattan be thus estimated, he must ever be accounted one of the most ardent, consistent, and patriotic of modern statesmen. Viewing him as an orator, we can only judge of his excellence by the report of contemporaries, who but rarely agree in such matters. We are informed that he had to contend with an indifferent voice, which was thin, and, considered simply as an organ of sound, unequal to the expression of impassioned feelings. His action, too, was seldom elegant or graceful, but it possessed a far higher character, it was forcible and energetic. Animation and ardour predominated in his manner; and his pronunciation was distinct and articulate. These are the qualities which are calculated most powerfully to impress a mixed assembly; and the effects which he accordingly produced on several occasions have not been surpassed by those of any orator of modern times. "With much of national peculiarity, but chiefly in the manner," says a very able writer;[1] "with much, too, of individual mannerism, his eloquence is, beyond all doubt, of a very high order. Perhaps, after making every deduction for obvious defects, he may even be accounted an orator of the first class. For he possesses an originality, and a force rising far above any excellencies of mere composition. Fervid, vehement thoughts, clothed in language singularly pointed and terse; an extraordinary power of invective, so remarkable indeed, that he may be ranked among the greatest masters of the sarcastic style; and, above all, and it is the distinguishing character of his oratory, a copious stream of the most sagacious and original observations, or the most acute and close arguments, flowing, though not continuous and unbroken, yet with an ease the more surprising, because they almost all are in the shape of epigrams;—these are the high and rare merits which strike the reader of Mr Grattan's speeches, and must have produced a still deeper impression upon those who heard him in his prime."—"He had deep, and warm, and generous feelings, and, when roused to enthusiasm, they sometimes found vent in simple language; but his accustomed style of epigram is far more prejudicial to the expression of passion than to the conduct of an argument; and accordingly, his declamation was by no means equal to his reasoning, if we except the vituperative parts of it, which were among the finest of all his performances. He had a lively and playful fancy, which he seldom permitted to break loose; and his habits of labour were such that he abounded in all the information, ancient and recent, which his subject required, and could finish his composition with a degree of care seldom bestowed upon speeches in modern times. Finally, he was a man of undaunted spirit, and always rose with the difficulties of his situation. He was ready, beyond any man, perhaps, who ever laboured his speeches so habitually. No one ever threw him off his guard. Whoever dreamt that he had caught him unawares, was speedily roused to a bitter sense of his mistake; and it is a remarkable circumstance, that, of all his speeches now preserved, the two most striking in point of execution are those personal attacks upon Mr Flood and Mr Corry, which, from the nature of the occasions that called them forth, must, of necessity, have been the production of the moment. The epigrammatic form in which he delighted to throw all his ideas, and the diction adapted to it, had become so habitual to him, that, upon such emergencies, they obeyed his call with the readiness of a natural style; and he could thus pour forth his indignation in antithesis and point, as easily as the bulk of mankind when strongly excited give vent to their feelings in the sort of language which, from this circumstance, we are accustomed to term the eloquence of nature or of passion.

"In the more glaring defects of what has been called the Irish school of orators, he certainly did not abound. Extravagance of passion; strained pictures of feeling; exuberance of metaphor, and of forced metaphor; and, worse than all, excess of passion expressed by unnatural and far-fetched imagery, in language quite wide of nature, and often wholly incorrect;—from these characteristic vices of his country's fanciful and ingenious and ready orators, he was exempted beyond all his contemporaries, by the chastening effects of classical discipline. Occasionally, indeed, they do break out in his compositions; but, generally speaking, it is rather in the style than in the ideas that he departs from nature; or if in the ideas, it is in his love of point, rather than in his proneness to metaphor. In one great quality he not only stands single among his countrymen, but may be pronounced eminently superior to our own greatest orators; and it is that in which all modern compositions, those of Dante and perhaps of Milton alone excepted, fall so far short of the ancient, and especially the Greek exemplars; we mean the dignified abstemiousness, which selects one leading and effective idea, suddenly presents it in a few words, and relies upon its producing the impression desired, without saying all that can be said, and, as it were, *running down* the topic. In Mr Grattan's speeches we constantly meet with opinions delivered, or illustrations flung out, in a single sentence, or limb of a sentence, and never again recurred to, although the opinion may have been so sagacious, and the illustration so happy, that a copious modern, or even an ancient of the school of Cicero, would have worked the one into a dissertation, and the other into an allegory. This is a merit of the very highest order, subject to the remarks already made upon the difficulty of making things thus lightly touched at once perceived by an audience, and the aggravation of that difficulty by the obscurity incident to the epigrammatic style."

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[1] *Edinburgh Review*, vol. xxxviii., p. 58.

Grattan's Life has been written in 5 vols. by his son, who has also edited his miscellaneous works and his speeches in parliament. (J. F. S.)

GRATZ, a city of Austria, capital of Styria, as well as of the circle of Gratz, occupies a commanding position on both sides of the river Mur, an affluent of the Drave, 1094 feet above the level of the sea, and 96 miles S. by W. of Vienna. It consists of the city proper or inner town, which stands on the eastern bank of the river, and four extensive suburbs, having altogether a circuit of about seven miles. The suburb Murstadt is on the western bank, and is connected with the opposite bank, on which are the three others, by two bridges. The inner town occupies little more than a seventh part of the entire area, and is separated from the suburbs by ramparts and a glacis. It has a gloomy and antique appearance, and the streets are narrow and irregular. The suburbs are much more regularly built than the town itself, and contain many elegant edifices. That of Murstadt is the largest and finest. The vicinity abounds with beautiful gardens and villas. On the Schlossberg, a rocky eminence in the centre of the town, rising to the height of 300 feet, stand the ruins of the citadel, destroyed by the French in 1809. The cathedral or church of St Ægidi is a Gothic structure, erected by Frederick IV. in 1456, and contains many handsome marble monuments. Near it is St Catherine's chapel, erected as a mausoleum by Ferdinand II., who lies interred here, together with his consort, mother, &c. Gratz possesses in all ten parish churches, twelve other churches and chapels, five monasteries, and two nunneries. The *Landhaus*, where the estates hold their sittings, is a very ancient edifice, in which is preserved the ducal hat of Styria, worn by the Emperor of Austria when he receives the allegiance of the Styrians. It also contains numerous suits of old armour. The university, founded by Charles Francis, Duke of Styria, in 1586, is one of the second order, having faculties of theology, law, and philosophy. Lectures are given in medicine, but no degrees are conferred. It has a library of about 100,000 vols. and 7500 MSS., a natural history museum, &c. In 1850 it had 866 students. The *convicte*, the largest building in the town, and formerly a college of the Jesuits, is now used as a school in connection with the university. The Johanneum institution was founded in 1811 by Archduke John (Johann), from whom it takes its name. Its object is the encouragement of the arts, sciences, and manufactures of Styria by the formation of collections of various natural and artificial productions, by a library, and by gratuitous lectures delivered by professors attached to the institution. It has a reading-room, library of 32,000 vols., collections of animals, minerals, antiquities, coins, plans, &c., a botanic garden, and chemical laboratory. Gratz possesses also a gymnasium, episcopal seminary, deaf-mute institution, lunatic, foundling, and orphan asylums, a general hospital and lying-in institution, theatre, &c. It is the seat of the highest civil authorities for the duchy of Styria, and the residence of the prince bishop of Seckau. Its chief manufactures are cotton, woollen, and silk goods, iron and steel wares, leather, paper, hats, earthenware, and rosoglio. Being in the line of railway from Vienna to Trieste, it carries on a considerable trade with these places, as also with Hungary, Croatia, Transylvania, and Turkey. It is the seat of two great fairs, each of which lasts for three weeks. Gratz was taken by the French in 1809, after a siege of seven days. Pop. (1851) 55,421.

GRAUDENS, a town of Prussia, province of West Prussia, and government of Marienwerder, on the right bank of the Vistula, here crossed by a bridge of boats 2700 feet long, 18 miles S.S.W. of Marienwerder. It is surrounded by a wall, and is farther protected by a strong fortress which commands the Vistula. It has a gymnasium, training seminary, house of correction, and an establishment for the reformation of juvenile offenders; also breweries, woollen cloth and tobacco factories, and some trade in corn. Pop. (1849) 7639, besides 2454 military.

GRAUNT, JOHN, the author of *Observations on the Bills of Mortality*, and the founder of Political Arithmetic, was born at London, April 24, 1620. At an early age he was apprenticed to a haberdasher in the city; and when he entered into business on his own account, he gained the esteem and confidence of his fellow citizens, passed with reputation through all the offices of his ward, and was first captain and then major of the trained bands. It is not known at what precise time he first began to collect and digest the Bills of Mortality; but it appears, from his own statement, that he had directed his attention to the subject several years before he had any design of publishing the discoveries which rewarded his researches. His book entitled *Observations on the Bills of Mortality* was published in 1661, 4to, and met with so favourable a reception that a second edition was called for the succeeding year, and others followed. Immediately after its publication, Louis XIV., by a royal ordonnance, provided that a more exact register of births and burials should be kept in Paris; and Charles II. conceived so high an opinion of his abilities, that, at the institution of the Royal Society, he recommended Graunt to the choice of the members, with this additional charge, that if they found any more such tradesmen they should be sure to admit them. Graunt appears to have changed his religion, and become Roman Catholic, some time before his death, which took place on the 18th of April 1674. He left his papers in charge of Sir William Petty, who had all along befriended him, and who took care to adjust and insert them in a fifth edition of his work, published in 1676, 8vo. The observations of Graunt may be considered as having formed the elements of that useful science afterwards styled Political Arithmetic, which, therefore, he is entitled to the honour of having founded; and whatever merit may be ascribed to Sir William Petty, Mr Daniel King, Dr Davenant, and others, there can be no doubt that the *Observations on the Bills of Mortality* served as the model, if not as the basis, of all their investigations. (J. B—E.)

GRAVE, in *Grammar*, a species of accent opposed to acute, and expressed thus (`). It marks that the voice is to be depressed, and the syllable it is placed over is to be pronounced in a low deep tone.

Grave (Sax. *græf*), a tomb or sepulchre. See Burial.

GRAVELINES, a strongly fortified seaport town of France, department of Le Nord, and arrondissement of Dunkerque, on the Aa, near its mouth, in the English Channel. It is chiefly known for its fortifications, which are of great strength, having been constructed by Vauban; and, being in a low marshy situation, protected from the sea by *dunes* or sandhills, the surrounding country may be laid under water at pleasure. The inhabitants are chiefly engaged in the cod, mackerel, and herring fisheries. Pop. 5582.

GRAVESANDE, William Jacob, a distinguished Dutch geometer and natural philosopher, was descended of an ancient and honourable family, and born at Bois-le-duc, in Holland, Sept. 27, 1688. The name of his family was properly Storm van s'Gravesande. He studied the civil law at Leyden; but the mathematics were his favourite pursuit. When he had taken his doctor's degree in 1707, he settled at the Hague, where he practised at the bar, and cultivated the acquaintance of learned men. In May 1713 he, with some other young men distinguished for their acquirements, organized a review entitled *Le Journal Littéraire*, which was continued without interruption till 1722. In 1715 s'Gravesande, in the capacity of secretary of legation, accompanied the deputies of the states-general sent to London to compliment George I. on his accession to the throne, and there, through the influence of Dr Burnet, Bishop of Salisbury, was admitted a member of the Royal Society. He returned the following year to the Hague, and in 1715 was appointed ordinary professor of mathematics and astronomy in the academy of Leyden. During the vacations of 1721 and 1722, s'Gravesande made two journeys to Cassel to visit the landgrave of Hesse, a prince who showed an enlightened taste for experimental philosophy, and generously furthered its advancement. In 1724 he resigned the rectorship of the academy, to which he had previously been promoted, and on this occasion pronounced a discourse *De Evidentia*, which has been prefixed to the third edition of his *Elements of Physics*. In 1730 he added to his ordinary course civil and military architecture, which he taught in Dutch; and in 1734 he was also appointed to teach philosophy, including logic, metaphysics, and ethics. S'Gravesande died Feb. 28, 1742, at the age of fifty-five. His principal works are: *Essai de Perspective*, Hague, 1711; *Physices Elementa Mathematica, experimentis confirmata, sive Introductio ad Philosophiam Newtonianam*, Hague, 2 vols. 4to, 1720–1742; *Philosophiæ Newtonianæ Institutiones in usus academicos*, an abridgement of the preceding, Leyden, 1723, 1728, and 1744; *Matheseos Universalis Elementa, quibus accedunt, specimen commentarii in Arithmeticam universalem Newtoni et de determinanda forma seriei infinitæ adsumtæ Nova Regula*, Leyden, 1727, in 8vo; *Introductio ad Philosophiam, Metaphysicam et Logicam continens*, Leyden, 1736, 1737. In the *Dictionnaire Historique* of Prosper Marchand may be found a detailed biography of s'Gravesande by Allemand, the editor of the work, who was intimately connected with s'Gravesande and his family. There is also an elaborate life of him in the *Biog. Univers.*, by De Gerando.

GRAVESEND, a municipal borough, river port, and market-town of England, county of Kent, on the right bank of the Thames, 22 miles below London, with which it is connected by railway. Gravesend is chiefly indebted for its prosperity to its intercourse with London; and since the establishment of steamboat and railway communication with that metropolis, it has been gradually increasing in size and importance. It occupies a pleasant and healthy situation, with good accommodation for bathing; and from the heights above the town, especially that called Windmill Hill, extended views of the river with its windings and shipping are obtained. During the summer season it is much resorted to by the middle classes of London, many of whom have houses here to which they come daily or weekly at the close of business. The crowds of visitors that come here on Sunday in fine weather are very great. The town occupies an acclivity rising from the river; the older and lower part of it is irregularly built, with narrow and inconvenient streets, but the upper and newer portion is well and regularly built, and has several handsome streets, squares, and terraces. The town-hall is a neat and conspicuous Doric edifice, erected in 1836. The church, which stands near the centre of the town is a neat brick building. It has several other churches and chapels, a free grammar-school, literary institution, market-house, custom-house, theatre, concert-room, bazaars, baths, &c. It has several piers, two of which, the town-pier and the terrace-pier, are very handsome and convenient structures, mostly of iron. East of the town is a battery, nearly facing Tilbury Fort on the Essex side. Gravesend is the boundary of the port of London. In the vicinity are extensive market gardens. The borough is governed by a mayor, 6 aldermen, and 18 councillors. It includes the two parishes of Gravesend and Milton, and extends along the river for a mile and a-half, and two miles inland in the southern part. Pop. (1851) 16,633.

GRAVINA, Giovanni Vincenzo, one of the most distinguished men of letters the kingdom of Naples has produced, was born at Rogiano, a small town near Cosenza, in Calabria-Ulteriore, Jan. 20, 1664. His parents, who, by their station and their fortune, held the first rank in the place, neglected nothing to promote his early education; but the precocity of mind, the vivacity of imagination, and the ardour to instruct himself evinced by their son, soon made them sensible that he required other cares at their hands, and needed to be restrained rather than stimulated. Gregorio Caloprese, his uncle, after having cultivated, with success, at Naples, poetry and philosophy, had retired to his native place, Scalea, a maritime city in that part of Calabria. The education of a nephew, who inspired so high hopes, appeared to him an agreeable task, and he willingly undertook it. As the relations of Gravino had destined him for the profession of the law, the time was now approaching when it would be necessary to make jurisprudence a serious study; but for that science he had conceived an aversion which appeared to be insurmountable. But his prejudices at length vanished; he applied himself vigorously to the study of the civil and canon law, and at the same time extended his knowledge of theology by an attentive perusal of the works of the Fathers. Gravina had long desired to visit Rome; but his uncle, Caloprese, who still superintended his education, opposed his wish until he should have completed his course of study. When this was accomplished, he repaired to the ancient capital of the world in 1689. In 1691, he published, under the suppostitious name of Priscus Censorinus, a dialogue, entitled *De corrupta Morali Doctrina*, Naples, 4to, the object of which was to prove that the corrupters of morals do more injury to the church than the boldest heresiarchs. Gravina was then only twenty-six years of age. But the eloquence of the style and the solidity of the reasoning ensured the success of the book, which, at the same time, excited lively dissatisfaction amongst the numerous partisans of convenient doctrines and loose practice. Father Concina has inserted this dialogue almost entire in his treatise *De Incredulis*. Nor did poetry escape the contamination which had so deeply infected morals. A single writer, Alessandro Guidi, a friend of Gravina, struggled at Rome against the prevailing debasement of taste, and, at the request of Christina, queen of Sweden, had, under the Arcadian name of Erillo Cleoneo, written a comedy, entitled *Endimione*. As this piece became the object of the most virulent attacks, Gravina, under the name of Bione Crateo, undertook the defence of his friend, which he read in a literary assembly, and which was afterwards printed under the title of *Discorso sopra Endimione*, Rome, 1692. This little work, in which he laid down excellent principles, drew upon the author new adversaries, who considered it equally strange and unpardonable that Gravina should attempt to constitute himself at once the censor of morals and the reformer of taste. A jealousy, almost amounting to fury, was excited against the young Neapolitan; whilst his disposition to censure the works of others, and the confidence which he appeared to repose in his own opinions, were but little calculated to calm the spirits of his enemies. Gravina sometimes commended, but he more frequently censured, and his decisions were often expressed in contemptuous terms. This tendency made him a host of enemies. His least actions were watched in order to calumniate him, and he was assailed with the most malignant invectives. Then appeared in succession, under the name of Quintio Settano, the Arcadian *alias* of Ludovico Sergardi, sixteen satires against Philodemus, the name under which Gravina was therein designated. These satires, which were equally spirited and bitter, obtained great success, and were circulated in profusion. Gravina at first affected indifference. It is a fault of the age, said he, to take pleasure in outraging merit. But as this tranquillity did not reduce his enemies to silence, he could no longer restrain his resentment, and composed some declamations of the nature of *verrine*, and also some iambics; but he has not published these retaliatory effusions, probably because he thought them inferior to the satires of Settano. The malignity of the enemies of Gravina did not lessen the esteem which he had inspired, nor abate his zeal for useful and wholesome pursuits. He united with several other literary men who had associated together for the purpose of cultivating poetry in silence. There were only fifteen of them, but their number soon increased, and Gravina assembled them for the first time in November 1695, at a house which he had provided for the purpose on Mount Janiculum. They framed for the association a democratic constitution, and took the name of *Arcadi*, or Arcadians. On the 20th of May 1696, the *Arcadi* held a general assembly on the Palatine Hill. Gravina, after an eloquent discourse, presented the marble tablets containing the laws, which he had written for the association, with the expressions consecrated in the Roman jurisprudence. During this period Gravina had composed several dissertations, which he collected under the title of *Opuscula*, Rome, 1696, and in which are included—1. Specimen prisci Juris; 2. De Lingua Latina dialogus; 3. Epistola ad Gabrielem Reignerium à Gallum; 4. De contemptu Mortis; 5. Épistola ad Trojanum Mirabellam; and, 6. Delle Favole Antiche, which has been translated into French by Joseph Regnauld. After the death of Alexander VIII., Antonio Pignatelli, having obtained the pontifical throne, under the name of Innocent XII., wished to raise Gravina to the highest ecclesiastical honours; but the latter refused to embrace the clerical profession, as all his ambition was confined to teaching the laws, and his taste led him towards secular erudition. Nor was his ambition disappointed. In 1699 he obtained the chair of civil law, and in his opening discourse traced the history of that science; whilst, in order to make his system of instruction better known, he composed the treatise *De Instauratione Studiorum*, which he dedicated to the new pontiff. The discourse *De Sapientia*, which he delivered in 1700, also relates to the same subject. In that one which is entitled *Pro Legibus ad magnum Moschorum regem*, after speaking of the pre-eminence and dignity of the Roman laws, he considers them in reference to the influence which they were likely to have in the civilization of the states of the czar, Peter the Great. The subjects of the other dissertations of Gravina we need not indicate, as they have been collected in his works. We shall merely refer to that one on the *internal rule*, because it makes known the religious sentiments with which the mind of this great civilian was deeply imbued. In 1703, Gravina passed from the chair of civil to that of canon law. From the commencement of his career as a public instructor he had abolished the usage of scholastic argumentation; and each succeeding year brought some useful change. He thought that the only means of establishing sound doctrine was to ascend to the sources or fountain-head of the laws; and this accordingly is the object of his treatise *De repetendis Doctrinarum Fontibus*. But these little treatises, which he composed with extreme facility, did not prevent him from continuing his great work, *De Ortu et Progressu Juris Civilis*, the first book of which appeared at Naples in 1701, and the whole was completed in three books, and printed in 1713. During the period which elapsed from 1711 to 1714, Gravina completed and published several works, particularly his Discourses, his book *De Romano Imperio*, Naples, 1712, in 12mo; his tragedies, *Palamede*, *Andromede*, *Appius Claudius*, *Papinianus*, and *Servius Tullius*, Naples, 1712, in 12mo; and his treatises, *Della Ragione Poetica*, Rome, 1708; and *Della Tragedia*, Naples, 1714, in 4to. Gregorio Caloprese died at Scalea in the summer of 1714. As soon as Gravina heard of his illness, he hastened to pay his last duties to a relation to whom he lay under so many obligations. He passed nearly two years in Calabria, and it was not until 1716 that he returned to Rome, where he died on the 6th of January 1718, leaving to his mother, Anna Lombarda, the property which he possessed in Calabria, and to Metastasio all that he had acquired at Rome, excepting some legacies to his other pupils, Giuliano Pier-Santi, Lorenzo Gori, and Horazio Bianchi, all men of reputation in letters. The works of Gravina have been collected in three volumes, under the title of *Opere del Gravina*, Leipzig, 1737, in 4to, and Naples, 1756, with notes by Mascovius the editor. (J. B—E.)

GRAVINA, an episcopal city of southern Italy, kingdom of Naples, and province of Bari, on the left bank of the Gravina, 37 miles S.W. of Bari. It is surrounded by walls flanked with towers, and has a cathedral and eight other churches, a college, and several convents. Its ancient castle was, during the middle ages, one of the strongholds of the Orsini, to which family the town and neighbourhood still belong. The cattle fair held here on the 20th April is one of the most famous in the kingdom. The vicinity is celebrated for its pasturage and for its breed of horses. Pop. 11,000.

GRAVITATION, and Gravity, terms used synonymously to denote the mutual tendency which all bodies have to approach each other. See Physics.

GRAVITY, Specific, the weight of any body as determined by its relation to the weight of another body which is assumed conventionally as a standard of measurement. The standard generally adopted is that of water at a certain temperature. This subject is explained in detail under Hydrodynamics, chap. ii.

GRAY, a town of France, capital of a cognominal arrondissement, in the department of the Haute Saône, on the declivity of a hill, on the left bank of the Saône, 29 miles S.W. of Vesoul. From its situation on the Saône, it enjoys great facilities for trade, and is an entrepôt for goods passing between the south and east of France. The town is built in the form of an amphitheatre, and at a distance presents an attractive appearance, which, however, disappears on nearer inspection,—the streets being narrow, crooked, and steep. It is commanded by the ruins of an ancient castle, formerly inhabited by the Dukes of Bourgogne. It has a fine quay, a handsome bridge across the river, cavalry barracks, town-hall, exchange, theatre, several hospitals, communal college, and public library. Pop. (1851) 6703.

GRAY, THOMAS, the author of the celebrated *Elegy written in a Country Churchyard*, was born in Cornhill, London, December 26, 1716. His father, Philip Gray, an exchange broker and scrivener, was a wealthy and nominally respectable citizen, but he treated his family with brutal severity and neglect, and the poet was altogether indebted for the advantages of a learned education to the affectionate care and industry of his mother, whose maiden name was Antrobus, and who, in conjunction with a maiden sister, kept a millinery shop. A brother of Mrs Gray was assistant to the Master of Eton, and was also a fellow of Pembroke College, Cambridge. Under his protection the poet was educated at Eton, and from thence went to Peterhouse, attending college from 1734 to September 1738. At Eton he had as contemporaries Richard West, son of the Lord Chancellor of Ireland, and Horace Walpole, son of the triumphant Whig minister, Sir Robert Walpole. West died early in his 26th year, but his genius and virtues and his sorrows will for ever live in the correspondence of his friend. In the spring of 1739, Gray was invited by Horace Walpole to accompany him as travelling companion in a tour through France and Italy. They made the usual route, and Gray wrote remarks on all he saw in Florence, Rome, Naples, &c. His observations on arts and antiquities, and his sketches of foreign manners, evince his admirable taste, learning, and discrimination. Since Milton, no such accomplished English traveller had visited those classic shores. In their journey through Dauphiny, Gray's attention was strongly arrested by the wild and picturesque site of the Grande Chartreuse, surrounded by its dense forest of beech and fir, its enormous precipices, cliffs, and cascades. He visited it a second time on his return, and in the album of the mountain convent he wrote his famous Alcaic Ode. At Reggio the travellers quarrelled and parted. Walpole took the whole blame on himself. He was fond of pleasure and amusements, "intoxicated by vanity, indulgence, and the insolence of his situation as a prime minister's son"—his own confession—while Gray was studious, of a serious disposition, and independent spirit. The immediate cause of the rupture is said to have been Walpole's clandestinely opening, reading, and resealing, a letter addressed to Gray, in which he expected to find a confirmation of his suspicions that Gray had been writing unfavourably of him to some friends in England. A partial reconciliation was effected about three years afterwards by the intervention of a lady, and Walpole redeemed his youthful error by a life-long sincere admiration and respect for his friend. From Reggio Gray proceeded to Venice, and thence travelled homewards, attended by a *laquais de voyage*. He arrived in England in September 1741, having been absent about two years and a-half. His father died in November, and it was found that the poet's fortune would not enable him to prosecute the study of the law. He therefore retired to Cambridge, and fixed his residence at the university. There he continued for the remainder of his life, with the exception of about two years spent in London, when the treasures of the British Museum were thrown open. At Cambridge he had the range of noble libraries. His happiness consisted in study, and he perused with critical attention the Greek and Roman poets, philosophers, historians, and orators. Plato and the Anthologia he read and annotated with great care, as if for publication. He compiled tables of Greek chronology, added notes to Linnæus and other naturalists, wrote geographical disquisitions on Strabo; and, besides being familiar with French and Italian literature; was a zealous archæological student, and profoundly versed in architecture, botany, painting, and music. In all departments of human learning, excepting mathematics, he was a master. But it follows that one so studious, so critical, and so fastidious, could not be a voluminous writer. A few poems include all the original compositions of Gray—the quintessence, as it were, of thirty years of ceaseless study and contemplation, irradiated by bright and fitful gleams of inspiration. In 1742 Gray composed his *Ode to Spring*, his *Ode on a Distant Prospect of Eton College*, and his *Ode to Adversity*,—productions which most readers of poetry can repeat from memory. He commenced a didactic poem, *On the Alliance of Education and Government*, but wrote only about a hundred lines. Every reader must regret that this philosophical poem is but a fragment. It is in the style and measure of Dryden, of whom Gray was an ardent admirer and close student. His *Elegy written in a Country Churchyard* was completed and published in 1751. In the form of a sixpenny *brochure* it circulated rapidly, four editions being exhausted the first year. This popularity surprised the poet. He said sarcastically that it was owing entirely to the subject, and that the public would have received it as well if it had been written in prose. The solemn and affecting nature of the poem, applicable to all ranks and classes, no doubt aided its sale; it required high poetic sensibility and a cultivated taste to appreciate the rapid transitions, the figurative language, and lyrical magnificence of the odes; but the elegy went home to all hearts; while its musical harmony, originality, and pathetic train of sentiment and feeling, render it one of the most perfect of English poems. No vicissitudes of taste or fashion have affected its popularity. When the original manuscript of the poem was lately (1854) offered for sale, it brought the almost incredible sum of L.131. The two great odes of Gray, the *Progress of Poetry* and *The Bard*, were published in 1757, and were but coldly received. His name, however, stood high, and, on the death of Cibber the same year, he was offered the laureateship, which he wisely declined. He was ambitious, however, of obtaining the more congenial and dignified appointment of Professor of Modern History in the University of Cambridge, which fell vacant in 1762, and, by the advice of his friends, he made application to Lord Bute, but was unsuccessful. Lord Bute had designed it for the tutor of his son-in-law, Sir James Lowther. No one had heard of the tutor, but the Bute influence was all-prevailing. In 1765 Gray took a journey into Scotland, penetrating as far north as Dunkeld and the Pass of Killiecrankie; and his account of his tour, in letters to his friends, is replete with interest and with touches of his peculiar humour and graphic description. One other poem proceeded from his pen. In 1768 the Professorship of Modern History was again vacant, and the Duke of Grafton bestowed it upon Gray. A sum of L.400 per annum was thus added to his income; but his health was precarious—he had lost it, he said, just when he began to be easy in his circumstances. The nomination of the Duke of Grafton to the office of Chancellor of the University enabled Gray to acknowledge the favour conferred on himself. He thought it better that gratitude should sing than expectation, and he honoured his grace's installation with an ode. Such occasional productions are seldom happy; but Gray preserved his poetic dignity and select beauty of expression. He made the founders of Cambridge, as Mr Hallam has remarked, "pass before our eyes like shadows over a magic glass." When the ceremony of the installation was over, the poet-professor went on a tour to the lakes of Cumberland and Westmoreland, and few of the beauties of the lake-country, since so famous, escaped his observation. This was to be his last excursion. While at dinner one day in the college-hall he was seized with an attack of gout in his stomach, which resisted all the powers of medicine, and proved fatal in less than a week. He died on the 30th of July 1771, and was buried, according to his own desire, beside the remains of his mother at Stoke Pogeis, near Slough in Buckinghamshire, in a beautiful sequestered village churchyard that is supposed to have furnished the scene of his elegy.[1] The literary habits and personal peculiarities of Gray are familiar to us from the numerous representations and allusions of his friends. It is easy to fancy the recluse-poet sitting in his college-chambers in the old quadrangle of Pembroke Hall. His windows are ornamented with mignonette and choice flowers in China vases, but outside may be discerned some ironwork intended to be serviceable as a fire-escape, for he has a horror of fire. His furniture is neat and select; his books, rather for use than show, are disposed around him. He has a harpischord in the room. In a corner of one of the apartments is a trunk containing his deceased mother's dresses, carefully folded up and preserved. His fastidiousness, bordering upon effeminacy, is visible in his gait and manner,—in his handsome features and small well-dressed person, especially when he walks abroad and sinks the author and hard student in "the gentleman who sometimes writes for his amusement." He writes always with a crow-quill, speaks slowly and sententiously, and shuns the crew of dissonant college revellers who call him "a prig," and seek to annoy him. Long mornings of study, and nights feverish from ill-health, are spent in those chambers; he is often listless and in low spirits; yet his natural temper is not desponding, and he delights in employment. He has always something to learn or to communicate—some sally of humour or quiet stroke of satire for his friends and correspondents—some note on natural history to enter in his journal—some passage of Plato to unfold and illustrate—some golden thought of classic inspiration to inlay on his page—some bold image to tone down—some verse to retouch and harmonize. His life is on the whole innocent and happy, and a feeling of thankfulness to the Great Giver is breathed over all.

Various editions of the collected works of Gray have been published. The first, including memoirs of his life and his correspondence, edited by his friend, the Rev. W. Mason, appeared in 1775. It has been often reprinted, and forms the groundwork of the editions by Mathias (1814) and Mitford (1816). Mr Mitford, in 1843, published Gray's correspondence with the Rev. Norton Nicholls; and in 1854 another collection of Gray's letters was published, edited also by Mr Mitford. Every scrap of the poet's MSS. is eagerly sought after, and every year seems to add to his popularity as a poet and letter-writer. (R. C—S.)

GRAYWACKE. See GREYWACKE.

GRAZALEMA (anciently *Lacidulermium*), a secular town of Spain, province and bishopric of Malaga, department of Ronda. It contains about 12,000 of a population, 5000 of whom are engaged in manufactures. This includes the suburbs of Gaidobar and Benamahoma; and it has 3 hermitages, 1 parish church, 1 convent of the barefooted Carmelites, &c. The name of this town is of Arabic origin; and there are still found in it inscriptions and other Roman antiquities. It stands on the great road from Ronda to Cadiz. The neighbouring sierra of the same name is of great extent, and occupied by sheep and immense herds of swine, in which a large traffic is carried on in the town, as well as with Seville and Cadiz. The manufactures consist chiefly of woollen and linen, flannel, leather, and soap; thread, dyeworks, carding-wool, &c. The export trade consists of the animal produce of the sierras, and articles manufactured in the town.

GREAT SALT LAKE, in the Utah territory of North America, lies on the margin of the Great Basin, between W. Long. 112. and 113., and under N. Lat. 41. See UTAH.

GREAVES (Fr. *grève*), a kind of armour for the legs, originally of leather, quilted linen, &c., and afterwards of steel. This kind of defence for the legs was used both by the Greeks and Romans, by the former of whom they were called *κνημίδες*, by the latter *ocreæ*. Greaves were made of various kinds of metal.

GREAVES, JOHN, an eminent mathematician and antiquary, was the eldest son of John Greaves, rector of Colemore, near Alresford in Hampshire, and born in 1602. He went to Baliol College, Oxford, in 1617; was chosen fellow of Merton in 1624; and, six years later, professor of geometry in Gresham College, London. After travelling in Europe, he visited the East in 1637, and collected a considerable number of Arabic, Persic, and Greek manuscripts, of which he well knew the value, as he was a thorough master of these languages. He also collected for Archbishop Laud many oriental gems and coins. He made a more accurate survey of the pyramids of Egypt than any traveller who had preceded him, and afterwards digested his observations in a work on that subject. On his return from the East, he visited a second time several parts of Italy; and during his stay at Rome instituted inquiries into the ancient weights and measures. Soon after his return he was appointed to the Savilian professorship of astronomy at Oxford, but was deprived of his Gresham professorship, the duties of which he had wholly neglected. In 1648 he lost his fellowship as well as his chair on account of his adherence to the royalist party. But his private fortune more than sufficed for all his wants till his death in 1652. Besides his papers in the Philosophical Transactions, the works of Greaves printed separately are, *Pyramidographia*, or *a description of the Pyramids in Egypt*, London, 1646, in 8vo; *A Discourse of the Roman Foot and Denarius*, ibid. 1649, in 4to; *Elementa Linguæ Persicæ*, ibid. 1649, in 4to; *Epochæ celebriores Astronomis, Historicis, Chronologis Chataiorum, Syro-Græcorum, Arabum, Persarum, &c. usitatæ, ex traditione Ulug Beig*, Arab. et Lat. London, 1650, in 4to; *Chorasmiæ et Mawarnalnabræ, hoc est, Regionum extra fluvium Oxum, descriptio*, ibid. 1650; *Astronomicæ quædam, ex traditione Shah Cholgii Persæ, una cum hypothesibus Planetarum*, ibid. 1652, in 4to. In 1737 Dr Birch published the Miscellaneous Works of Greaves, in two vols. 8vo, containing some of those above mentioned, with additions, and a biographical notice of the author.

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[1] A claim has been put up for the churchyard of Granchester, about two miles from Cambridge, the great bell of St Mary's serving for the "curfew." But Stoke Pogeis is more likely to have been the spot, if any individual locality were indicated. The poet often visited the village, his aunt and mother residing there, and his aunt was interred in the churchyard of the place. Gray's epitaph on his mother is characterized not only by the tenderness with which he always regarded her memory, but by his style and cast of thought. It runs thus:—"Beside her friend and sister here sleep the remains of Dorothy Gray, widow, the careful tender mother of many children, one of whom alone had the misfortune to survive her. She died March 11, 1753, aged 72." She had lived to read the *Elegy*, which was perhaps an ample recompense for her maternal cares and affection. Mrs Gray's will commences in a similar touching strain:—"In the name of God, amen. This is the last will and desire of Dorothy Gray to her son Thomas Gray." [Cunningham's edit. of *Johnson's Lives*.] They were all in all to each other. The father's cruelty and neglect, their straitened circumstances, the sacrifices made by the mother to maintain her son at the university, her pride in the talents and conduct of that son, and the increasing gratitude and affection of the latter, nursed in his scholastic and cloistered solitude—these form an affecting but noble record in the history of genius.

GREECE.

Introductory observations.

GREECE and its inhabitants, after a long period of oblivion, have latterly become objects of general interest to the more enlightened nations of Europe. It was singular, indeed, that whilst classical scholars were immersed in the study of its poets, orators, and historians, the country that gave birth to so many literary treasures, though neither distant nor inaccessible, seemed to have been completely forgotten. The learned contented themselves with supposing that the modern country was inhabited by rude and unknown tribes, governed by fanatical Turks, whose barbarous rule exposed travellers to continual insults and pillage, and had swept away all traces and memorials of the ancient glory of Greece. Besides, the country was not known to be distinguished by its natural beauties; and being confounded with the torpid mass of the Ottoman empire, its political importance was reduced to nothing. Till the commencement of the present century the only intelligible accounts we had of the country were drawn from Strabo and Pausanias. The inquiries of Spon and Wheler, Le Roy, and Stuart, which brought some of its precious antiquities to light, were chiefly addressed to artists and scholars. Chandler's *Travels* were not much better adapted for general use. But the work which, more than any other, contributed to render all subjects connected with Greece and its antiquities popular, was the *Travels of Anacharsis*. Previous to the appearance of this work, however, various circumstances had contributed to bring the Greeks more conspicuously forward on the theatre of European affairs. While the general diffusion of education was increasing the number of those who felt an interest in classical subjects, the rise of the power of Russia, the connection she endeavoured to form with the Greeks, and her projects against Turkey, held out a probability that Greece might speedily regain some share of political importance. The Greeks themselves, by the desperate efforts they made in 1770, and again in 1790, gave a proof to the world, that their existence as a people, and their national feelings, had survived those destructive revolutions which were supposed to have overwhelmed them. When the political enthusiasm created by the French Revolution made the most gigantic plans of political change appear easy, the emancipation of this long neglected country from the Turkish yoke was looked to as one of the most certain and gratifying triumphs of the new principles. Before the interest arising from this state of things had expired, circumstances of a different kind directed public attention more immediately to Greece. The host of English travellers who had been accustomed to roam over the Continent, shut out from their usual routes by the arms of France, were forced into less frequented tracts, and numbers of them visited Greece. By these, and by a few individuals from other parts of Europe, a great part of the country was explored, and a great mass of information given to the public. Its topography and statistics are now better known than those of many of the nearer and more accessible parts of Europe; the classical interest of the country has been augmented by vivid descriptions of its monuments and its scenery; and the stirring events of the revolution completed in 1832 have greatly strengthened its claims to the attention and the sympathies of western Europe. It is now found that the modern Greeks, instead of being the mixed progeny of obscure and barbarous tribes, possess a respectable degree of civilization, and great capacities of improvement; that they have preserved the features and national character of their ancestors with surprising distinctness; and that their dialect does not deviate much farther from the language of Plato and Demosthenes, than that of Chaucer does from the English of the present day. Independently, too, of its other attractions, Greece surpasses Italy, and perhaps every other country in the world, in the beauty of its scenery. Its antiquities are not, like those of the latter country, accumulated chiefly upon a single spot. They are scattered over a wide surface, associated with a variety of scenery, and present memorials of many separate communities, distinguished by differences of character, habits, and civilization. Its monuments, compared with those of Rome, breathe a purer taste, a finer moral spirit, and bespeak a sublimer genius; they tell of brighter and better times, of characters and actions more surprising, generous, and romantic. Some of them transport the mind back to those remote times where truth and fable are blended,—to those delightful fictions which bear the impress of the genius of the people more distinctly than the real events of their history. No country, in short, presents greater attractions to a well-informed traveller.

Name.

In this article we shall first describe Greece in its full extent, according to the boundaries recognised in ancient times by the Greeks and Romans. We shall then give a brief sketch of the history of the late revolution; and conclude by a statistical view of the new state, which forms only a portion of ancient Greece.

The original name of the Grecian Peninsula was Hellas—a term at first confined to a small town and district in the south of Thessaly, whose inhabitants, the Hellenes, gradually overran the whole of Greece. As they extended their conquests, they gave the name of their mother country to all the places that fell under their dominion. Even their distant colonies in Italy, Sicily, and Africa, were looked upon by them as integral parts of Hellas equally with the capital cities of Greece Proper or the Peloponnesus. In a more restricted sense the term was applied to the country stretching southwards from the River Peneus and the Ambracian Gulf to the Isthmus of Corinth. The part of Epirus, however, that fell geographically within this distribution, was not regarded as forming part of Hellas, though Herodotus and others maintained that it did. The Peloponnesus, though inhabited by Hellenes, was not, strictly speaking, comprised within Greece Proper. At a later period, however, not only the Peloponnesus, but Macedonia and part of Illyria, were included in the general term. It is not known why the Romans called the country by the name of Græcia instead of adopting the term in common use among the Greeks themselves. The name *Græcia* is first used by Aristotle. After the country passed by conquest under the Roman yoke, the conquerors reduced it to a province and called it by the name of Achaia. As the various states of Greece are all discussed under their respective heads (See ATTICA, BŒOTIA, &c., &c.), we shall in the present article take the appellation in its most extensive sense, and so follow what may be considered the natural limits of the country; because the territories included within these limits are associated by certain political relations; and because many of the most interesting subjects of inquiry and discussion relating to the ancient, and still more to the modern state of Greece, connect themselves most naturally with this arrangement.

Extent.

The continent of Greece, including Albania and Mace-

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[1] Cellarii *Geog. Antiq.*, lib. ii., cap. 13; Strabo, lib. viii.; Potter's *Antiq.* b. i., chap. 16.

donia, is nearly shut in on the north by a chain of mountains known anciently by the names of Rhodope, Scomius, and Orbelus;[1] it is bounded on the west by the Adriatic and Ionian Seas, on the south by the Mediterranean, and on the east by the Ægean Sea, or Archipelago. It extends from 36. 10. to 42. 40. of north latitude; and from 19. 45. to 24. 40. of east longitude from London. Its length, from Cape Matapan to Mount Orbelus, or Argentaro, is 450 English miles; its greatest breadth, from Durazzo to Cavale, at the foot of Mount Pangœus (a branch of Rhodope), 235 miles; and it embraces an area of 57,750 square miles, exclusive of all its islands except Eubœa. But, as our ideas of the extent of the country have always a reference to those ancient states which comprised but very minute portions of its surface, it is necessary that its dimensions should be described more in detail.

Ancient limits and divisions.

The country recognised as Greece before the rise of the Macedonian power, comprehended the Morea or Peloponnesus, Attica, Eubœa, Bœotia, Phocis, Doris, Ætolia, Acarnania, Thessály, and Magnesia; and even several of the states included within these limits had little or no share in those splendid actions which have shed so much glory over the country. The surface of Peloponnesus, which included seven different states, is about 9000 English square miles; that of the countries just named, without the peninsula, including Eubœa, is 14,800; and both together amount to 23,800 square miles—an extent of surface not exceeding two-fifths of England, or one-fifth of the British isles. If to this we add 16,000 square miles for Albania or Epirus (including the basin of the Drino), 18,000 for Macedonia, and 1000 for the Cyclades, the whole surface of Greece and its islands will be 58,800 square miles, which is almost exactly the area of England. While Greece preserved its independence, however, all these territories were never united into one body politic, nor was their confederated force ever applied to the prosecution of any common enterprise. The communities whose warlike achievements and brilliant career in arts and philosophy raised the Grecian name so high, occupied but very minute portions of the country; as the following table, deduced from measurements, will show:—

	Eng. Sq. Miles.
Attica, including Megaris and Salamis, but not Eubœa	1190
Bœotia	1530
Laconia (without Messenia)	1720
Achaia (the twelve cities with their territories)	1140

These states, therefore, were in general about equal in extent to middle-sized English counties. None of them was so large as Norfolk or Devonshire; and the two adjoining counties of York and Lancaster were nearly equal to the whole seven states of the ancient Peloponnesus. Attica, indeed, besides possessing at one period Eubœa, had many colonies in the Cyclades, Thrace, and other parts; and Sparta held Messenia long in subjection; but, in great struggles, these colonies and dependencies often shook off their allegiance, and the parent state was obliged to rely on its own resources. Such was the energy of these small communities, that Attica, which scarcely supports, at present, a population of 50,000 souls, sent out sometimes colonies of 10,000 men at once (Diod. Sic. lib. ii.); and Sparta furnished 50,000 soldiers to fight the Persians at Platæa. The territories of Corinth, when she formed a separate state, were much smaller than any of these; her wealth and power depending chiefly on commerce.

Gulfs and mountains.

Greece forms a long and rather narrow peninsula, singularly indented on three sides by arms of the sea, and having a greater proportion of its surface occupied by mountains than any other country in Europe of equal extent, except Switzerland. It has been justly observed, that those physical features which distinguish Europe from the other quarters of the world belong in a peculiar manner to Greece, and distinguish it in the same proportion from the other parts of Europe. Of these arms of the sea, the most considerable are the Gulfs of Contessa, Salonica, Volo, Ægina, and Nauplia, on the east; those of Kolokythia and Coron on the south; and those of Lepanto and Arta on the west. Of the mountains, the first in order are those which pass along the northern frontier. Mount Argentaro, the ancient Orbelus, placed at the northern extremity of Greece, near the forty-third degree of latitude, may be considered as the centre of the whole system of mountains in European Turkey. From this nucleus an elevated chain, bearing the names of Scomius and Rhodope anciently, passes south-eastward, and sends off branches on both sides, one of which, Pangeus, advances southward to the Ægean Sea, nearly opposite to the Isle of Thasus, and shuts in Greece on the east. From the same central nucleus another great chain passes south and south-eastward, under the ancient names of Scardus, Pindus, Cithæron, and Parnes, and terminates at Cape Colonna, the southmost point of Attica. This chain, which includes the celebrated mountains of Parnassus and Helicon, divides the northern continent of Greece into two parts of nearly equal breadth, and gives birth to all the most considerable rivers, which flow off on its opposite sides, but in no instance cross it. On the east side, besides many small lateral ridges, it sends off two principal branches, which enclose Thessaly on the north and south; these are the Cambunian Mountains, which, connecting the central ridge of Pindus with the lofty group of Olympus, separate Macedonia from Thessaly; and Mount Œta, which, running eastward to the Maliac Gulf, forms, at its termination, the famed pass of Thermopylæ. Mount Othrys, a little farther north, may be considered as a subordinate chain to Œta. Mount Olympus is separated only by a narrow ravine from Ossa and Pelion, which enclose Thessaly on the east. On the western side of the central chain, the whole country to the Ionian Sea, northward of the Gulf of Arta, is covered by a series of ridges, not running off laterally, but disposed in lines nearly parallel to the central chain, and separated by deep valleys. One of these ridges, nearest the coast, and terminating in a promontory, in latitude 40. 30., was known anciently by the name of Acroceraunus; another farther north, and more inland, was Mount Tomarus. A long and narrow ridge occupies the Island of Eubœa, and is evidently continued in the outermost chain of islands included under the name of the Cyclades. Another chain of these islands may be considered as a prolongation of the great central ridge from the promontory of Sunium or Colonna.

The mountains in the Morea or Peloponnesus, which are as numerous as in the north of Greece, present rather a singular configuration. A long ridge, bent into a circular form, encloses the central plateau or basin of Arcadia; and five spurs, or subordinate ridges, run off from the different sides of this circular chain to the five prominent points of the peninsula.

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[1] Throughout this article we use the ancient or the modern names, according as either happen to be better known than the other. In general, the ancient divisions of the country, being more minute and more accurately defined than the modern, serve better for the purposes of description. The greater number of modern travellers have felt it necessary to adopt this practice.

Elevation of mountains. The elevation of some of the Grecian mountains has been estimated, but not accurately measured. Mount Orbelus, the northern boundary of the country, has its summit covered with snow all the year,[1] and must therefore exceed 8000 feet in height; but none of the other mountains seems to reach the circle of perpetual congelation. The elevation of the great central chain of Pindus is loosely estimated by Dr Holland at 7000 feet.[2] That of Olympus, one of the loftiest summits in Greece, was computed by the ancient philosopher Xenagoras to be ten stadia and a plethrum, an elevation not materially different from that of 1017 toises, or 6500 feet, assigned to it by Bernoulli. The famed Parnassus seems to be considered by Dr Clarke and Dr Holland as rising above most of the other Grecian mountains; but as its summit is destitute of snow during a part of the year, its height cannot exceed 9500 feet, and is probably much less. This mountain is still called Parnassu by the peasants residing on it, but in the low country of Livadia it bears the name of Lakura.[3] The celebrated Athos, which is now the seat of twenty-two monasteries, rises to the height of 713 toises, or 4350 feet. (Walpole, p. 204.) Several of the Albanian mountains are estimated by Dr Holland to be from 3000 to 4000 feet high. The mean height of the mountains of the Morea is estimated at 1200 feet; on the west side they attain a height of from 3000 to 4500 feet; Mount Cyllene rises to the height of 4500 feet, and Mount Oleno to 6000; Mount Taygetus, in its range from Cape Matapan to Arcadia, varies from 3000 to 7200 feet. The plain of Tripolizza, in Arcadia, is about 2000 feet above the sea, and the insulated rock of the Acro-Corinthus about 1900. (Boblaye, *Annales des Sciences Naturelles*, Feb. 1831.)

Geology. A great part of the surface of Greece is occupied by a formation of compact limestone, of a whitish or bluish grey colour, approaching at times to the nature of chalk. It forms in some places long sharp continuous ridges, in others round or craggy summits, and it presents strata highly inclined. It contains a few organic remains, with many flint nodules, and some beds of gypsum on the western side; and occasionally masses or beds of a calcareous conglomerate. The Acropolis of Athens consists of the last-mentioned rock. The compact limestone, which forms the entire mass of Parnassus and Helicon, rests on mica slate near Athens. The hills of Attica consist generally of primitive limestone; and the same species of rock, with clay slate, serpentine, sienite, porphyry, abound in Negropont, the central parts of Pindus, Olympus, and Athos, and all round the Gulf of Salonica. Farther north, in Mounts Scomius and Rhodope, granite and gneiss are found. In general, primitive rocks are most abundant on the east side of Greece, and the secondary on the west. Tertiary deposits are found in Elis, Laconia, and Argolis; and trachytes and other igneous rocks exist in Ægina, Milo, Santorin, and on the continent at Methana in Argolis. M. Boblaye states that four, and in some cases five, successive terraces of shingle are seen at many parts on the shores of the Morea, each of which had once formed the sea beach, indicating that the land had been elevated by a corresponding number of sudden movements upwards. (Boblaye, *Annales des Sciences Naturelles*, Feb. 1831; Holland's *Travels*, p. 89, 319, &c.) It is to the peculiar constitution of the great limestone formation that Greece owes those physical features which so remarkably distinguish the country; the numerous caverns, fountains, subterraneous river courses, hot springs, and gaseous exhalations, which gave birth to so many of the popular superstitions of the ancients.

Rivers. The rivers of Greece, flowing within a narrow territory, are much inferior in size even to the larger branches of the Danube. They may be fitly compared with those of Great Britain for the length of their courses and the quantity of water they convey. The classical rivers, however, which are chiefly in the south, are generally mere brooks, such as would find a place only in a county map. The largest rivers in Greece are the Axius, now the Vardar, in Macedonia; the Drinius, now the Drino, in North Albania; the Peneus, now the Salympria, in Thessaly; the Achelous, now the Aspropotamo, in Ætolia; the Alpheus, now the Roufia, and Eurotas, now Vasilipotamo, in the Morea. These and some others have permanent streams; but the greater number are mere mountain torrents, short, but rapid in their courses, and dry in summer.

General aspect. The general aspect of Greece is characterized by a very singular distribution of its mountains. These are usually neither placed in parallel chains nor in massive groups, but are so disposed as to enclose extensive tracts of land, which assume the appearance of large basins or circular hollows. The bottom of these basins consists of an alluvial plain of the richest soil, and level as the ocean, through which sometimes rise steep insulated rocks, like the summits of vast natural columns. Nature had thus marked out the country into a number of distinct districts, admirably calculated to become the seats of small communities. The plain, with its rich alluvial soil, furnished subsistence for a dense population; the insulated rock became the Acropolis or citadel of the chief town, a place of refuge in war; and the surrounding mountains were barriers against invasion. In proportion as access from without was difficult, internal communication was rapid and easy. A crowded population, dispersed over the sides and the area of this natural amphitheatre, lived as it were in the continual presence of one another. Their country, a word of undefined import in large empires, conveyed to them as distinct an idea as that of their own homes. Its whole landscape, with its trophies, temples, monuments, and fields of renown, were constantly under their eyes. Their patriotism, concentrated within this narrow sphere,—attached to visible objects by early and habitual associations,—kept alive by frequent struggles with neighbouring communities, for independence or glory, and still more by the proud sense of individual importance, inspired by their republican institutions,—was not, as in larger empires, a vague and languid feeling, but an ardent and steady passion, of which nothing in the modern world can give us an adequate idea. The same circumstances had an influence on their political condition. Conquest, which forces nations of different habits, characters, and languages, into combination, is the great parent of slavery. In such heterogeneous masses union becomes impossible. The despot, glittering in barbaric pomp, and surrounded by foreign guards, appears in his subject provinces like a being of another order, not to collect the sentiments or redress the wrongs of the people, but to silence all complaints, and enforce obedience to his own lordly will. Though hated by all his subjects, he can still employ the wealth and the physical force of one nation to trample on the rights of another, and is thus able to hold the whole in slavery. But the small Greek communities, protected by the barriers of their gulfs and mountains, escaped this evil destiny. The people, united by identity of manners and language, by common interests and continual communication, could combine with the utmost facility to resist the first encroachments of their rulers. They were able to apply freely the lights of reason to all their common concerns, to model their government according to their circumstances and their views of common interest, and to make the end for which it existed the measure of the powers bestowed upon it. The forms of government they adopted, though not contrived by absolute wisdom, were probably in principle better adapted to their situation than any other that could have been suggested. And never did the powers of the human mind display themselves with such energy and grandeur under any other system in the history of the human race.

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[1] *Travels in the Morea, Albania, and other parts of the Ottoman Empire.* By F. C. Pouqueville, M. D. (translation), London, 1813, p. 443.

[2] *Travels in the Ionian Isles, Albania, Thessaly, Macedonia*, &c. during 1812 and 1813. By Henry Holland, M. D. 1815, p. 207.

[3] *Memoirs relating to European and Asiatic Turkey*, edited by the Reverend Robert Walpole, A. M. 1817, p. 72; Clarke's *Travels*, 4th edition, 8vo, 1818, vol. vii. p. 260; Holland's *Travels*, p. 394. Article CLIMATE in this work.

Of the plains we have mentioned, some terminate in the ocean, and seem to owe their existence to the retiring of the waters. Such are those of Macedonia, Athens, Argos, Laconia, Messenia, and Ambracia. Others are completely surrounded by a rampart of mountains or high grounds, except at a single point where the waters have found or forced a passage. Of this description are the three remarkable valleys of Thessaly, Bœotia, and Arcadia. Each of these forcibly suggests the idea of a vast inland lake, where the waters, accumulating for a long period, had at length burst through the barrier that confined them, and left the bottom dry. There is also an analogy between these valleys and some of the inland seas of Greece, such as the Gulfs of Corinth, Arta, Volo, and the channel of Negropont, which are marine lakes completely land-locked, and communicating with the Mediterranean by a single passage, which may at one period have been closed. It may even be conceived that the Archipelago itself, at one period, was completely shut in by a barrier of high lands, of which Cerigo, Creto, Scarpanto, and Rhodes, are portions or fragments; and that its numerous isles are either the summits of mountains which then diversified its surface, or of detached rocks like those of Meteora in Thessaly, which have resisted the incessant action of the waters.

Topography.

The valley of Macedonia, which extends in a semicircle round the head of the Gulf of Salonica, is the largest and most fertile district in Greece. Its produce has been supposed to be nearly equal to that of all the rest of the country. The rivers in the lower parts, which overflow annually, render the country marshy, and subject to the malaria. It contains a considerable number of ancient remains, but they have only been partially examined. A large tumulus still marks the site of the battle of Pydna, which reduced Macedonia to a Roman province. Thessaly, separated from Macedonia by Olympus and the Cambunian Mountains, is a vast circular basin, of fifty or sixty miles diameter, enclosed on all sides by mountains, and next in fertility to Macedonia. The whole of its waters flow off by the river Peneus. The celebrated Vale of Tempe, a deep ravine, formed by precipitous cliffs six or eight hundred feet high, and separating Mount Olympus from Ossa, affords a passage for this river to the sea on the east. The vale is about five miles long, and so narrow, that the river in some parts occupies the whole breadth of its bottom; the scenery is more striking by its grandeur than its beauty. The rocks, which are of bluish-grey marble, have a shattered appearance, and, wherever the surface admits of it, are covered with trees and shrubs. Some of the ancients believed that this defile was formed by an earthquake. Were any natural convulsion to close it up, Thessaly would again be converted into a lake; and Xerxes, when he invaded Greece, threatened the Thessalians with this catastrophe if they opposed him. The rocks of Meteora, at the upper side of the Thessalian plain, are objects of a very remarkable kind. They rise from the level surface of the country near the Peneus, and cover a triangular space of two miles each way. They consist of a great collection of lofty rocks, in the various shapes of cones, pillars, rhomboids, and irregular masses, all standing detached from one another, with faces generally as perpendicular as a wall. Their height varies from one to three or four hundred feet, and the deep winding intervals between them are filled with trees and brushwood. On the summits of some of these rocks monasteries are suspended in mid air, as it were on the tops of very tall pillars. Some of the monasteries occupy the whole surface of the rock they rest on, and persons ascending to them are swung in a basket or net, and dragged up by a rope passing over a pulley. The rocks are composed of a conglomerate, consisting of fragments of granite, gneiss, and other primitive substances, disposed in horizontal strata. The narrow district on the eastern side of Mounts Ossa and Pelion is the ancient Magnesia, and is now called Zagora. At the south extremity of Thessaly lies the famed Pass of Thermopylæ, which is merely the narrow space between the flank of Mount Œta and the sea. The part of this space nearest the sea is occupied by a marsh, between which and the cliffs the breadth of firm land is still about sixty paces, as stated by Livy. The hot springs mentioned by Herodotus, the remains of the wall built by the Phoceans, and a tumulus, believed with good reason to be that of the Spartans, are all yet to be seen. The length of the pass is about five miles. The country of Phocis, which lies immediately south of the pass, is one of the most rugged in Greece, being occupied almost entirely by the branches and declivities of Mounts Œta, Parnassus, and Helicon. Bœotia is a large circular valley, enclosed by Parnassus on the west, Helicon on the south, Cithæron on the east, and a range of high lands on the north. A low ridge running north and south divides it in two. The lake Copais, which occupies the bottom of the western and larger division, and receives all its rivers, sends off its waters by subterraneous passages to the sea on the north-east. In summer this lake has the appearance of a green meadow covered with reeds. Bœotia has more than once been inundated by obstructions in these subterraneous channels. The country is very fertile, but is higher and colder than Attica. It is often covered with thick fogs, as described by the ancients; and, from the abundance of its marshes, is very subject to malaria. Attica, which adjoins to Bœotia on the east, is comparatively arid and barren, hilly rather than mountainous, but distinguished peculiarly by the dryness and elasticity of its atmosphere, and the beauty and serenity of its climate. The isthmus of Corinth, which connects Attica with the Morea, is occupied towards the north by high rocky hills, which render it strong as a military post; but in the south, where its breadth is about four miles, the surface is low, seldom exceeding a hundred and fifty feet. The remains of the ancient wall, and of the canal begun by Nero, are yet visible. The Morea consists of an elevated central plateau or valley, namely, Arcadia, and of five separate districts, formed by the exterior declivities of the mountains which surround the central plateau, and by spurs or branches which run off from these mountains. The central valley of Arcadia, so famed for its pastoral character by the ancients, is, like the inland districts of Thessaly and Bœotia, high and cold, often covered with fogs, arising from the moisture of its soil, and hence also subject to malaria. All its running waters escape by the single channel of the Alpheus; and it has sometimes suffered from partial inundations. Its scenery, in the opinion of Lord Byron, is by no means deserving of its ancient celebrity. Argolis, lying in a semicircle round the Gulf of Nauplia, embraces but a small portion of level country, which, however, is remarkably rich, but very unhealthy. The city of Argos still exists in its ancient plain, and, till ruined by the revolution, was one of the best built towns in the Morea. The ancient

Laconia, consisting of the long open valley of the Eurotas, is very thinly peopled. The ruins of Sparta, four miles south-west from the village of Mistra, are extensive, but afford no fine specimens of architecture; the spot is entirely deserted. Messenia, which lies round the head of a gulf, has a pretty large plain, of a very rich soil. Elis, on the west, and Achaia, on the north of the Morea, are in general hilly, and rather dry. In general, the west of Greece has a different physical character from the east. Ætolia, Acarnania, and Epirus (the modern Albania), present none of those circular basins so characteristic of the east and south sides of the country, except the valley surrounding the Gulf of Arta. Ætolia and Acarnania consist of long valleys open to the south, and rising into mountains in the north. Albania has the same features on a larger scale. Its mountains, which are more numerous than those of any other district of Greece, cover the country in long parallel ridges, and are separated by deep valleys, some of which open to the south, and others to the west, but none to the north. The Cyclades, and other islands in the Ægean Sea, are almost all steep and rocky.[1]

Scenery.

The mountains of Greece, which cover so large a proportion of its area, are partly wooded and partly naked, and the woods abound more on the west side than the east. The low country susceptible of tillage probably does not amount to more than two fifths of the whole surface, and of these two fifths, judging from the corn, olives, cotton, tobacco, &c. required for the population, one twelfth or fifteenth part may be actually in cultivation. It is generally bare of wood, and, from the want of enclosures, the profusion of weeds and brushwood, the thinness of the population, and the ruinous condition of the few cottages, combined with the crumbling remains of the noble structures of the ancients, has a desolate, melancholy, and deserted aspect, which harmonizes well with the fallen fortunes of the country. In the end of summer, from the excessive heat which dries up the streams, the hills and fields appear parched. In many quarters of the country, however, there are copious perennial springs, which gush out suddenly from the limestone rock. Greece combines in the highest degree every feature essential to the finest beauties of landscape, except large rivers, which are perhaps incompatible with the general character of its scenery. Travellers of taste have wanted words to describe the magnificence of the views it affords. Its mountains encircled with zones of wood, and capped with snow, though much below the Alps in absolute height, perhaps are as imposing from the suddenness of their elevation. Rich sheltered plains lie at their feet, which want nothing but an industrious population to fill the mind with images of prosperity, tranquillity, and happiness. But it is in the combination of these more common features, with so many spacious and beautiful inland bays and seas, broken by headlands, enclosed by mountains, and specked and studded with islands, in every variety of magnitude, form, and distance, that Greece surpasses every other country in Europe, and perhaps in the world. The effect of such scenery, aided by a serene sky and delicious climate, on the character of the Greeks, cannot be doubted. "Under the influence of so many sublime objects, the human mind becomes gifted as by inspiration, and is by nature filled with poetical ideas." Greece became the birth-place of taste, science, and eloquence, the chosen sanctuary of the muses, the prototype of all that is graceful, dignified, and grand, in sentiment or action. The poetry of the north, nursed amidst bleak mountains, amidst oceans covered with fogs and agitated by storms, is austere and gloomy; but the muses of Greece, awakened into life in a rich and beautiful land, amidst bright and tranquil seas, are gay, joyous, and luxuriant. You almost conceive (says Chateaubriand), as it were by intuition, why the architecture of the Parthenon has such fine proportions, why ancient sculpture is so unaffected, so simple, so tranquil, when you behold the pure sky and delicious scenery of Athens, of Corinth, and of Ionia. In this native land of the muses, nature suggests no wild deviations: she tends, on the contrary, to dispose the mind to the love of the uniform and the harmonious.[2]

Climate.

The climate of Greece seems to be distinguished from that of Spain and Italy in the corresponding latitudes, chiefly by having the characteristics of an inland region in a higher degree; that is, the extremes of summer and winter are more severe. In Attica, which has a drier atmosphere and more uniform temperature than the rest of the country, the average rain is about twenty-one or twenty-two inches, and the greatest heat, in each of the four years ending with 1807, was 104, 99, 93, 94. The greatest cold was from 28 to 32 of Fahrenheit. The mean deduced from all these extremes is 63·5. This agrees very nearly with the temperature of a spring in the isthmus of Corinth, observed by Dr Clarke to be 64, and with the temperature given in Professor Leslie's table, which is 64·4. At the southern extremity the annual temperature, according to the same authority, is 65·3, and at the northern extremity about 60. But local diversities have a greater effect than mere difference of latitude, on the distribution of the seasons. In Attica, which, being freely exposed to the sea, has in some measure an insular climate, the winter sets in about the beginning of January. About the middle of that month snow falls, but is seldom seen for more than a few days, though it lies for a month on the summits of the mountains. Gentle rains fall about the middle of February, after which spring commences; and the corn, which is a considerable height in March, is cut in May. In the beginning of March, the vines and olives bud, and the almonds are in blossom. In the great interior plains and valleys, which are girt with mountains, and cut off from the direct influence of the sea, the winters are much colder, and the summers, making allowance for the difference of height, are warmer. At Tripolizza, in Arcadia, the snow has been found eighteen inches thick in January, with the thermometer at sixteen degrees Fahrenheit; and it sometimes lies on the ground six weeks. Dr Clarke was informed, that in the winter preceding his visit, the peasants at the foot of Mount Cithæron in Bœotia were confined to their houses for several weeks by the snow. At Yanina, situated in an inland plain, 1000 or 1200 feet above the sea, the snow lies to a considerable depth in the winter, and sometimes falls as late as April. The neighbouring lake was so firmly frozen over in 1813, that it was everywhere crossed on the ice. The summits of the central chain of Pindus, and most of the Albanian mountains, are covered with snow from the beginning of November to the end of March. These various facts show that the winter in Albania, though shorter than in England, is as severe; but that the summer is a vast deal hotter, the extreme summer temperature being fifteen or eighteen degrees higher at Athens than London; while Bœotia and Thessaly are probably still hotter than Attica. Though we have no accurate data to establish a comparison between the climate of Greece and those of Spain and Italy, yet the fact of cotton being successfully cultivated, on a large scale, in Macedonia, as far north as the latitude of Rome and Valadolid, where it does not succeed in the two last countries, is a proof that the summer temperature in Greece is higher than either in Spain or Italy. The coldest weather in all parts of Greece is accompanied with a N.E. wind. The N. and N.W. winds are distinguished by their serenity and dryness. The zephyr or W. wind is famed for its balmy softness; the S.E., S., and S.W. winds are all humid, and the E. wind still retains the character of a morning breeze, as described by Aristotle. The sirocco is felt in Greece. It blows from the S.E., and produces its usual effects on the human constitution; a sense of oppression, a dull headach, with lassitude and uneasiness in the limbs. Earthquakes are very frequent in Greece, but they are seldom very destructive.[1]

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[1] Beaujour, let. 1–4; Holland, p. 280, 291, 234, 376, 420; Clarke, vi. 562, vii. 303; Hobhouse, let. 14, 15, 16; Walpole, 60, 303, 306, 335, 522; Byron's notes to canto 2d of *Childe Harold;* Tournefort, let. 4–8.

[2] Holland, 248, 302, 401, 254, 418; Hobhouse, 83, 461, 201; Clarke, vii. 260; Beaujour, let. 4; Chateaubriand's *Travels* (translation), vol. i. p. 85, 187; Williams' *Travels*, let. 54, 55, 68, 72, 74.

Metals.

As yet little is known of the mineral resources of Greece; but, from its geological structure, we may conclude that it is, like Italy, rather poor in metals. The silver mines of Laurium, in Attica, which were extensive enough to employ 10,000 slaves, and supported the Athenian navy at one period, are now entirely abandoned. Copper also was anciently found in Attica. Ores of iron, gold, silver, lead, or alum, were wrought in Eubœa and Melos, Naxos, Siphnos, and others of the Cyclades. The gold and silver mines of Macedonia yielded Philip 1000 talents a year.

The mines and quarries of Greece might be a source of considerable wealth. The marbles of Pentelicus and Paros are still the finest in the world. The first—close, fine, glittering; the second—of a limpid transparence, with broad veins and a warm colour, giving to statues a flesh-like appearance. Not long ago there were discovered in the Archipelago quarries of rosso-antico; and in Taygetus, beds of the admirable jasper known by the name of verd-antique; but not one of these fine quarries is worked. At Marcopoulo, in Bœotia, there is a bed of lignite or coal, equivalent to $\frac{45}{100}$ths of its weight of pure carbon, but neither is this worked. At Kumi, in the island of Eubœa, there is a much better lignite, said to be equal to $\frac{2}{3}$ds of an equal weight of Newcastle coal. This mine, after paying all expenses, clears for the state 12,000 drachms a year.

Greece has several mines of argentiferous lead, especially one on the island of Zéa, where the veins run down to the sea at the bottom of a little creek where coasting vessels can touch. The ore contains about 80 per cent. of lead; and the lead, on an average, about 0·00125 of silver. These mines are not worked; but when the winter rains detach masses of ore, the municipality claims them. The produce of the emery of Naros, which is now extracted and sold by the government, may be said to be the only revenue that Greece derives from her mineral wealth. Its amount is about 400,000 drachms. One reason for the mines and quarries not being worked is the want of roads and capital.

Diseases.

There are few or no diseases peculiar to Greece. Like all the countries on the shores of the Mediterranean, it suffers greatly from malaria. This prevails chiefly in the months of August and September, and produces remittent or intermittent fevers, which attack those who reside in low situations, near the mouths of rivers, or in the neighbourhood of lakes, marshes, or rice grounds. The ancients were aware that fevers of this description affected certain districts; but, undoubtedly, the sphere of their influence has been vastly extended by the neglected state of the country. Attica, though one of the driest districts of Greece, is not entirely exempted from them. These fevers, recurring frequently, vitiate the system, and produce goitres and scrofulous complaints. Coughs, catarrhs, and apoplexies are prevalent in some districts; and elephantiasis, and leprous affections, arising probably from deficient and unwholesome nourishment, are more common than in other countries. The plague has not made its appearance since the establishment of the kingdom, and when it had previously occurred it had been imported from either Constantinople, Smyrna, or Egypt. The cholera has appeared in later years; and in 1855 it made severe ravages in Athens.

People.

It has been said that there are no longer any Greeks in Greece—that the population is altogether Albanian; but this is not correct. Notwithstanding all they had passed through, previous to the war of independence, they preserved their lineage and language to a wonderful extent. The Albanians principally inhabit Attica, Bœotia, Phocis, Argolis, with the isles of Hydra, Spezzia, Salamis, and Andros. They have also several villages in Arcadia, Achaia, and Messenia. But the wars of independence destroyed a great part of this population, and the rest is now mixed in the Greek element. In the rest of the Peloponnesus, in all the other islands, in Ætolia, Acarnania, a great part of Thessaly and Lower Macedonia, the population is exclusively Greek.

As soon as the war cry of independence was raised, many Fanariot families, who were the most educated of the Greeks, and serving the Turkish government as ambassadors in foreign missions, as learned interpreters in the Divan, and as governors in the principalities, came to assist their common country with their talents, and continued to fill the highest offices even under the government of King Otho. Such are the Morousis, the Risos, Mavrocordatos, and other distinguished families now at Athens. These speak a purified Greek, but they adopt the dress and manners of western Europe, as do also the greater part of the people in the towns.

A numerous and very different class of Greeks are the mountaineers of the northern provinces, who, finding that the diplomatic arrangements had left their part of the country in the hands of the Turks, proceeded southwards, and fixed their homes in the kingdom which had been founded by their prowess. These people who call themselves Palikars have brought with them, even into the city of Athens, many of the strange usages of their former life; and it may be said of them in common with the Mainots of the Morea, that they form the most original and characteristic portion of the Greek population. They still continue to wear the national dress—a calico shirt with a large turned-down collar, short cotton drawers, leggings fastened up to the knees, not unlike the κνημίδες of Homer's heroes, red slippers, a skirt resembling a Highland kilt, a sash, and narrow garters of coloured silk, a jacket generally of silk, and often embroidered with gold, a broad leather belt, from which are suspended an embroidered handkerchief, purse, tobacco-bag, inkstand, and arms; and to crown all, a red cap with a blue tassel. Such a dress often costs a sum equal to L.25. The dwellings of the Palikars resemble fortresses; and their servants, selected from among their old retainers, form a little garrison. They practise a ruinous hospitality, especially towards such Greeks as come from their own part of the country. Their language is mingled with Turkish words, and some of them can still speak that language.

Between the Palikars and the Fanariots, but rather resembling the latter in character and habits, are the Islanders, who are by profession mariners or traders, generally both. They wear the red cap, a short jacket, with the wide Turkish trousers instead of the kilt and leggings.

All Greeks wear the moustache but shave the beard, except in mourning, when it is allowed to grow. Whiskers are considered indicative of dandyism, and not very creditable. Few of the women are handsome; the men are almost universally so; and their great stature, slender form, oval face, long aquiline nose, large moustache, and easy gait, give them an imposing appearance. They are an exceedingly temperate people; drunkenness is a vice remarkably rare among them; their food also is spare and simple; even the richest are content with a dish of vegetables for each meal, and the poor with a handful of olives or a piece of salt fish. Very few partake of animal food more than once a week or once a fortnight, except at Easter, when every one must partake of it. All other pleasures are indulged in with similar sobriety; their passions are moderate, and insanity is almost unknown among them. They have much intelligence, aptitude, and ready wit, rather than great capacity for abstruse study and profound thought. Greek mechanics learn even a difficult trade in a few months; commercial young men rapidly acquire the command of five or six languages; students of law, medicine, and theology, likewise attain in a very short time to the knowledge necessary for their respective professions; all minds appear eager after knowledge, both as matter of pride and natural curiosity. The love of liberty and independence does not seem to have been rooted out of the national mind by centuries of subjugation; they love to command, but though they are very loyal to a good government, are apt easily to rise when their rights are infringed. As there is little love of obedience among them, so neither is there any toleration for aristocratic pretensions. They have all groaned alike under the Turkish oppression; all alike have been beaten with the same rod, all are nearly alike poor; and though in western Europe we hear of Greek counts, and even princes, such titles are not recognised in Greece itself. The counts, if of good coinage, are from the Ionian Islands, where the population received them from the Venetians; the self-styled princes are those who filled the temporary functions of hospodar or bey, under the Turkish regime. Another distinguishing characteristic of the Greeks is their ardent patriotism—a genuine legacy from their illustrious ancestors. This passion strangely blinds them as to the real importance of their country, so that one would think they deemed Greece the centre and object of all the events in Europe. But this weakness aside, it must be admitted that many of them have sacrificed all their property, which was not inconsiderable, for the liberation of their country. The public buildings of Athens have been raised by the subscriptions of individuals; most of the Greeks who live abroad bequeath their property to their national institutions.

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[1] Holland, 47, 137, 411, 426; Hobhouse, let. 24; Pouqueville, p. 29, chap. xv.; Clarke, vi. 585, vii. 102; Arist. *Meteor.* lib. 2, c. 2.

The Greek is generally supposed to hate agriculture, and, in fact, other trades and pursuits are preferred by him. Distant voyages, hazardous speculations, and, above all, commercial bargains, are more agreeable to his disposition. But his dislike to agriculture under the Turks lay not so much in his indisposition to follow it, as in the heavy taxes and repeated exactions demanded by the pachas of his district, which left him hardly one-fourth of his products for himself.

In business the Greek is quick, intelligent, and attentive; and in his transactions with the Turks he has the celebrity of possessing keenness, amounting to swindling, inasmuch as he generally charges twice the value for the goods sold to them. But if the faithful followers of the Prophet are thus imposed upon by their more acute neighbours, it not unfrequently happens that the latter fail to get payment of half their account, and perhaps lose all.

The Albanians form about a fourth of the population of the country; and retain their foreign dialect. They are strong, patient, addicted to manual labour, and as well adapted for agriculture as the Hellenes are for commerce. The Wallachs or Blakhs on Mount Pindus, and on the borders of Thessaly and Macedonia, betray by their language their descent from the Roman colonies of Dacia, and still call themselves Romuni. They are a nomad or pastoral race, sleeping in the open air among their flocks, which are protected by ferocious dogs like those of Eumeus. In Greece a Wallach and a shepherd are synonymous.

The Maltese are numerous about Athens and Piræus; and, by a curious exception, bear a high character for honesty; whereas at Constantinople and Smyrna they are for the most part robbers and assassins. At Athens they share with the robust inhabitants of Maina the severer labours of the mason, the gardener, and the porter. The Bavarians have almost disappeared; Turks are scarcely found; and there are comparatively few settlers from other parts of Europe.

The Greeks marry young. The ceremony is a purely religious act; and divorces are not so easily obtained as in Constantinople. The pride of the Greek matron is placed in the number and beauty of her children; but though great numbers are born, comparatively few come to maturity. They die off under the influence of fever, which is a great scourge in the country.

There are very few people who have a family name, but each adds to his baptismal name either the name of his father, or some bye-name invented for himself. Thus, there are thousands of Basils, Athanasiuses, Peters, Georgeses, Nicholases, or even Aristideses, and Themistocleses. This one is Peter the son of Nicholas, or Peter the Albanian, or Peter of Nauplia, or Black Peter, or Short Peter. The duties of relationship are strictly observed; and the poor man who maintains at his own expense the widow and children of a brother is not praised as though he had done anything more than his bounden duty. The right of primogeniture is not likely ever to be known in Greece. Those who have such a strong sense of equality among compatriots will never tolerate inequality among brothers. Yet it is different with their fathers. They submit to him as to an absolute master; and this respect is shown by all classes without exception. The father has absolute command in his family, and is respected and supported to the last days of his life even by his married children. Parricide is said to be almost as little known as when Solon refused to make laws against it. There seems to be, on the whole, very much that is commendable in family life among the Greeks.

Money.

The drachm, which is the unit of the currency, is about $8\frac{1}{2}$d. of our money. It is divided into 100 equal parts called lepta. There are copper coins of 10, 5, 2, and 1 lepta, the only Greek money that circulates in the country. The silver coins of 50 and 25 lepta have been melted down or exported. Those of 1 drachm are very rare. Those of 5 drachms are now only to be found in Turkey. The gold pieces of 20 drachms, called othos, also have disappeared.

Weights and measures.

A very complete scale of weights and measures was established by the government in 1836; but the people adhere for measure of length to the pique = 27 inches. Then for weight—the principal one known, even in the capital, is the oke, a Turkish weight equal to 2 lb. 12 oz., which is divided into 400 dramia = $1\frac{3}{4}$ Eng. drams. The cantaar or quintal is generally 44 okes = 121 lbs. The kilo or quilot of corn is 22 okes, or 60 lbs. The land measure is the *strema*, equal to about one-fourth of an English acre.

Cultivated land.

It appears that not half the surface is susceptible of cultivation; and at least two-thirds of the cultivated, and four-fifths of the uncultivated soil belong to the state. One great disadvantage to agriculture is the scanty supply of running water; but the peasants are very dexterous at taking advantage of the smallest rill to irrigate their tillage.

Money rent is little known; the lands being farmed on the metayer system, according to which the landlord receives a certain proportion of the net produce—usually a third. He has frequently to furnish the seed, and sometimes the oxen for tillage, the cost of which, with high interest, is deducted from the profits before any division is made. On this system, there is little inducement for the proprietor to expend capital on improvements; still less is there for the metayer, who has no interest in the land beyond the season. Consequently, inclosure and drainage are scarcely thought of; and the stones having never been removed, lie so thick together that in some places it is scarcely credible that they can have accumulated naturally. The dwellings of the peasants are extremely poor, consisting of stones and fragments of tile and pottery held together by mud. Glass casements are rare even in provincial towns; and in the country cottages the light is most frequently admitted only by the door-way.

Productions. The arable soil of Greece is devoted chiefly to the cultivation of corn, vines, mulberry trees, and fruit trees. Wheat, rye, barley, and maize, succeed pretty well in the stony districts where the mould is but a few inches deep. Oats render but a middling crop, and the potato is quite unsuitable. But the leguminæ grow well, and rice might be raised in the wet soils. In many parts of the country cakes of maize flour form the staple article of food. (See page 32.)

At the head of all the agricultural productions for exportation are the Corinth grapes, which we corruptly call currants, and which are cultivated from the isthmus to Arcadia, along almost all the northern and western shores of the Morea. This fruit is of a violet colour, and hangs in long loose bunches. They are gathered at the same time as other grapes, dried in the sun and packed. Very few of them are used in Greece, few anywhere except in England. The consequence of this is, that the effect of raising a large crop is merely to lower the price in the London market; whereas if France, America, and Russia used plum-puddings to the same extent as the English, Greece would have had in this one article an inexhaustible source of revenue. All kinds of grapes succeed well, and the best vintage is that of the island of Santorin, where above sixty varieties are reckoned. The Russians are very fond of Santorin wine, and import L.20,000 worth yearly. The art of expressing and fermenting the juice of the grape is quite in its infancy; and unfortunately the Greeks have no wine-cellars, and very few casks. The wine is kept in skins, and rosin is put into it to keep it from spoiling. It is at first exceedingly disagreeable to the taste; but the natives prefer it to the choicest beverages of France and Spain; and even foreigners become reconciled to it with use.

Next to the vineyards as a source of revenue are the mulberry plantations. There is a demand for silk in every market in the world, and the climate of Greece affords facilities for an unlimited extension of this branch of industry. The south of the Morea generally, and all the islands of the Ægean Sea, are adapted for it, and here the house of almost every peasant is in part given up to the rearing of the worm. The spawn or eggs are nestled in the bosoms of the women; and the worms hatched in spring are abundantly supplied with the young mulberry leaves then shooting. The cocoons are placed in the sun, and the heat kills the worms. In 1836 some Greek merchants, who had resided in the silk districts of Italy, introduced Italian workmen with their families into Morea to improve the mode of winding; and a few years have greatly advanced this branch of industry and placed it on a firm and extensive basis, giving promise of a lucrative and increasing trade. Two silk-throwing manufactories have been established at Athens with great success. (For further particulars see page 32.) The *Moniteur* of Paris of 16th and 17th October 1855, pays a high compliment to the quality of the Greek silk in the Paris Exhibition, which gained the first prize.

The olive next claims attention. Being indigenous, the trees are found in a wild state in every direction, and seem only to require grafting to yield excellent fruit. Grafted olive trees are very numerous; and many of the people live all the year round on little but olives, indifferently pickled in brine. The oil is extracted in the rudest manner, after which it is either run into cisterns or jars. There is a large consumption of it in the country, nothing else being used for light, and a great deal being consumed in food and cookery; but still there remains a good quantity for exportation. Cotton succeeds well wherever it is sown, especially in the plain of Argos, and in the islands. It does not form an important item in the exports, owing to the large consumption of it in the country. Madder thrives well in the northern districts. Greek tobacco is said to be of good quality, and to have a delicious perfume. It is cultivated at little expense.

The cultivation of fruit-trees might be a profitable branch of industry. The figs of Attica have not degenerated since the olden time; the apricots are delicious; and the pomegranates, oranges, and lemons, would make a good figure in the shops of London and Paris.

First among its natural productions may be mentioned valonia, the cup of the acorn of the *Quercus Ægilops*, an oak of which considerable forests exist in the neighbourhood of Marathonisi, Cape Papa, Arcadia; also in Attica, the island of Zéa, and other places. The acorn is a powerful astringent, used in tanning and dyeing, and for this purpose is shipped for England and Italy. Another species of oak—the *Quercus coccifera*, commonly called galls—grows in great quantities on Mount Taygetus, and breeds the insect known as kermes. In the process of drying the insect assumes the appearance of a small brittle berry partly filled with powder, which, from time immemorial, has caused some to look upon it as the berry of the plant, while others considered it to be a swelling caused by the puncture of a particular kind of fly. It is used in dyeing the red Tunis caps both of the Greeks and Turks, and a good deal is exported to Tunis and Alexandria. The dried leaves of the lentisk, also, under the name of *Σχοινό φυλλον*, are used by the tanners in Greece and the Levant. Turpentine is obtained in large quantities from the pine forests of Mount Cithæron and other districts.

Notwithstanding the immense clearances made by the ravages of war and other causes, Greece contains 2,800,000 acres of forest, filled with timber trees of the best quality; yet wood is bought abroad for house and ship building, as for want of roads these forests cannot be worked. The shepherds make a practice of setting fire to the coppice woods, in order that their flocks may find some tender sprouts to crop in spring. It is not unusual in the neighbourhood of Athens to find large black patches covering half a square league; and if an explanation be required, the answer is, "Only a shepherd who has been making pasturage for his sheep."

The principal places of trade are Syra, Patras, Piræus, Kalamata, and Nauplia. The trade of Patras is chiefly import; Hydra, Spezzia, and Galaxidi, come more properly under the denomination of ship-owning ports. The exports are chiefly the articles we have enumerated, with others of minor importance; the imports are chiefly iron ware and woven fabrics; besides coffee, sugar, and spices.

The carrying trade is very considerable, especially among the islands. Some of the Greek vessels are between 600 and 700 tons register, and a good many from 300 to 400 tons; but the great majority of them are boats of 6 or 7 tons having a large hatch in midships. (See page 32.) It is customary for a ship-owner to bargain with a captain and crew, taking up a certain sum at interest, generally secured on bottomry bond; with this money a cargo is purchased on the ship's account, and the profit is divided between the vessel and the crew, the latter sharing among themselves according to their special agreements. In this way the Greeks carry on extensive speculations in corn whenever bad harvests or other circumstances present openings in the ports of Turkey, Italy, Spain, or France. Besides this, they export the various productions of Turkey, Greece, Egypt, Persia, and Southern Russia, to London, Marseilles, and Trieste. The great advantage which the

Greeks have over foreigners in prosecuting this trade is that of having relations and connections in the interior on whom they can rely for the collection of small parcels; and thus they avoid the impositions of agents and the profits of middlemen. The Greek trader despises nothing, and will gather a few bags of rags, or a ton or two of bones and horns, while he is chartering fifty vessels to load with corn and tallow. Then the same vessels supply Turkey, Persia, and Greece with the manufactures of England and Germany. The extensive Greek establishments at Manchester for purchasing, examining, and packing goods, attest the importance of this branch of commerce. They have almost quite superseded the English traders here, chiefly from their thorough knowledge of the countries to be supplied, and their readiness to execute the smallest as well as largest commissions for the shopkeepers of the East. The Greek trader slips in everywhere, neglects no business, disdains no expedient, and changes his flag as often as he finds it his interest to do so.

The Greek government does nothing for maritime trade. There is but one lighthouse on the coasts; and, notwithstanding the shipwrecks that are recorded every winter, the ministers turn a deaf ear to the appeals of the mariners. A similar neglect is shown concerning the means of internal communication. There are only seven roads, amounting in all to a length of 30 leagues, and this in a country where the state owns more than half the land, where evictions are easily effected, and where the peasants are willing to lend their hands for works of public utility. There is no highway from Athens to Sparta, or to Corinth, or to Patras, which, owing to the trade in currants, is becoming the commercial capital.

The banking and exchange operations form perhaps the most remarkable part of the commercial system. The national bank was founded at Athens in 1842, the capital being in the first instance fixed at 5,000,000 drachms. Branches have since been opened at Syra and Patras. The exchange operations throughout the country are ruled chiefly by the transactions at Athens, where bills on London, Paris, Marseilles, Trieste, &c., are negotiated with facility. The most serious hindrance to the progress of industry in Greece is the high rate of interest. The legal rate is 10 per cent. for ordinary loans, and 12 per cent. in commercial business. High as this is, most of the loans are effected at still higher rates; and the government cannot suppress the usury. From a statement inserted in the *Spectateur de l'Orient* of Athens, it appears that the bank has paid interest to the shareholders, from 1849–54, at $8\frac{1}{2}$ to $9\frac{1}{2}$ per cent. per annum; that its capital amounts now to 6,000,000 drachms, and a reserve fund of 400,000 drachms to provide against emergencies.

anufac-ures.

The manufactures of Greece are few and simple, the value of the raw material being little enhanced by the labour; yet the peasantry are entirely clothed in cotton and woollen fabrics of their own manufacture. The capotes, not only of the Greeks, but of the whole maritime population of the Mediterranean, are made of a woollen stuff, the peculiar manufacture of the Wallachs; and Kalamata is famous for a silk gauze, highly prized in the East for bed-curtains. Embroidery in gold, silver, silk, and cotton, is brought to great perfection; and marble-cutting and sculpturing have made great progress. At the Great London Exhibition of 1851, the embroidered dresses in red and gold, and in blue and silver, were highly praised. The samples of marbles were not in a condition of manufacture to demand much notice as specimens of industry. Commendatory mention is made, in the report, of lithographic stones from Messenia, samples of steatite (the French chalk of commerce), of a fine natural cement of puzzuolan, of varieties of flexible sponge, and some other objects. In the Exhibition of 1851, only four medals were given for various productions of art and manufacture from Greece; and in the Exhibition of Paris, eleven of the first class were given (five of which were for agricultural products); thirty of the second, and twenty-seven of the third.

Animals.

The Greeks call the horse Alogon, that is to say, the animal above all others. Alogon also means unreasonable, a term, it would seem, not very inappropriate, for they appear to be intractable creatures. The ass is here, as elsewhere in the East, a much less degraded animal than with us. They are tolerably swift as well as sure-footed. Oxen are scarce, and the city of Athens can only boast of five or six cows. The milk, butter, and cheese of sheep are in general use. Sheep are indeed an important part of the wealth of the country. Every family eats roast lamb at Easter.

The coasts of Greece are well provided with fish; but the people do not seem disposed to cultivate this branch of industry.

The game is excellent; the hares, snipes, and thrushes are said to have a delicious flavour. The passage of the wild ducks at certain seasons affords fine opportunities to those who live near Lake Copaïs. So the quails on their passage supply the Mainotes with food for a month; they are so heavy on their arrival that they are sometimes knocked down with sticks. Pigeons may be shot in spring and autumn during their migrations, and thrushes in March and April. The Greeks have an almost incredible tolerance for the sportsman. He wades through the barley, scrambles over the walls of the enclosures of unburnt brick at the risk of demolishing them, eats the best fruit, and nobody interferes with him except when he is seen to carry fruit away in his bag. The only enemies the sportsman has to fear are the shepherds' dogs—immense curly monsters which their masters encourage to throw themselves upon strangers. Even in towns dogs are troublesome after nightfall.

Eagles and vultures are abundant in Hymettus, Pentelicus, and most of the other mountains. A few foxes, and even jackals, are found in the Morea. The owl still inhabits the town of Athens, but it is no longer held as sacred there. In the month of April a species of hawk called the kestrel, visits the Acropolis, and rids it from all the crows which invest it. It departs, however, in October, and crows return to defile the marble of the monuments. The tortoise is common in the fields and brooks of Greece, but the people have the greatest repugnance both to the land and water animal.

Athens.

The choice of Athens as the capital of Greece proceeded on archæological rather than prudential considerations; and those who know the country express much regret that Corinth was not rather chosen, as being much more convenient for the interests of commerce, besides enjoying a more fertile soil, a more salubrious climate, and a more plentiful supply of water. Even the Piræus would have suited better than Athens, for, as has been remarked, the capital of a nation of mariners should be a seaport. When King Otho, or rather his father, decided on Athens as the headquarters of government, the once splendid city was but a village in ruins, surrounded by an arid plain. A palace was hastily erected, the court settled as it could into the neighbouring dwellings, and the officials encamped around. But houses were rapidly built; the stone costs nothing, the plaster is excellent, and the Greek masons are not unskilful. There are now 4000 houses and 32,000 inhabitants. The Turkish village which formerly surrounded the base of the Acropolis still remains, and forms a quarter of the new town called Plaka. The new quarter of Athens, where the palace, the university, the legations of England, France, Bavaria, and Russia, with other public establishments, are situated, presents a curious spectacle. The streets are not regularly laid out, nor are they carefully levelled; and a great fosse or open sewer traverses it throughout. Yet at every step are to be seen pretty houses ornamented with columns or pilasters, and standing in the midst of gardens. Even the best of these consist but of two storeys above ground and one beneath. The basement, like a cellar with us, is warm in winter, and cool in summer. Here the family take their meals. On the ground floor are the public or reception rooms, and the bedrooms above. The public buildings are few, the ministers' offices and the courts of justice are located on the first floors of houses occupied as shops or taverns below.

Government.

Greece is a constitutional monarchy. The charter guarantees to citizens equality before the law, personal and religious liberty, freedom of the press, immunity from confiscation, and education of the people at the public expense. Unfortunately for Greece, its constitution, from various causes, was never tried to its full extent; above all, the nation was not ripe for a representative government, and the king never gave to it that cordial assistance necessary to strengthen and consolidate it. Since the events of 1854, however, we learn that he has in conjunction with his ministers attempted to bring about those improvements which the advantages of the constitution enable him to do. These endeavours to improve and benefit the country are not thrown away, for the people fully appreciate them; and we may safely say that throughout Greece he is universally loved. Though religious liberty is the first article of the Greek constitution, proselytism is strictly prohibited. The highest offices of state are open to all without distinction. A Greek subject, whether he be Jew, Turk, Catholic, or other persuasion, can attain the highest position in the country by his own individual efforts.

The legislative power is exercised by the king, the senate, and the chamber of deputies collectively. The king enjoys all the privileges of a constitutional monarch; his person is sacred, and his ministers, who are seven in number, are responsible. Senators are nominated for life by the king; they must be forty years old; they receive 500 drachms (about L.18) per month. The deputies, who must be above thirty years of age, are elected from among persons who possess some property or an independent profession. They retain their places for three years, and receive 250 drachms (about L.9) per month during the session. The electors consist of all men above twenty-five years of age, who possess any kind of property, or exercise any independent profession in the district of their political residence.

The power of the king is not however really controlled either by the senators or deputies. As little are the ministers of state any check upon his sovereign will. We quote from M. About.[1]

"In fact, the power of the king is only limited by the diplomatic body. Every minister is ready to do anything for the sake of keeping his place. These men—poor, ambitious, without principles, and brought up in such a miserable school of politics—only aspire to gaining as long a time as possible their 800 drachms a month. They know that their position is precarious, that no ministry has lasted, and that the quidnuncs of the coffee-house of "Beautiful Greece" announce every morning the formation of a new cabinet. They only think, therefore, of keeping in their places, and of making the best of their temporary tenure of state affairs. Each one on coming into power takes care to surround himself with his creatures. He does so from prudence and from duty; from prudence, not to be betrayed by his subordinates; from duty, to reward the devotion of those who have served him. A minister who did not make a clean sweep in his department, and did not put devoted officials into the places of those that knew their business, would pass for a fool and an ungrateful person. He would lose the friendship of his clients, and would become the laughing-stock of his enemies. It follows that all the staff of the administration is renewed with each new ministry; that men of capacity are never formed in the offices; that the officials of all ranks, not having any certainty for the future, lay hands on all that is within their reach; that the state has no old servants, and that there is in the kingdom but one civil functionary who has been able to acquire the right to a pension. A more distant, but not less necessary consequence of such a state of things is, that the king never finds any resistance either in his ministers or in any of the other officials.[2]

"Neither did the governments which gave to Greece an absolute monarchy consider seriously enough the character of the people and the state of the country; nor did the revolutionists, who tore from the king the constitution of 1843, take into account the ignorance and barbarousness of the nation. If ever it could be said that a country was not ripe for liberty, it may be said in speaking of Greece. Not that men's minds are closed to political ideas; far from it. All Greeks, without exception, are apt to discuss public affairs—all talk of them, if not wisely, at least with a knowledge of them—all take a passionate interest in the smallest debates of the session."

In the election of representatives, political and personal passions have the greatest influence, and the government takes advantage of this to insure the election of its supporters. Sometimes intimidations and other means are used, which have, on one or two occasions, caused the loss of human life.

The judges of Greece are characterized for their independence and integrity of character. Since the government has been established we believe there is no example of their having been influenced, either by intimidation or by bribe, to commit an act contrary to their consciences. The constitution provided for the appointment for life of the judges after five years from its promulgation, but stipulated that this must first be established by a law. The reason for this was, because at that time there were few judges deeply learned in jurisprudence, and the constitution allowed five years to supply this want from the class that were then studying. Unfortunately, though the five years have long elapsed, no one has yet introduced a law to that effect, because each ministry wishes to reserve these places for their particular supporters.

For administrative purposes, the kingdom is divided into 10 nomarchies or prefectures, and into 49 eparchies or subprefectures, two of which may be administered by one subprefect. The eparchies are subdivided into demarchies or cantons; and the rural districts are administered by municipal functionaries called paredri—that is, coadjutors of the demarch. All these functionaries are nominated by the king, and salaried by the state.

Nomarchies.	Capitals.	Eparchies.	Chief Towns.	Pop. in 1854.
I. Hellas, or Northern Greece (3822 sq. m.)				
1. Attica and Bœotia	Athens	Ægina	Ægina	104,807
		Megaris	Megara	
		Attica	Athens	
		Thebes	Thebes	
		Livadia	Livadia	
2. Phocis and Phthiotis	Lamia	Parnassis	Amphissa	99,697
		Doris	Ægition	
		Locris	Atalandi	
		Phthiotis	Lamia	
3. Acarnania & Ætolia	Messolonghi	Valtos	Ambracia	118,265
		Vonitza	Vonitza	
		Messolonghi	Messolonghi	
		Lepanto	Lepanto	
		Trichonia	Agrinion	
		Eurytania	Karpenisi	

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[1] *Greece and the Greeks of the present day.* Edinburgh: Thomas Constable and Co.

[2] It also has the effect of increasing the class of functionaries, already much too large for the country.

Nomarchies.	Capitals.	Eparchies.	Chief Towns.	Pop. in 1854.
II. PELOPONNESUS (10,160 sq. m.)				
4. Argolis & Corinthia	Nauplia	Nauplia	Nauplia	134,099
		Argos	Argos	
		Hydra	Hydra	
		Trezene	Poros	
		Spetzia	Spetzia	
		Corinth	Corinth	
5. Achaia & Elis	Patras	Patras	Patras	129,984
		Ægialia	Ægion	
		Kalauryta	Kalauryta	
		Elis	Pyrgos	
6. Arcadia	Tripolitza	Mantinea	Tripolitza	118,488
		Gortys	Gortys	
		Cynouria	Agios Petros	
		Megalopolis	Leondari	
7. Messenia	Kalamata	Tryphyllia	Cyparissia	109,900
		Olympia	Andritzena	
		Pylos	Navarino	
		Messenia	Nisi	
		Kalamata	Kalamata	
8. Laconia	Sparta	Lacedæmon	Sparta	96,846
		Epidaurus	Menomoasia	
		Limera		
		Gythion	Marathonisi	
		Œtylon	Œtylon	
III. ISLANDS (1255 sq. m.)				
9. Eubœa	Chalcis	Chalcis	Chalcis	70,969
		Xerchori	Xerchori	
		Carysto	Carysto	
		Scopelos	Scopelos	
10. Cyclades	Syra	Syra	Hermopolis	159,172
		Zēa	Zea	
		Andros	Andros	
		Tinos	Tinos	
		Naxos	Naxos	
		Santorin	Santorin	
		Milos	Milos	
			Total	1,142,227

For the administration of justice there is an areopagus, or supreme court, 2 courts of appeal, 3 commercial courts, 10 civil and criminal courts, 120 justice of the peace courts, with jury trials, lawyers, notaries, &c. Then there is a provisional civil code, a commercial code, a code of civil process, and a code of criminal law, which seems to secure everything that can be desired for the ends of justice. Capital punishment was introduced by the penal code in 1837, but before an executioner could be found there were 30 or 40 prisoners waiting for execution. The guillotine is the instrument used; and the horror of the scene is occasionally augmented by the struggles of the culprit to escape. The law provides that he shall walk freely and unbound to his doom; and as most of those who are thus condemned are vigorous men, brigands by profession, the struggle is sometimes fearful. The executioner, however, at length prevails, being armed with a dagger, and when the culprit is exhausted with loss of blood from its thrusts, he goes freely to suffer the last sentence of the law.

Religion.

The people, who are for the most part strongly attached to the Greek Church, have almost forgotten the religion of their king, because they look forward to the 40th article of their constitution being strictly enforced, which stipulates that the next heir or successor of King Otho shall be of the same religion as their own. Prince Leutpold, the brother next in age to Otho, declines changing his religion. A still younger brother, Prince Adalbert, consents to accept the sovereignty in his stead, and the London conference has authorized the substitution; but as he is not absolutely certain of the succession, he chooses to continue a Roman Catholic till actually put in possession of the throne; and to all appearance it will again be the fate of Greece to receive a king who is an utter stranger to them, and at heart averse to their religion.

When Greece was a province of Turkey, its religious community naturally formed part of the patriarchate of Constantinople, one of the four great divisions of the Eastern Church. The war of independence virtually freed it from this position, and the constitution of 1843 established the fact. The patriarch, however, did not recognise the independence of the church in Greece, and the result of a long negotiation between the Greek government and the patriarch was a bull or *tomos*, signed in 1850 by the patriarch and synod. It set forth that the right of uniting or separating ecclesiastical provinces had in all ages belonged to the œcumenical synods; and it granted to the Greeks the permission to separate, but not without some restriction, to the effect that difficult cases should be referred to the patriarch and his sacred college. This tomos did not satisfy either party. The Russian emperor and his partisans desired to see the Greeks kept in connection with the synod, while the friends of independence desired more perfect freedom. In 1852, the matter was brought before the Chambers, and a bill was passed to the effect that the superior ecclesiastical authority of the kingdom should reside in a permanent synod, called the Holy Synod of the Church of Greece. This synod is composed of four prelates of the kingdom, besides the metropolitan, who enjoys the right of presidency. A commissioner appointed by the king attends the sittings, not to vote, but to countersign all their acts and decisions. The functions of the synod are either internal, including the preservation of pure doctrine and worship with the maintenance of ecclesiastical discipline, and other matters purely religious; or they are external, relating to matters which involve public interests, as marriage, divorce, the excommunication of laymen, and the celebration of extraordinary religious festivals on working days. In the former, the powers of the synod are independent of the state; in the latter, it can act only in concert with the government.

Excommunication, however, is used in a different spirit from the Roman Catholic Church, namely, to influence, by the fear of God and future punishment, the consciences of those who, knowing the perpetrators of a crime, conceal, or do not reveal to the authorities, the criminal, or of those who are the possessors of stolen property. Very often this has succeeded better than the efforts of the police. It is, however, very seldom used, and the synod must first have permission from the king.

The kingdom is divided into 24 episcopal sees, of which 11 are directed by archbishops, and the remaining 13 by bishops. Every bishop is chosen by the king out of three candidates presented by the Holy Synod. He can displace him again only in conformity with the canons, and after the advice of the synod. The metropolitan receives 6000 drachms (L.212) a year; each archbishop, 5000 (L.180); and each bishop 4000 (L.145). The inferior clergy receive no salary from the state. They live chiefly by the altar, but they also levy certain portions of the harvest.

The government found the country infested with monks, and it has shut up many of their houses; but it has been impossible either to suppress or reform a convent at Janina (Turkey), containing about 200 females, who are not closely secluded, and whose morals are said to be scandalous. The religious houses are understood to be asylums of anti-national intrigue, the inmates being generally devoted to the interests of the Russian emperor, and disposed to look on King Otho as a mere heretic.

There are above 300 churches in Athens and its neighbourhood; only five or six of them are habitable, the rest are miserable sheds or ruins, yet none of them is utterly abandoned. On the day of the saint to which it is dedicated, a little lamp is lighted, a little incense burned, and a few prayers chanted. It would be deemed sacrilege to destroy even the meanest of these sanctuaries. There are no infidels or latitudinarians in Greece; no one is ashamed of punctually attending to the duties of religion. (For the doctrines and state of the Greek Church, see GREEK CHURCH.) Roman Catholics are tolerated, among whom is the king himself; but he is obliged to render public homage to the state religion five or six times a year. There are few Jews who, though they have every protection, do not seem to prosper amongst the Greeks.

The army, which was reorganized in 1843, consists now of 6 battalions of the line, 3 battalions of light infantry, 2 troops of cavalry, 3 companies of artillery, 1 company of engineers, and 1 of artillery workmen, 3 corps of gendarmerie, 1 corps of pensioners and phalanx; in all, including the administrative hospital pensioners, 952 officers, 1257 subalterns, 8237 soldiers—total 10,446.

The fleet numbers 21 vessels, principally small, except 3 steamers and some gun-boats which the government has lately ordered in England. The complement of the Greek navy is 1431 men, including 418 officers and 139 sub-officers.

Education. Greece boasts of one university, divided into the faculties of theology, philosophy, law, and medicine; a military school; a polytechnic school of arts and trades; a normal school for training elementary teachers; a school of agriculture; a seminary; seven lyceums; an extensive institute for female education; an orphan female school, called Amalion, was established last year at Athens, under the patronage of Her Majesty the Queen of Greece (who is very much beloved by the nation for her intelligence and judgment, and for the great zeal she shows for the patriotic cause); 179 Hellenic schools, in which ancient Greek is taught; and 369 communal or Romaic schools, in which strictly elementary instruction is imparted. In 1854–5 there were 643 students at the university—20 in theology, 190 law, 317 medicine, 74 philosophy, and 42 pharmacy; and there were 38,018 scholars at the various schools. The education in all, from the humblest village school to the university, is gratuitous. The effect is to draw the youth of the country in undue proportion towards the learned professions. A young man will at once enter the house of a Fanariot as a valet, and matriculate at the university as a medical student. When his studies are completed, he will ask his master's permission to attend him in future as his physician. Children and youths of all ages prosecute their studies with indefatigable eagerness; and at Athens an idle student is not to be found.

Newspapers and periodicals form the principal literature of the country, but a considerable number of books are published yearly in every branch of knowledge, either translated or original. In 1851, 188; and in 1852, 164 books were published, the greater part of which were of poetry; and though we understand few of the latter are of a first-class character, yet it shows that the Greeks aspire to gather the laurels of Parnassus once more. All the books are written by Greeks; and it may be mentioned, that out of the 164 published in 1852, 120 belong to the kingdom of Greece, 29 to the Ionian Islands, 7 to Turkey, and 8 to Vienna and London. They are a very musical people; but until lately music did not form a part of their education.

In sculpture, there is now an establishment at Athens of a talented artist, who with such splendid prototypes before him may succeed in approaching his ancestors.

In 1846 M. Salvandy, minister of public instruction in France, resolved to found at Athens a school for the promotion of literature, similar to the French Academy at Rome for the fine arts. It was decided that the members should be chosen from among young men who had obtained fellowships in history, philosophy, and literature; and that they should each spend two or three years in Athens, at the expense of the state, in a house provided for them, and prosecute the study of Greek literature. The first professors that repaired to Greece seemed at a loss what to do with themselves. Some began to learn modern Greek under an Athenian professor; others employed themselves in teaching French to the Athenians; others travelled about the country; while economisers at home, disposed to pick holes in the budget, wondered what end was gained by the 40,000 francs per annum which this academy cost the state. In 1850 a decree was passed, placing the school under the patronage of the Academy of Inscriptions and Belles-Lettres, and enjoining that each member should annually send home a paper on some question of Greek history, geography, or archæology. The institution was, however, nearly extinct, when the fortunate excavations of M. Beulé gave it a fresh impulse. There are now five young professors prosecuting with enthusiasm their researches into the archæological remains.

The kingdom of Greece has ever been pecuniarily in an embarrassed state. It was necessary for the protecting powers to enable her to negotiate a loan by becoming security for her. The sum thus raised has been squandered by the Bavarian regency, and now the revenue never meets the expenditure; so that there is little hope of the debt ever being paid. The greatest part of the taxes are paid in kind, because of the scarcity of money. The wealthy proprietors bribe or intimidate the officials; and the lesser ones are protected either by a powerful friend or by their own poverty. The ministers of finance, therefore, up to 1846, used to prepare two budgets—one indicating what sums the government ought to receive; the other, what it could dare to hope for. The year after the revolution, only a small portion of the taxes imposed were realized.

Income. The state income consists of—(1.) *Direct* taxes, including land tax, paid in kind; usufruct, or the rent paid in kind by the cultivators of the state lands; except the tax on the currants, valonia, and all kinds of fruit, which is paid in money; taxes on bees, cattle, and buildings, which are paid in money; and a tax on grants of land from the state, also payable in money. (2.) *Indirect* taxes, including customs-duties, stamp-duties, taxes on trade and professions, licenses to carry arms, consular fees, and quarantine, harbour, and navigation dues. The *public establishments*—as the mint, the mails, and the royal printing-office—yield very little return. The *national property*—consisting of mines, quarries, medicinal springs, salt-works, fisheries, forests, olive-groves, vineyards, &c.—ought to supply a considerable revenue, if the government were intelligent enough to have them worked advantageously, and strong enough to compel payment from those who work them. The state expenditure consists chiefly of the interest on the national debt, internal and foreign; the civil list; the salaries of the chambers and the expenses of the ministry; besides those of collecting taxes and customs.

Debt. The following statement of the foreign debt is from the report of M. Metaxas, audited by M. Lemaître, commissioner of the French government:—

> In 1832, France, England, and Russia, to complete the emancipation of Greece, and to assure her prosperity, supported by their guarantee a loan of sixty millions of francs. Each of the three powers guaranteed a third of the sum, that is to say, twenty millions.
>
> One part of these sixty millions was intended to indemnify the creditors of Greece, and particularly the Turkish government; the remainder was to supply the first wants of agriculture and commerce, and to form as it were a social capital for this improvised kingdom.
>
> Unfortunately, the funds were confided to the Council of Regency. The regents were irresponsible; they employed the money as they pleased, and went away without giving in any accounts. It is difficult to say which most to admire, the audacity of the regents, the simplicity of the Greeks, or the rashness of the great powers, to confide sixty millions to three individuals who had the right of squandering them.
>
> Since the year 1832, up to the 31st December 1843, the issues of the bonds for the loan amounted to:—

For the guarantee :—

	Francs.	Cents.		Drachms.	lep.
English	19,838,805	33⅓	=	22,155,977	79
Russian	19,999,573	33⅓	=	22,335,523	50
French	17,400,661	33⅓	=	19,433,058	58
	57,229,040			63,924,559	87

To be deducted :—

	Drachms.	lep.	Drachms.	lep.
Loss in the negotiation of the loan adjudged to MM. Rothschild, at 94 per cent.	3,835,473	59		
Discount paid to those that took up the loan for payment in ready money	1,176,188	10		
Commission and other expenses	1,964,251	73		
			6,986,013	42
Nett capital			56,948,546	45
Interest, sinking fund, commission, different expenses up to 31st December 1843			33,080,795	31
	Remains,		23,867,751	14
Greece contracted in Bavaria another loan, which produced, after deducting the expenses of negotiation	4,658,186	14		
Paid for interest, sinking fund, commission and expenses up to 31st December 1843	2,809,077	66		
Nett	1,849,109	00	1,849,109	00
Sums advanced by France			3,085,098	25
Sums advanced by the three Powers			2,757,028	32
Gross total of the resources of which Greece could have disposed			31,558,986	71
To be added for two heads misplaced			100,947	62
Total			31,659,934	33

Greece, or at least her government, has therefore received from foreign powers, between 1832 and 1843, a nett and clear sum of 31,659,934 drachms, 33 lepta.

Let us see how these resources have been employed :—

	Drachms.	lep.
Indemnity stipulated nominally in favour of Turkey, but in reality to the advantage of Russia, who had pecuniary demands to press against Turkey,	12,531,164	54
Reimbursement to different persons for debts anterior to the establishment of the Greek kingdom,	2,238,559	15
To which may be added, as useless expenditure, the Bavarian Regency, 1832–33	1,397,654	27
The conveyance, cost, and return of the Bavarian troops, from 1st September 1832 to 30th September 1834	4,748,050	0
	20,915,427	96
Which, deducted from	31,659,934	33
Give a remainder of	10,744,506	37

With a little assistance, Greece paid the interest of the loan of 60,000,000 frs. in the years 1841, 1842, 1843. Since then she has fallen hopelessly into arrears. She now owes to the three Powers 100,000,000 drs., which she cannot pay; besides above 200,000,000 drs. to English capitalists, which she will not pay.

As to other items of the state expenditure, the king's civil list is 1,000,000 drs., or about L.36,000 sterling; the chambers receive about 600,000 drs. a year; the seven ministers, as salary, 9600 drs.; while the departments of the army and navy expend 5,500,000 drs.; and the other five state departments, 4,500,000 drs.

It has been remarked, that if Greece were organized like the Ionian Islands, without either king, fleet, or army, 6,500,000 drs. might be realized above the annual expenditure towards liquidating her debt and improving the national property.

Antiquities.

The antiquities of Greece open so wide a field, that, in an article of this kind, we can do nothing more than allude to the various classes of objects comprised under the title. Among these we may, without much impropriety, rank many of the cities themselves, which not only exist on the very spots they anciently occupied, and bear the same names, but, deriving their most striking characters from natural objects which remain unchanged, they still present to the eye at a distance the same general aspect and outlines. With regard to the interior of the cities, also, though the august temples of the gods have disappeared, and filth and meanness meet the eye everywhere, little doubt will remain with those who have read what the ancients have left us on the subject of their private houses, and what modern travellers have told us respecting the disinterred buildings of Pompeii, that the houses at the present day—with their square inclosed courts, their projecting roofs, and dead walls, and all that is most peculiar in their plan and interior arrangements—are copies (though miserable copies) of those of the ancient Greeks; and it is probable that some of the modern dark and narrow streets of Athens come much nearer in appearance to what they were in the age of Pericles than the admirers of antiquity are willing to allow. Among the cities which occupy their ancient sites, and bear their ancient names with little alteration, may be mentioned Athens, Thebes, Livadia, Larissa, Pharsalia, Salonica, Corinth, Argos, Nauplia, Patræ; and a great number of others of less note might be added. The ancient buildings of which remains now exist belong to three different eras :—1. The very ancient structures to which the name of Cyclopean has been given, consisting of vast masses of unhewn stone, put together without cement. They are not numerous. The ruins of the citadels of Tyrins and Mycenæ, which are of this description, have remained in their present state for 3000 years, and present the most perfect specimen in existence of the military architecture of the heroic ages.[1] 2. The works of the classical ages, consisting of temples, baths, porticoes, theatres, columns, stadia, fountains, which are extremely numerous, and executed in a great variety of styles, exemplifying the infancy, progress, perfection, and decline of the arts. Of the two or three hundred temples enumerated by Pausanias—many of which were models of the most exquisite beauty and symmetry—that of Theseus at Athens was the only one tolerably entire; and it was destroyed by the Turks in 1827. Others are found in various stages of dilapidation; and the far greater part have vanished from their sites, and only left traces of their existence in their innumerable fragments of inscribed and sculptured marbles scattered over the fields, or stuck into the walls of forts, churches, and clay-built cottages. 3. A number of square towers, of a rude construction, built on the tops of hills, for military purposes, are the only memorials left by the Latin princes who ruled Greece for two or three centuries before the Mohammedan conquest. 4. Next in importance to the remains of ancient edifices we may rank the statues, bas-reliefs, and inscribed marbles; a great number of which, generally somewhat mutilated, have been brought from Greece to enrich the museums of Western Europe; and a much greater number, no doubt, lie buried under the soil. 5. Vessels of terra cotta, or ancient pottery, consisting of vases, amphoræ, lamps, &c., of exquisite workmanship, adorned with coloured designs illustrative of the arts, habits, and mythology of the ancients, and often in high preservation. The quantity of these found among the ruins of ancient cities is incredibly great. 6. Coins of gold, silver, and copper, which are great in number and variety, every considerable town having its separate coinage. 7. Amongst the most interesting remains are the tumuli, erected to commemorate great victories. These simple but expressive monuments, formed of conical mounds of earth, but long since divested of their sculptured ornaments, still mark the fields of Marathon, Leuctra, Platæa, Cheronæa, Thermopylæ, Pharsalia, and Pydna. 8. We ought also to class among the antiquities of Greece a vast number of fountains, caves, rocks, and other natural objects, which owe their interest, not to any beauty or importance they possess in themselves, but to the legends associated with them in the history and mythology of the ancient Greeks. With regard to the antiquities of Greece in general, it may be observed, that the finest, the best preserved, and the most numerous specimens of ancient art are found at Athens. Salonica, it is said, ranks next to it in this respect; but its monuments are deficient in the interest derived from classical associations. In general the southern and eastern parts of Greece, and the islands, abound most in antiquities. Albania and Ætolia contain but few, and these not of much interest.[1]

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[1] In Sir William Gell's *Itinerary of Argolis*, a good account of these remarkable ruins is given, illustrated by excellent drawings.

Languages. There are five languages spoken in Greece at the present day:—1. The Turkish, which is in use among a few of the Turks, but the great majority speak Romaic. 2. The Bulgarian, a dialect of Sclavonic, spoken by the tribes of Bulgarians who inhabit the northern parts of Macedonia. 3. The Wallachian, in use amongst the Vlaki, who occupy the branches of Pindus and Olympus; a language of uncertain root, but containing a large mixture of Latin, and some Italian. 4. The Albanian or Skipetaric, spoken by the natives of Albania, and by some of the colonies of this people in the south of Greece. It is an unwritten tongue, and abounds in nasal sounds. Its basis is supposed to be the ancient Illyrian, with which is intermixed a large proportion of Latin, and smaller proportions of Romaic, Sclavonic, Italian, and Turkish. 5. The Romaic (Ρωμαικη) or modern Greek, spoken by all the Greeks, by most of the Turks, and by a part of the Albanians. This is the name given to the language by the Greeks, who call themselves Ρωμαιοι, or Romans, a denomination derived from the establishment of the Roman empire for so many ages at Constantinople, which they consider as the capital of Greece. The Romaic bears a much closer resemblance to the Hellenic than the Italian to the Latin. Indeed we have been informed by one of the best modern Greek scholars in Europe, that if we take the Attic as a standard, the ancient Doric differs as much from it as the present living dialect. The peculiarities which distinguish the Romaic from the ancient Greek cannot be fully explained without many details; we shall, therefore, only notice some of the most prominent. These are,—1. The disuse of the aspirates in speaking, though they are retained in writing. 2. The adoption of the first numeral εἷς *μία* ἕν, for an indefinite article, as in the French. 3. In substantives it discards the dual number, and the dative case; makes some alterations in the oblique cases; marks cases sometimes by prepositions; and often changes the Hellenic masculine and feminine into neuter. 4. The degrees of comparison are formed as of old, by adding -τερος and τατος, but sometimes by πλέον, *plus*, as in the French. 5. Diminutives are much used, as in the Italian. 6. Considerable changes and substitutions have been made in the tenses of the verbs; the infinitive and the middle voice have been suppressed, and two auxiliary verbs introduced, θέλω, *I will*, and ἔχω, *I have*. 7. The Hellenic pronouns are retained, but with many modifications. Many old Hellenic words have changed their meaning, attributives being used as substantives, and *vice versa*. The pronunciation of the Romaic deviates widely from that of the ancient Greek as taught in our schools. The B is sounded like our V, whilst the place of B is supplied by μπ. The Δ is sounded like *th* in *that*, and θ like our *th* in *think*. The vowels η, ι, υ, and the dipthongs ει, οι, υι, are all pronounced like the Italian *i*. It is said, however, that the dialects of the spoken Romaic in Greece have not so marked a difference as those of the distant provinces of France or England. The purest dialects, or those which approach nearest to the Hellenic, are found in some of the least frequented islands of the Archipelago, in the mountainous parts of Greece, at Yanina, and among the well-educated Greeks of Constantinople. The name of Romaic is going into disuse; the modern language being denominated *Neo-Hellenic*, and the ancient, for the sake of distinction, *Hellenic*.

The new Greek language has lately made immense progress, and great care is taken by every writer not only to avoid introducing any foreign idioms in the language, but also to imitate the style of their Greek prototypes. They keep with the greatest scrupulosity the ancient orthography.

The Romaic, which, before the revolution, was a mixed language, full of foreign words, and unintelligible to any one not acquainted with the Greek, the Italian, and the Turkish, is written and spoken now by the educated classes, pure, as in the ancient language. Any Greek scholars can easily understand a Greek newspaper, by impressing on his mind the above remarks on the language.

NARRATIVE OF THE GREEK REVOLUTION.

In the course of last century, the Greeks made two unsuccessful attempts to liberate themselves. The first was in 1770, during a war between Russia and the Porte. The Russians, in pursuance of a plan previously concerted, landed a small force of 2000 men at various points in the Morea. The Mainotes and other Greeks instantaneously rose in arms, and got possession of the open towns, butchering the Turks with every circumstance of cruelty. Before they had mastered any of the fortified places, however, a great force of Albanians pouring in, defeated them, and retaliated, with dreadful severity, the cruelties committed on the Turks. The inhabitants of some entire towns and villages were massacred, and the country was almost desolated. Though the Greeks acted with much vigour at the outset, it was observed that their spirits sank at the first check they received. But it is impossible to reprobate too strongly the cruelty and perfidy of the Russian government, which, by sending such an inadequate force, exposed the Greeks to certain destruction, for the sake of operating a paltry diversion in its own favour; and, at the conclusion of a peace, took no effectual means to protect them from the rage of their enemies.

In 1790, the Greeks of Suli, in Albania, rose in arms, upon an understanding that assistance was to be received from Russia. A deputation went to Petersburg to offer the crown of Greece to Prince Constantine, brother of the emperor, whom they saluted βασιλευς των Ἑλληνων. They were to collect their various troops from Suli, Livadia, Attica, and the Morea; to march through Thessaly and Macedonia, where they were to be joined by other reinforcements; and to meet the Russians at Adrianople with 300,000 men (as they gave out), after which the combined army was to proceed to Constantinople, and drive the Turks out of Europe. But in the end little was done. The Russians sent a trifling sum of money, which was chiefly embezzled by their own agents, and soon made peace, without concerning themselves about the peril into which they had brought the Greeks. The Suliotes defeated the Pasha of Yanina; and, aided by their rocks, defended themselves, performing prodigies of valour against the Albanian Turks. A squadron of twelve small vessels, which they had fitted out at Trieste, signalized itself in the Archipelago, and after spreading terror amongst the Turks, was overpowered and destroyed by a greatly superior force. This second enterprise, in short, ended like the first, without any other effect than that of exposing the Greeks to renewed outrages from the Turks. The brave tribe of the Suliotes, on whom the Greeks placed great reliance, as the best soldiers of their faith, were reduced to a remnant by Ali in 1803, after a contest of many years.

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[1] On the subject of the Antiquities of Greece, the reader may consult the following works:—*Les Ruines des plus beaux Monumens de la Grèce*, par M. Le Roy, fol. 1758; *The Antiquities of Athens*, by Stuart and Revett, 4 vols. fol. 1762–1816; *The Ionian Antiquities*, by Chandler, Revett, and Pars, 2 vols. fol. 1769–1797; *The Unedited Antiquities of Attica*, by the Society of Dilettanti, fol. 1817; Chandler and Clarke's *Travels*, already referred to; and Mr Edward Dodwell's *Classical and Topographical Tour in Greece*, 2 vols. 4to, 1819;—and on the geographical, historical, archaiological, and statistical condition of ancient Greece, consult also M. S. R. Rangabé's, *Τὰ Ἑλληνικὰ*, edited at Athens, 1853.

Though the hopes of the Greeks were cast down for a time by this event, various causes were silently operating a change in their situation, and preparing the way for a more successful effort. Amidst all the hardships of their lot, knowledge had been steadily increasing. The influence of Russia over the Porte was visibly extending, and promised them sooner or later the means of exchanging Mahommedan for Christian rulers. But what was of more immediate importance, the establishment of Russian ports on the Black Sea, and the destruction of the French shipping by the wars of the revolution, created a trade in corn between Odessa, Marseilles, Leghorn, and Trieste, which falling into the hands of the Greeks, had raised up a class of capitalists amongst them, and given them possession of a commercial navy. From a few small barks engaged in coasting traffic, a short period saw them in possession of some hundred large well-rigged merchantmen, making long voyages. Greek houses were established at the ports mentioned, as well as at Smyrna, Salonica, and Constantinople. As patriotic feelings were universally diffused, a part of the wealth thus acquired was expended in founding schools and libraries, and the number of Greek youths sent to the universities of Western Europe was greatly increased. The ancient classic writers of the country were studied with new ardour, and lessons of freedom, magnanimity, and patriotic devotion, eagerly imbibed from their pages. Amongst the educated Greeks, those especially who had studied in France, Russia, and Germany, a more just idea was acquired of the relative weakness of the Porte, and the advantages which any people contending with it might derive from those arts and improvements, the growth of an advanced civilization, which the Turks despised. The conviction thus gained strength, that nothing more was necessary to accomplish the liberation of the Greeks, than a combined and organized effort by themselves, aided if possible by the countenance of some great Christian power. This idea gave birth to the *Hetairia*, a secret association, which is supposed to have originated about the beginning of the present century, but remained obscure and feeble till 1815. About that time Count Capo d'Istrias, a Greek by birth, who enjoyed a considerable rank in the Russian service, established a Philomuse Society, ostensibly to promote Greek literature, but really to serve as a cloak for the Hetairia. In a little time he withdrew from its apparent guidance, but without ceasing to promote its objects privately. The Hetairia had a complex and artful organization. It was divided into five orders: those of the first or lowest receiving merely a general intimation that a scheme was in contemplation to regenerate Greece; and the information communicated of the society's designs becoming more special and distinct through the other grades, to the fifth or highest, called the Grand Arch, which was composed of sixteen members, and alone possessed a full knowledge of the society's plans, the power of issuing general orders, and fixing the time and mode of execution. All the members were sworn to secrecy on their knees, at the dead of night, and bound to kill any one of their brother members who should be guilty of treachery. The grand arch had its seat at Moscow, from which it corresponded with persons in all parts of Europe. The society spread its ramifications through the southern parts of Russia, had numerous members in Odessa, Yassy, Bucharest, and in Greece Proper, and some at Vienna, Paris, and Leghorn. Most of the primates of the Morea joined it in 1819. This conspiracy had been spreading its roots through European Turkey for five years before the Ottoman government knew of its existence; and when at length apprised of the fact by an accidental circumstance, its usual apathy, and its contempt of the Greeks, prevented it from taking any precautions to avert the threatened danger. It has been said that the Hetairists had fixed upon the year 1825 for beginning the revolution; but the statement rests on no good authority. Whatever might be their intentions, the rebellion of Ali Pasha, by embarrassing the Porte, and neutralizing one who would have been a formidable enemy, presented an opportunity too favourable to be lost, and precipitated the commencement of hostilities.

In the autumn of 1820 a Turkish army advanced into Albania. Most of Ali's officers and armies having deserted his standard and joined the enemy, he shut himself up in a fortress at Yanina, after destroying the town, and prepared to stand a vigorous siege. Aware of the designs of the Hetairists, he stimulated them to take up arms, by a promise of money and assistance; and though they did not confide in it, they resolved to embrace the advantage which the position of affairs held out. The first movement was in a distant quarter. By previous concert a number of Greeks assembled at Yassy in Moldavia in the end of February 1821, and on the 6th of March Prince Ipsilanti, who held the rank of major-general in the Russian service, crossed the Pruth, and joined them. After proclaiming the independence of Greece, he left that town on the 13th, with eight hundred horsemen, proceeding towards Bucharest, but lost time foolishly on the road, and did not enter the capital of Wallachia till the 9th of April. Dissensions in the mean time broke out in his small army; and though the spirit of the people was good, and the lethargy of the Turks left him a clear space for action, his incapacity and indecision rendered him unable to improve these advantages; and a proclamation issued by the Russian consul, in which the insurrection was strongly condemned by the emperor, on whose assistance they had relied, completely disheartened the insurgents. About the end of April, a body of Turks put themselves in motion from Silistria, occupied Bucharest, and followed the insurgents northward. Some trifling skirmishes took place in the neighbourhood of Tergoivisht, rather to the disadvantage of the Greeks; and a rash and unsuccessful attack made by one of their officers at Piteshti caused a panic in the army, followed by a disastrous retreat. In this action the greater part of the Sacred Battalion, composed of Greek youths from various parts of Europe, was destroyed, after a brave resistance. Ipsilanti shortly afterwards stole away from his troops, and sought refuge within the Austrian boundary. A partisan warfare was continued a little longer. One small corps retreated to Yassy, and thence to Skuleni on the Pruth, where, under Athanasius of Agrapha, they sustained an attack from a body of Turks six times more numerous, refusing to fly, though the means of retreat were open to them, till three fourths of their number were destroyed. Another small party under Yorgaki, or George the Olympian, shut themselves up in the monastery of Secka, where they resisted the Turks for six and thirty hours. At length, when the enemy got into their rear, and success was hopeless, the gallant chief, having refused the safe retreat which the Turks offered him, called his followers together, and exhorted them to seek a glorious death sword in hand.

Finding that instead of seconding his heroic resolution, they were preparing to fly, he retired to the chamber where his powder was deposited, and uttering a short prayer, blew himself up, with four of his attendants. George was a native of Mount Olympus, and during this short campaign showed a prudence and courage which would have fitted him admirably for heading the insurrection; but the Greeks of that district were slaves to family titles, and George, who had no pretensions to rank, held only a subordinate situation. Quiet, modest, averse to intrigue, he seems, says Mr Gordon, to have been a real hero, inspired with sincere devotion, sublime courage, and an enthusiastic love of his country. With his death, on the 26th of August, all resistance ceased in the principalities. The intention of the insurgents was to erect European Turkey into a province for Prince Ipsilanti.

From the beginning of 1821 secret conferences were held by the more zealous Hetairists of the Morea, and a spirit of insubordination began to appear amongst the people. At length, on the 2d of April, the standard of independence was hoisted at Kalavrita, a town about thirty miles south-east from Patras, by Germanos, archbishop of Paleon-Patron, and Andreas Londos.[1] Two days afterwards the fighting began at Patras, where the Christian inhabitants rose on the Turks, and, during a bloody struggle of some days, a part of the town was burned. The Turks, however, retained the citadel, from which the Greeks had no means of expelling them; and Yusuf Pasha crossing the straits of Lepanto, the armed insurgents suddenly fled, leaving their brethren in the town to be butchered by the Turks. The insurrection spread with such rapidity over the Morea, that seven days after the first shot was fired, a Greek senate assembled at Calamata in Messina, under the presidency of Petras Mavromichalis, bey of Maina. A partisan warfare was carried on for some time against the small bodies of Mahommedan settlers living in the country, most of whom ultimately sought refuge in Tripolizza, the capital of the Morea. Meanwhile three thousand Albanians coming from the north, victualled the Acrocorinthus, and advancing to Argos, routed a body of Greeks posted there, killing seven hundred of them, and afterwards burned the town. The Kihaya Bey then proceeded to Tripolizza, and seemed resolved to act with vigour. The Greeks, who had now assembled a considerable force, were divided as to the mode of acting; but it was finally determined to fight, and they accordingly posted themselves at Valtezza, near the enemy. The Kihaya Bey, leaving Tripolizza with five thousand troops, attacked them on the 27th of May, but was repulsed in several attacks made on the village in that and the following day, and finally fled to Tripolizza, with the loss of two pieces of cannon and four hundred men. This victory, though small, had a great moral effect in raising the courage of the Greeks. The three great seats of Greek commerce, Hydra, Spezzia, and Psyra, entered into the revolutionary cause about the same time with the towns on the mainland. A small fleet of Hydriot and Spezziot vessels visited the other isles of the Ægean, proclaiming the independence of Greece, and was everywhere received with enthusiasm; whilst light-armed ships scoured the seas, and captured every Ottoman trader.

In Rumelia the insurrection broke out a few days later. The Armatolis, a sort of stationary Christian militia, in the mountains of Acarnania, Ætolia, and Thessaly, kept up by the Turkish government for the purposes of police, were unwilling to risk the loss of their pay. The peasants of Attica and Bœotia, however, took the field in the beginning of May; and on the 7th of that month, scaling the low wall which surrounds Athens, took possession of the town, and drove the Turkish inhabitants into the citadel. In Epirus, the remnant of the brave Suliotes, reinforced by other Greeks, and encouraged by Ali Pasha, harassed the Seraskier Kourschid Pasha, by cutting off his convoys of provisions. The scene of these hostilities was chiefly in the ancient Thesprotia, and it was carried on with great activity in May by Marco Bozzaris. From this district it spread into Acarnania and Ætolia; the independent flag was hoisted in Messolonghi in June, by several of the Armatoli chiefs; Vrakhori, a Mahommedan town twenty miles north of Messolonghi, was carried very gallantly, and some weeks afterwards Zarpandi in the same district; Salona was next taken; and the Turks in three months were deprived of a large proportion of the posts which they had occupied south of Mount Œta. Kourschid Pasha, however, made a vigorous opposition, and success often changed sides. In this desultory warfare the summer passed away. The Rumeliots, in the various actions fought, showed themselves much better soldiers than the Moreots, and this reputation they continued to maintain during the war. Whilst these events were passing, Mavrocordato arrived at Messolonghi from Leghorn, and, after conferring with the primates, went to Tripolizza, where the Moreot leaders were assembled for the siege. Finding he was an object of jealousy to Demetrius Ipsilanti, he returned to Messolonghi in September, and laboured to organize the insurrection in Rumelia. In the mean time Omar Pasha, with a body of four thousand Turkish troops, marched from Thessaly, routed a party of seven hundred Greeks at Thermopylæ, a second larger party under Odysseus at Scripu, and destroyed Livadia, the most flourishing town of Rumelia. He then advanced to Athens, and on the 30th of July relieved the citadel, in which sixteen hundred Turks had been blockaded for eighty-three days, by a motley army consisting of Attic peasants, Æginetans, and other islanders. The armed Greeks retired to Salamis and Ægina, and the Albanians of the pasha's army plundered and wasted the country. The Greeks now collected in small corps in the hilly districts of Bœotia and Phocis, straitening the communications of the Turks, and cutting off their supplies. A strong reinforcement coming to the latter from Thessaly, was routed at Thermopylæ by Odysseus, with the loss of eight hundred men. The pasha shortly afterwards withdrew from Attica and Bœotia, and the Athenians from Salamis re-occupied the town, and resumed the blockade of the citadel in November. In the extreme north the insurrection had been unfortunate. The Macedonian Greeks, who had taken refuge in the peninsula of Pallene, had their line of defence at Isthmus forced by Aboulaboud, and, except a portion who escaped by sea, were either killed or made prisoners. The monks of Athos capitulated to the same pasha, after two thousand of them had left the mountain. The people of Magnesia, when dividing the booty they had taken from the Mahommedans, were surprised and routed by the Pasha of Drama. A part sought shelter in the forests of Pelion, and part fortified themselves in the peninsula of Trikeri, or fled to the neighbouring isles of Scopelos and Skiathos. The thirty-five neat and flourishing villages of the district were mostly burned by the Turks. The Olympians, or Greeks of Pieria, also rose in arms, but at too late a period. The Pasha Aboulaboud had previously subdued the Christians of Athos and Macedonia, and being able to bring his whole force against them, routed them, and burned the 120 villages they possessed in the valleys of Olympus.

The Greeks of Macedonia, cruelly used by the Pasha of Salonica, were driven by despair to take up arms. Unable, however, to make head in the plain country against the Ottoman cavalry, they retreated to the peninsula of Cassandra, abandoning seventy villages, which the Turks burned. We must explain, however, that the rage of the Turks was excited to fury by the discovery of a plot formed by a Hydriot captain, to fire the arsenal at Constantinople, kill the sultan, and raise the Greek population.

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[1] See *History of the Greek Revolution*, by M. Tricupi, Greek Ambassador in London, tom. i., p. 76, who gives rather a different version.

The government, alarmed by this event, seized and executed the leading individuals of the Fanariot families, whilst some thousands of the other Christian inhabitants were massacred in their houses, without the least regard to legal forms. The death of the patriarch, a very old man, much esteemed for his virtues, and of a number of the other high clergy, created a great sensation. Salonica, Adrianople, and Smyrna, were the scene of similar barbarities. The last of these towns, in particular, was consigned to a general sack, like a city stormed. Kydonia, a Greek town with thirty thousand inhabitants, which had grown up in a few years, and was renowned for its college, where three hundred students received a superior education, falling under the suspicion of the Turks, was burned to the ground, and its people were forced to seek refuge in Psyra and other isles. The Greek ships, which were merely merchant vessels, carrying from twelve to twenty-four guns, would have been impotent against any navy but the Turkish; but by their superior seamanship, and a bold and skilful use of brulots or fire-ships, they often baffled or defeated strong squadrons of large men of war. Their first exploit of this kind was the burning of a Turkish seventy-four on the coast of Mytelene in June. This paralysed the operations of the capitan-bey for a little; but setting forward again, he arrived at Samos, the poor but brave inhabitants of which, forty thousand in number, had slain their Ottoman rulers, and now harassed the Turks of the neighbouring continent by frequent descents upon the coast. A large land force was collected to subdue them, and the capitan-bey attended with the fleet to co-operate. But the Turks were defeated with great loss in an attempt to land a thousand men, and a second armament was intercepted by the Greek fleet, who burned ten transports, whilst the soldiers escaped to the shore. The troops after this refused to embark. The Greek and Turkish fleets manœuvred in presence of each other, but parted without fighting, after the former had burned several fire-ships without effect.

Demetrius Ipsilanti, second brother of Alexander, travelling in disguise from Russia, landed at Hydra in June, and thence sailed over to the continent, where he was welcomed with extraordinary demonstrations of joy. He brought a small supply of money and arms, and a commission from his brother, investing him with the supreme command of the army. Patriotic, upright, brave, and accomplished, he unfortunately wanted the energy necessary for the post he assumed, and soon found himself thwarted in his views, and rendered incapable of effecting any thing, by the jealousy of the bishops and military chiefs. Prince Mavrocordato, another Greek of noble descent and considerable talents, arrived in the Morea a few weeks later. The Turks at this time were driven out of the open country, but held nine fortresses in the Morea, Patras, the castle at the adjoining straits, Navarin, Coron, Modon, Nauplia, Acrocorinthus, Monemvasia, and Tripolizza. The Greeks wanted both materials and skill for conducting regular sieges, and merely kept most of these places blockaded less or more strictly. Monemvasia, and afterwards Navarin, surrendered in August, in consequence of famine. The one capitulation was pretty faithfully kept; the other was most disgracefully violated by the massacre of the Turks, to whom a safe retreat had been guaranteed. The siege of Tripolizza was pressed with a little more vigour, as it was the capital of the peninsula, and contained a number of wealthy Turks, whose property was looked to as the prize of conquest. The city was defended by a wall fourteen feet high and two miles in circuit, flanked by a few towers with cannon, and its population was increased by refugees to 25,000 souls. The besieging army amounted to about 4500 men, which was less than the number of adults within the walls; it gradually swelled, however, as the increasing scarcity in the town multiplied the chances of a surrender. The contest was carried on by trifling skirmishes, till the Turkish cavalry, which was the only force dreaded by the Greeks, being entirely ruined, the besiegers were enabled to invest the place more closely. Famine was now doing its work upon the unhappy Moslemins, who were negotiating for a capitulation on the 5th of October, when some Greeks mounting a part of the wall which had been neglected (there was no truce), entered the town, and were immediately followed by the rest of the army. The place was completely sacked, and of ten or twelve thousand inhabitants, young and old, of both sexes, still remaining in it, about eight thousand are supposed to have been slain. A number of women were carried off as captives, and a few officers were spared for the sake of the ransom expected for them. Some Turks sold their lives dearly, and a party of forty cut their way through the Greeks, and escaped to Nauplia. The booty in money, shawls, jewels, dresses, pistols, sabres, and other articles, was very great, and led to petty contests amongst the victors. The town presented the aspect of a ruin. As a small counterpoise to this loss, the capitan-bey destroyed the village of Galaxidi, near Salona, and carried off thirty-four small trading vessels, the property of its industrious inhabitants. The Ottoman fleet at the same time revictualled Modon, Coron, and Patras. The Greeks made an attempt to surprise Nauplia, which would have succeeded but for the cowardice of the Moreots; and a large body blockading the castle of Patras were, owing to their gross carelessness, surprised and routed by a party of Turks who crossed at Lepanto. Thus terminated the year 1821.

The Turks of Crete, inspired with alarm by the appearance of Greek cruisers in the adjacent seas, began to strip the Christian inhabitants of their arms, and to butcher many of them in cold blood. A number of the latter, comprehending the brave and hardy mountaineers of Sphakia, were driven by this cruel usage to fight for their lives. In July, August, and September 1821, the insurgents, about twelve hundred in number, repeatedly defeated large bodies of Turks; but the pasha at length collecting an army of ten thousand men, overpowered them, and burned most of their villages.

A national assembly convoked by Prince Ipsilanti had met at Argos about the end of 1821, but finding that position insecure, it removed to Piada, near the ancient Epidaurus, in January 1822. The assembly chose Mavrocordato president, and adopted an organic law or constitution, framed on republican principles. The government was to consist of a senate of seventy members elected annually by the people, and an executive council of five persons. The constitution enacted equality of rights, the freedom of the press, and toleration in religion. The government was then organized. The executive council consisted of Mavrocordato, president; Kanakaris, Logotheti, Delhyani, and Orlando, members; and Theodore Negris, secretary. Seven ministers were also appointed for finance, foreign affairs, war, &c., whose names it is unnecessary to give. After passing a decree for a loan of 5,000,000 of piastres, the assembly closed its session on the 20th of January. The government thus erected proved a mere phantom. It had no means of coercing the military chiefs, who set its powers at defiance, and disdained even to pay it marks of outward respect.

The citadel of Corinth, a post of great importance, surrendered on the 26th of January 1822, when the Turks were inhumanly slaughtered, in violation of a compact to convey them away in safety. The Greek government fixed itself here for some months, and issued a variety of decrees, which were very little attended to. The death of Ali, pasha of Yanina, who was shot by the Turks in February, after giving himself up on a promise of personal safety, made a considerable change in the position of the Greeks. Kourschid Pasha shortly after sent an army of 17,000 men to attack the Suliotes, who, though numbering only 4000 warriors, including Epirots, made so obstinate a resistance with the aid of their rocks and woods, that the Turks were finally compelled to retreat with a heavy loss, and the pasha had no resource but to turn his active hostilities into a blockade. Mavrocordato arrived at Messolonghi in June, commissioned to act as captain-general of Western Greece. Anxious to succour the Suliotes, he marched northward with 3000 men to Petta near Arta. Here he was attacked by 10,000 Turks, and in consequence of the treachery of Gogos, one of the Armatoli chiefs, his little army was overpowered, and lost four hundred men, including two thirds of the small corps of disciplined Philhellenes. He made his way back to Messolonghi; and the Suliotes, reduced to extremity, signed a capitulation with the pasha, by which the existing remnant of three hundred and twenty men, and nine hundred women and children, were transported to Cephalonia, with their arms and baggage, at the pasha's expense, with a douceur of two hundred thousand piastres superadded. Released from this troublesome enemy, Omar Pasha approached Messolonghi in October with ten thousand men. The town had scarcely any defences, and the garrison being under four hundred men, he might have carried it by a *coup-de-main.* He spent some weeks, however, in a state of inaction, or in trifling negotiations, and this interval Mavrocordato diligently improved, by raising new works, whilst a reinforcement of men from the Morea increased the garrison to upwards of 2000 men, and the Greek fleet brought supplies of ammunition and arms. The rainy season too having set in, spread sickness through the Turkish camp; and the pasha, now aware of his error, and anxious to retrieve it, attempted to carry the works by escalade before daylight on Christmas morning, when he supposed the Greeks would be at their devotions. They had previous information, however, and beat back the Albanians at every point, with the loss of six hundred men. The pasha now began his retreat, obstructed by the swoln rivers, and harassed at every step by the Acarnanians, who where up in arms; he reached Previsa with the wrecks of his army in February 1823.

In the Ægean Sea the spring of 1823 was marked by the most unfortunate and tragical event which distinguished the revolution; the entire destruction of the happy and prosperous Greek community of Scio. This island contained 120,000 Christian inhabitants, whose peaceful habits, intelligence, industry, and wealth, exhibited a picture of civilization unrivalled in the other parts of the Turkish empire. They were unwarlike, but being mildly governed, they desired no change. When the Hydriot fleet appeared, they entreated the admiral to leave their coast, and not compromise them with the Porte. Two adventurers, however, one of them a Sciot by birth, who had spent his life abroad, the other a Samian, in an evil hour, planned an expedition to dislodge the Turks, which was too feeble and ill supported to accomplish its object, but strong enough to alarm the Porte, and bring ruin on the unhappy islanders. Leaving Samos in March 1822, with a flotilla of eight brigs and thirty launches, filled with one or two thousand men, the two adventurers, Bournia and Logotheti, disembarked near Scio, and entered the town without experiencing any resistance. They were coolly received by the inhabitants, who dreaded the vengeance of the Turks; but the citadel with a stout garrison held out against them, and disturbed them by frequent sallies. A month passed away thus, when the Ottoman fleet suddenly appeared before the town, and driving off the few Greek ships stationed there, conveyed over a part of an army of thirty thousand men collected on the opposite Asiatic coast, which is only ten miles distant. The Turks carried the town by assault on the 15th of April, putting to death the men, young and old, without mercy, and not even sparing women and children. A part of the town was burned, and what escaped the fire was destroyed otherwise. For a month crowds of armed barbarians wandered over the island, wasting and plundering. It was calculated that 25,000 of the Sciots were slaughtered, and 45,000 dragged into slavery; 15,000 were saved at first in the Mastic villages, the property of the sultan, but were afterwards massacred; the rest escaped, or were absent when the catastrophe occurred; but those who saved their lives lost every thing else, and the most opulent families of which Greece could boast were thus reduced in an instant to beggary. In August the island did not contain above 1800 Greeks, out of the 120,000 who peopled it in March. If the Hydriot fleet had appeared in proper time, the Turks could have been prevented from disembarking, and, with moderate diligence, the town might have been secured against a sudden assault. But the insurrection was no less rashly planned than ill conducted, and the horrors in which it terminated filled all Greece with unavailing lamentations. A strong fleet sailed from Hydra when it was too late; but it achieved nothing except burning the Turkish admiral's ship, in which more than 2000 men perished. This exploit was accomplished in a very gallant manner, by Canaris, a high-spirited patriot, whose name, and that of Miaulis, are associated with the most brilliant achievements of the Greek navy in the history of the war.

In Eastern Greece a desultory warfare was carried on in the spring of 1822. The Greeks of Mount Œta, Othrys, and Pelion, harassed the Turks in the south-eastern plains of Thessaly, but without gaining any advantage. An attempt was made to dispossess the Mahommedans of Eubœa, but it miscarried. The Athenians had tried to bombard their citadel, but they wanted skill and an adequate supply of projectiles; they then mined parts of the wall, but could not produce a practicable breach. At length, however, famine did their work. The Turks capitulated on the 22d of June, and though their personal safety was guaranteed, a large number of them were, as usual, massacred in cold blood, and the rest were saved with difficulty by the Frank consuls.

Kourschid Pasha had been collecting a large force in Thessaly, but the Greeks, with their usual negligence and want of foresight, though apprised of the fact, made no defensive arrangements till the enemy was in the heart of their country. The Turkish army, twenty or thirty thousand strong, chiefly cavalry, with a small body of infantry and artillery, crossed the Sperchius, seized the defiles of Mount Œta, and entered Bœotia in the beginning of July. Odysseus, who had charge of the Pass of Thermopylæ with 4000 men, either from weakness or treachery, offered no resistance. The Pasha Dramali, the commander of this army, burned Thebes, passed Cythæron and the Dervend of the isthmus unopposed; and the impregnable castle of Corinth, though victualled for three months, fell into his hands by the pusillanimity of the garrison, without firing a shot. From Corinth he pushed on to Nauplia, the Greeks everywhere leaving their houses and flying in the utmost consternation at his approach. No one thought of fighting, till Demetrius Ipsilanti threw himself with a small party into the ruined castle of Argos, not with the hope of making an effectual resistance, but in order to gain time, and induce the fugitives to rally. The manœuvre succeeded. A pause took place in Dramali's operations, during which Colocotroni arrived from the interior with a considerable force, which he drew up between the mountains and the sea near Lerna, strengthening his position with some hasty works calculated to render useless the cavalry, which was the pasha's right arm. After skirmishing for one day, with little success, the Greeks wisely resolved to wait the effect of scarcity upon their enemies, having previously burned all the standing corn. The Turks soon exhausted their stock of provisions by their wasteful habits, and Dramali had neglected to secure his communications with Corinth and Northern Greece, by guarding the passes. The insalubrity of the soil, and the inconsiderate use of unripe fruit at the same time, gave birth to fevers, which cut off numbers of his men; whilst the cattle brought for food, and the cavalry horses, died in thousands from want of fodder. Pressed by these evils, and unable to force the entrenchments in his front, he began his retreat on the 5th of August. The Greeks, however, who had divined his purpose, stationed some thousand men in the mountainous defiles, who assailed him in his flight, and, besides killing 2000 of his soldiers, captured all his treasure and baggage, with a vast number of horses, mules, and camels. Many more of the Turks died at Corinth, where marsh fevers prevailed, and amongst these the commander, Mahmoud Dramali. A great number of the survivors were destroyed in an attempt to reach Patras by land; and at the commencement of winter only a small remnant was in existence of the formidable army which, three months before, seemed powerful enough to overwhelm Greece.

The Palamede, or castle of Nauplia, pressed by famine, capitulated in the end of December; and for once the Turkish prisoners were allowed to depart in safety. The Greeks who held the citadel of Athens gave up the command of it to the crafty and treacherous Odysseus, a choice of which they had reason to repent. The Turkish fleet, instead of supporting the army, sailed round the Morea to Patras, and on its way back to the Hellespont a ship of the line was burned by the intrepid Canaris.

In February 1823 a second Greek congress assembled at Astros in Argolis, and was attended by 260 deputies. Feuds ran so high between the parties that it was difficult to prevent bloodshed. It broke up at the end of April, having appointed Petro Bey president of the executive council, and fixed Tripolizza as the seat of the government. Its decrees, however, were treated with contempt by the military chiefs, who soon compelled the executive to seek refuge in Salamis. The transient gleam of prosperity caused by the retreat of the Turks had kindled a violent spirit of disunion; and the nation was now rent into factions, headed by men like Colocotroni, Petro Bey, Londos, Delhyani, Odysseus, Ghouras, and Panourias, who, having been originally *klephts* or robbers, retained the craft, ferocity, and rapacious habits of their primitive vocation, and, when the enemy was no longer present, thought of nothing but plundering the people, and assassinating one another. The men of better principles, Mavrocordato, Ipsilanti, and Conduriotti, armed only with resolutions of the national congress, had no power to awe these ruffians and their military bands into obedience. The country, in fact, was everywhere a prey to anarchy, and as early as 1823 the wiser part of the people began to broach the scheme of inviting a foreign prince to accept the sovereignty of Greece.

In the early part of the year 1823 the Turks of Eubœa made predatory incursions into Attica and Bœotia; whilst the Greek mariners of Psyra and Samos made descents on the coasts of Asia Minor, plundering the towns, and carrying off wealthy Mahommedans prisoners for the sake of the ransom obtained for their liberation. In June, however, a Turkish army of 6000 men broke into Phocis and Doris, and advanced to the neighbourhood of Athens. The Greeks, as before, avoided battles, but encamping on the heights, cut off detachments and foraging parties; and ultimately this force melted away by casualties or desertion, without accomplishing any thing of importance. An expedition undertaken by Odysseus to drive the Turks from Eubœa miscarried; and the Christians of that isle having risen in arms, were vanquished, and compelled to seek refuge in the isles of the Ægean, after witnessing the destruction of the 150 villages they possessed. The principal effort of the Turks, however, was made in Western Greece. The Pasha of Scodra led an army of 5000 Mirdites or Albanian Christians into Acarnania. Messolonghi at that time was without men or arms, and almost defenceless. Marco Bozzaris, a brave Suliote, with a small corps of his countrymen, finding himself unable to arrest the pasha in his march, conceived the bold idea of surprising him in his camp. The attack was made in the night time; but of the three parties of Souliotes, two slunk back; and the third, led by Bozzaris, consisting of only 350 men, after storming several tambourias, and making a horrible slaughter of the enemy, finding itself unsupported, retired with the loss of one third of its number, including its intrepid commander. The Pasha of Scodra now joined Omar Vrioni, and the two approached Messolonghi; but the town was by this time garrisoned and provisioned; and the Ottoman commanders having an extravagant idea of its strength, turned aside to besiege Anatolico, a paltry village a few miles distant. They bombarded it for some weeks, till the rains setting in, and spreading sickness amongst their troops, forced them to retire in November. No solicitations could induce the Pasha of Scodra to engage in the invasion of Greece a second time.

In Crete the insurrection opened in 1823 with a promise of success, which was not realized. Affendouli, the former chief of the insurgents, having lost his influence, resigned; and Tombazi, a Hydriot, and an able but rapacious man, was elected leader in his place, and dignified with the Lacedemonian title of Harmost. He arrived in Crete with 1200 Rumeliots and Moreots, and a few small armed vessels, early in the summer, and being joined by the Sphakiots, gained several advantages over the Turks. Kissamos, a fortified post, fell into his hands by capitulation, but his troops were routed at Khadeno, and failed in an attack upon the Mahommedans of Selino. The sea being in the mean time open, the Pasha of Egypt disembarked two successive bodies of disciplined troops. The last of these, which landed at Canea in September, routed the insurgents in the neighbourhood of that town, and carrying fire and sword throughout Sphakia and the other disaffected districts, completely extinguished the insurrection. In the course of the year the capitan-pasha sailed as far as Patras, and afterwards paraded his fleet about the Ægean; but the whole extent of his achievements consisted in relieving Carysto, and reducing the Magnesians of Trikeri; whilst some of his smaller vessels were run ashore and destroyed by the Greeks. The citadel of Corinth, after a blockade of nine months, surrendered in November to Nikitas, who, in terms of the contract, faithfully secured the unmolested retreat of the Mahommedans. Whilst the Greeks thus prospered externally, there was nothing but dissensions among themselves. "The members of the executive," says Mr Gordon, "with the exception of Zaimis, were no better than public robbers.... Every corner of the Morea was torn to pieces by obscure civil contests, and hardly any revenue came into the treasury."

The efforts of the Greeks to liberate themselves from the Turkish yoke had from the first excited the sympathies of Western Europe; and in 1823, when their resistance began to rise above the character of a transient rebellion, these sympathies produced small succours in men and money. In England, France, Germany, and Switzerland, subscriptions were raised, the value of which was generally sent out in ammunition or military stores. Small corps of volunteers, actuated by a fine enthusiasm, also went from Western Europe, and though universally disgusted with the treatment which they received, they always fought bravely, and often rendered very important service. Amongst these foreigners, who received the appropriate name of *Philhellenes*, no one was the object of such universal interest as Lord Byron. His lordship disembarked at Messalonghi with 8000 dollars in specie, on the 5th of January 1824, and was received with the most extravagant marks of joy. Shortly afterwards Lieutenant Parry arrived with some small field-pieces, supplies of powder, shot, and tools, sent by the Greek committee in London. His lordship took into his pay a corps of 500 Suliotes, whose insolence and rapacity rendered it soon necessary to expel them from the town, or rather to purchase their absence with a sum of money. The Rumeliots who replaced them were not much better; and Byron found himself so incessantly teased for money, so distracted by the turbulence of the military, the intrigues and dissensions of the different parties, that his mental anxiety preying on his frame, produced a shock of apoplexy, by which his health was seriously injured. A fever followed some time afterwards, and carried off this gifted man, on the 19th of April, amidst the lamentations of the Greeks, who atoned in some degree for the vexation they had caused him, by the sincere homage which they paid, and still pay, to his memory. After his death the mutual jealousies of the chiefs became more violent than ever, and the summer passed away in a state of comparative inaction. Mavrocordato advanced with 2000 men to the Gulf of Arta in August, and skirmished with the Turks, till the rains in November forced him to retire. In the east a body of Turks, who penetrated into Bœotia and threatened Athens, retired without effecting any thing. Ghouras, who held the citadel of that town for Odysseus, having quarrelled with the latter, got him into his power, and put him to death.

The naval campaign of 1824 was signalized by two unfortunate events. The small and prosperous isle of Kasos, of which Savary gives so interesting a description, was invaded by an Egyptian force, and entirely ruined, 2000 of its inhabitants being sold into slavery. The Porte, greatly exasperated by the active hostilities of the Psyriots, whose ships preyed on the Ottoman trading vessels, and insulted the coasts of Asia Minor, sent a powerful fleet against them under the capitan-pasha, with 14,000 troops on board. The island of Psyra is small and barren; its rocky coasts render disembarkation difficult; and its inhabitants, whose numbers had been increased to fifteen or twenty thousand by emigration from Scio, trusting to their courage and the natural strength of their territory, had taken no pains to secure themselves by artificial works. The small Greek fleet stationed off the harbour fled at the approach of the Moslemins, who, under cover of a false attack, landed a strong force at the north extremity of the isle, and gained possession of the hill which rises above the town. This unexpected success produced a panic among the timid refugees, which spread from them to the Psyriots; men and women threw themselves into the boats and attempted to escape, whilst the Turks entered the town unresisted, and laid it waste with fire and sword. In the midst of this miserable rout, a band of 600 refugees from Mount Olympus and other parts of Macedonia distinguished themselves by a feat of heroism worthy of ancient Greece. Throwing themselves into the convent of St Nicholas, where they had placed their wives and children, they resisted the attacks of the whole Turkish army, till two thirds of their number were killed. All hopes of relief being at an end, they resolved to blow up the convent. Their fire having accordingly ceased, the Turks scaled the walls on every side, when suddenly, says Gordon, the Hellenic flag was lowered, a white banner inscribed with the words *Liberty or Death* waved in the air, a single gun gave the signal, and a tremendous explosion, shaking the isle, and felt far out at sea, buried in the ruins of St Nicholas thousands of the conquerors and the remnant of the conquered. This happened on the 5th of July. Only two of the Greeks were taken alive. The loss of life was great in Psyra; and the island, which might have been saved by a little foresight and exertion, was completely ruined. After the deed was done the Greek fleet appeared, took some Turkish vessels, and destroyed a small corps of Janizaries left on the island. From Psyra the capitan-pasha proceeded to Samos, but here all his movements were watched by the Greek fleet; and his attempts to convey over an army from the mainland were not only defeated, but he lost three ships of war and a thousand men, and at last retired from the shores of Samos completely baffled.

The sultan, made sensible, by the failure of three campaigns, of the inefficiency of his own fleets and armies, delegated the task of re-conquering Greece to the Pasha of Egypt, whose ambitious views made him listen readily to the request of his nominal superior. In the beginning of August, Ibrahim, the pasha's adopted son, sailed from Alexandria with a powerful fleet of ships of war and transports, amounting altogether to 400 sail, with 17,000 men on board, 2000 horses, and a strong train of artillery. He put into the bay of Macri, the ancient Telmessus, to water, and shortly afterwards was met by the Greek fleet of seventy sail, carrying 700 guns. For more than three months Ibrahim manœuvred amongst the gulfs and isles on the coast of Caria, endeavouring to beat off the Greeks, and proceed on his voyage; but though he counted six guns and six men for every one his enemies could muster, his mariners were so wretchedly deficient in skill, that he was continually baffled, and at last thought himself fortunate in escaping to Crete in the beginning of December, with the loss of two fine frigates and four brigs of war blown up, fifty transports taken or sunk, and 4000 soldiers and seamen slain or drowned, exclusively of some thousands who died of disease.

The first Greek loan was negotiated in London in February 1824. The nominal amount was L.800,000, of which all that was available, after deducting interest, commission, sinking fund, &c. was L.280,000. It served to quicken the operations of the government, and no doubt contributed materially to the success of the fleet, and the defeat of Ibrahim. In the Morea fierce civil war raged, Colocotroni, Londos, Sisini, and other robber chiefs, setting the government at defiance. They were crushed, however, by the vigorous efforts of Colletti, the secretary; but the Rumeliots, by whose agency he put them down, proved a scourge to the country by their rapacity.

Ibrahim having procured reinforcements from Egypt during the winter, set sail from Suda in February 1825, and landed with 4000 men at Modon on the 24th, a day pregnant with sorrow to the Greeks. The success of their naval efforts in the preceding year showed that, with common activity, they might have prevented the disembarkation; but no precautions were thought of, partly from want of foresight, partly from a feeling of false security, which led them to think that the Egyptians would be as feeble adversaries as the Turks. Ibrahim attempted nothing till he had brought over additional corps, and raised his army to 11,000, and afterwards to 15,000 men. He then commenced the siege of Navarin, defeated 7000 palikars who tried to relieve it, breached the walls, carried some outworks after hard fighting, and gained possession of the place by capitulation on the 18th of May. Thence he advanced into the interior, burning the villages, which the Greeks deserted on his approach. Colocotroni endeavoured to arrest his progress in the mountainous defiles, but without success; Tripolizza was burned by its inhabitants; and Argos shared the same fate at the hands of the Egyptians. Nauplia was threatened, but

Ibrahim had no battering artillery; and dreading the want of provisions, he retreated towards Messenia. The Greeks, who had assembled to the number of 7000, attacked him near Tripolizza, but were beaten so completely that they gave up all further thoughts of resistance in the open field. In August and September the pasha ravaged the valleys of the Alpheus and the Eurotas, destroying the town of Misitra and a number of villages, and then returned to Modon. One or two gallant feats were performed by the Greeks during this unfortunate campaign. A small body of 300 men under Papa Flessas, surrounded by many thousand Egyptians, defended themselves with the bayonet and the but-ends of their muskets, till the whole perished except two, who lay hid under the slain; and at the Mills of Lerna, Ipsilanti, with a few hundred men, baffled the main body of the pasha's army.

In Northern Greece, Redschid Pasha, the most energetic of all the sultan's officers, had been intrusted with the conduct of the war. Leaving Yanina, he arrived in May before Messolonghi, which contained about 5000 of the bravest Greek soldiers, and opened trenches. The works were carried on with vigour, in the face of a most determined resistance. Elevated mounds were raised to command the batteries of the besieged, and mines were sunk; the Franklin bastion, the most exposed part of the defences, was laid open by breaching, and repeated attempts were made by the Turks to take it by assault, in one of which they at length succeeded; but the Greeks, no way daunted, sprung a small mine, and rushing upon their enemies sword in hand, dispossessed them, and following the Turks into their lines, destroyed some of their batteries. Fresh efforts were made by the pasha, and still frustrated by the courage of the Greeks, till the winter rains in October compelled Redschid to suspend his operations, and coop himself up within a fortified camp near the town. Ibrahim, who had received a great accession of force in November, now determined to try a winter campaign, and gratify the Porte by conquering Messolonghi. Marching northward, he burned the villages of Elis, and crossing the Straits of Lepanto, encamped before Messolonghi in January 1826. He began by offering terms to the besieged, which were proudly rejected. His batteries were more skilfully constructed than those of the Turks, and his artillery better served; but after he had ruined part of the town's defences, his attempts to storm were constantly defeated by the Greeks, who, in fighting hand to hand, with sword or bayonet, were vastly superior both to the Turks and Egyptians. The siege would indeed have ended in total failure, if he had not succeeded, at a great expense of life, in reducing various outworks commanding the channels of the lagoon by which the besieged communicated with the sea, and received supplies of provisions. Starvation now accomplished what arms could not achieve. After every thing edible, whether wholesome or unwholesome, was consumed, the remainder of the gallant garrison adopted the resolution of cutting their way through the enemy's lines. A deserter betrayed their plan to the pasha, who was fully prepared to receive them. Formed into two bodies, they issued from the town by moon-light on the 22d of April; a false alarm induced the one to return: the other, raising a simultaneous shout, "On, on, death to the barbarians," rushed forward with their muskets in their hands, and their sabres slung to their wrists. "Neither ditch nor breastwork," says Gordon, "neither the flashing peals of cannon and small arms, nor the bayonets of the Arabs, could arrest the tremendous shock; in a few minutes the trenches were cleared, the infantry broken, the batteries silenced, and the artillerymen slaughtered at their guns." Of the other body which returned to the town, some escaped in boats, some by wading through the lagoon, some voluntarily blew themselves up with a number of the enemy, when the latter entered the powder magazine, and not a few of the survivors died of fatigue and exhaustion before they reached Salona. The heavy loss of the Turks and Egyptians during the siege attested the superior valour of their enemies; and the heroic defence of Messolonghi may well vie with the proudest achievements of ancient Greece.

In Eastern Greece, Colonel Fabvier, a brave and zealous French officer, formed a corps of regulars or tacticos, and carrying them over to Eubœa, made an attempt on Carysto, which failed. No drilling, in fact, could induce the palikars, or Greek irregulars, who had been accustomed to rely entirely upon their strength, agility, and adroitness, to meet a steady fire when drawn up in line. Another national assembly was held at Piada in Argolis, but it effected nothing. After the fall of Messolonghi, Redschid Pasha invaded Attica, and took Athens, but failed in his attempts upon the citadel, into which, when its garrison was greatly reduced, Colonel Fabvier introduced 600 men, with a supply of powder. The glorious fall of Messolonghi had awakened an enthusiasm in Western Europe in favour of the Greek cause, and contributions to the amount of not less than L.70,000 were raised in 1826. The royal families of Bavaria, Prussia, and Sweden, and the king of France, were amongst the contributors.

In May 1827 Ibrahim invaded the country of the Mainots, but was defeated in all his attempts to penetrate their mountain fastnesses. The rest of the summer was spent in ravaging the open country, and burning the villages, the inhabitants of which took refuge in woods and caverns. To his great mortification, none of the people made their submission, and parties of irregulars watched his movements, cutting off stragglers, and intercepting convoys. Lord Cochrane arrived in Greece in March 1827 with a steam-frigate. A very splendid frigate, built in America, also reached Ægina this year, but proved of no great use, the Hydriot mariners being unaccustomed to manage vessels of such a size. These two frigates were nearly all that the Greeks derived from a second loan of L.2,000,000 negotiated in London in February 1825.

General Church, an Englishman who had served in a Greek corps formerly kept in English pay in the Ionian Isles, arrived by invitation about the same time. They found the Greeks rent into factions furiously hostile to each other. It is a memorable fact, that whilst Ibrahim was wasting the Morea, there were no less than seven petty civil contests raging in different parts of Greece! By the influence of Church, Cochrane, and Captain Hamilton of the Cambrian, a temporary reconciliation was effected between the adverse parties, and the necessity of having a foreign chief being generally acknowledged, a congress assembled at Trœzene in April, and elected Count Capo d'Istrias president for seven years. Church was appointed general of the land forces, and Cochrane admiral of the fleet. The fortunes of Greece were now at a very low ebb; but what power remained in the country was summoned up in an expiring effort. From the Morea, the isles, and Western Greece, a force of nearly 10,000 men was collected at Salamis and the Piræus. After carrying on a war of posts, chiefly at Port Phalerus, for some time, General Church was persuaded to risk a battle with the Turks in the plain of Athens, the object being to relieve the citadel. The result was a disastrous defeat on the 5th May, in which the Greeks lost 1500 men. The remaining troops dispersed, and the citadel capitulated. The only fortified posts now in the hands of the insurgents were Nauplia and the Acrocorinthus.

Relief was, however, approaching from another quarter. From circumstances which it would be tedious to explain here, the policy of the great Christian powers had undergone a change. A protocol had been signed at Petersburg in April 1826, by the Russian and British ministers, the object of which was to effect an accommodation between the Porte and the insurgents, by erecting Greece into a dependency of the Porte, paying a fixed tribute, but having the entire regulation of its own affairs. On the 6th July 1827 a treaty of intervention was signed between France, Russia, and Britain, on the same basis. The sultan firmly denied their right of interference, for which, however, the piracy practised by the Greeks gave them a good pretext. A naval force was sent into the Mediterranean to inforce the provisions of the treaty, and the belligerent parties in Greece were enjoined to suspend hostilities. The Greeks joyfully agreed; but Ibrahim hesitated, as the measure was not sanctioned by the sultan; and the capitan pasha, who was lying in the harbour of Navarin with a strong Turkish fleet, having similar scruples, the warlike movements were partially continued. The combined fleets of England, France, and Russia, stood into the Bay of Navarin in order of battle on the 20th October. Though the intention of the admirals was to treat, the Turks believed they came to fight, and were anchored in smooth water to receive them, and supported by batteries on shore. Who began the battle is uncertain; but it was obstinate and bloody, and most destructive to the vanquished party. About 6000 Turks were slain, and of 120 men of war and transports, all were sunk or destroyed except twenty or thirty brigs and corvettes. The killed and wounded on the side of the allies amounted to 626. The victory produced unbounded joy among the Greeks, and excited them to make a new attempt upon Scio, by an expedition under Colonel Fabvier, which, though conducted with great courage and skill, ultimately failed. Ibrahim, seeing his communications with Egypt now cut off, obtained his father's authority, and agreed to evacuate the Morea. He sailed in the beginning of October 1828, leaving, according to stipulation, about 8000 troops in Patras, Modon, Coron, Navarin, and Castle Tornese, of whom 1200 were Egyptians. To avoid renewed hostilities between the Greeks and Turks, a French army was sent to the Morea in the autumn, and took possession of these five fortresses, the last being the only one that offered any resistance.

Count Capo d'Istrias passed from Petersburg to London and Paris in the end of 1827, and after conferring with the British and French ministers, he set sail from Toulon, and landed at Nauplia on the 18th of January 1828. The people received him with great joy, hoping to find repose and security under his government; and his authority was acknowledged at once by the military chiefs and other functionaries of all descriptions. He was a clever and dexterous diplomatist, but his conduct as president seems not to have been judicious. Anxious to copy the centralising system which prevails in absolute monarchies, he dissolved the municipalities, and nominated prefects, judges, and other officers, deriving their authority entirely from himself. Many of his appointments also gave offence: among others, the nomination of his brother Augustin, a person of no ability, to the command of Western Greece, led to the resignation of General Church in 1829, after that officer had recovered all the country south of the Gulf of Arta from the Turks. The French troops, it is to be observed, confined themselves to the Morea, such being their instructions, and left the Greeks to carry on hostilities in the north with their own means.

The Porte obstinately rejected the arrangement proposed by the three powers in 1827, till it was humbled by numerous defeats in 1828 and 1829, and saw the Russian army within a few leagues of its capital. The stipulations in behalf of Greece made by Nicholas were, however, set aside by the governments of France and Britain, and it was settled that the affairs of that country should be discussed in London. The conference held there, after much deliberation finally resolved that Greece should be erected into a monarchy entirely independent of the sultan, and ruled by a Christian prince. The crown was offered, in the end of 1829, to Prince John of Saxony, who refused it; and then to Prince Leopold of Saxe-Cobourg, who agreed to accept it; but having corresponded with Capo d'Istrias, the latter artfully infused so many doubts and apprehensions into the prince's mind, that he resiled from his engagement. This was in May 1830. Other princes, it is said, were proposed, but nothing was decided; and in the mean time Greece was again falling into a state of anarchy. The popularity of Capo d'Istrias' government was of short duration. Visibly the partisan of Russia, he showed a devotion to her interests which offended all the more independent Greeks. He extinguished the freedom of the press, which the people were perhaps more eager to possess than fitted to enjoy; established a council, called the Panhellenion, which was intended to supersede the elective senate; refused to publish any account of the national finances, and threw many popular leaders into prison. These and other measures produced violent discontents, which at last broke out into open rebellion. The Mainots, whose prince he had placed in durance, were the first to throw off his authority. They were followed by the people of Hydra, who established a provisional government, at the head of which were Miaulis and Condouriotti, assisted by Mavrocordato. The French and English ships of war in the Archipelago stood neutral; but the Russian admiral, Ricord, eagerly took a part in the contest, on the side of the president. With this aid he attacked Poros, where the Greek fleet lay; but the islanders had anticipated his design, and, when the loss of their ships of war became inevitable, blew them up to prevent them falling into his hands. Whilst this contest was going on, the son and brother of Mavromichaeli, the captive bey of Maina, instigated by a feeling of revenge, came to Nauplia and assassinated the president at the door of a church, on the 9th of October 1831. One of the assassins was murdered on the spot by the people, and the other was seized, tried, and executed. A new commission of government was then appointed, consisting of Augustin Capo d'Istrias, with Coletti and Colocotroni, who thought it prudent to convoke a national assembly. Loud complaints were made that the free choice of the people was defeated by force and fraud; and when the assembly met in December, it speedily separated into two hostile bodies, one of which remained at Argos, while the other seated itself at Megara, and thence fulminated decrees against Augustin and his associates. The Moreots generally adhered to the former, the Rumeliots to the latter. Civil war now raged furiously in the country, and the peaceful cultivators were driven, as in the time of the revolutionary struggle, to desert their homes, and seek refuge in the woods and caverns. This lamentable state of things probably quickened the languid proceedings of the conference in London, who in May 1832 fixed upon Otho, second son of the king of Bavaria, as the sovereign of Greece. The prince was born in 1815, and was of course a minor; but the defect was supplied as far as possible by a council of regency. The three powers, parties to the conference, obtained an extension of territory and a better frontier for the new state, including the province of Acarnania, for which, however, a price was to be paid to the sultan; and, in order to put Otho in a condition to meet initiatory difficulties, they guaranteed a loan of L.2,400,000 for him, to be paid in three equal annual instalments. Otho landed at Nauplia on the 31st January 1833, attended by 3600 Bavarian soldiers, and was warmly welcomed by the people. The French troops had been gradually reduced, and were now entirely withdrawn. The regency commenced the work of organizing the government, made a new division of the country, disbanded the palikars, formed a small body of Greek regulars, and took some steps towards the establishment of tribunals. As might have been expected, its endeavours to introduce order soon awakened the factious spirit of the klephts or military chiefs, some of whom, including the arch-anarchist Colocotroni, were tried for plotting the overthrow of the government, convicted, and sentenced to imprisonment or exile.

(The preceding narrative, as far as the end of 1827, is abridged from Mr Gordon's *History of the Greek Revolution*, Edinburgh, 1832; an able, impartial, and instructive work.)

In the whole course of the war, the Greeks never had any regular army; for the attempts to form a corps of disciplined troops, and keep them in pay, always failed. Their soldiers, with the exception of some small bands of Armatoles, consisted of peasants who took up arms for a few months, when the enemy made an irruption, and fought till he was expelled, or driven into the fortresses. They made war as irregulars, seldom encountering the Turks in the field, but posting themselves in defiles, and on mountains, taking advantage of rocks, inequalities of the ground, villages, or ruined buildings; and where these were wanting, covering themselves by small temporary parapets of earth or stones, called Tambourias. The Rumeliots were excellent marksmen, and admirable at defending a post. A hundred of them planted in a ruined monastery seldom failed to beat off one or two thousand Turks. Their defeats were chiefly owing to three circumstances: first, their entire want of cavalry—for as infantry they were superior to their enemies; secondly, their deficiency in artillery, both for service in the field, and for battering fortified posts; thirdly, their incorrigible neglect of order and discipline, in consequence of which they were often surprised and routed by a contemptibly inferior force. As obstacles to their success, we must also mention their mutual animosities, the rapacity and selfishness of their chiefs, and their habit of neglecting all advantages for the acquisition of spoil. Their fleet was better managed than their army, but its operations failed on many occasions, from the mutinous spirit of the sailors, and the habit, which they could scarcely ever be persuaded to abandon, of returning to port to see their families at the the end of every month, however pressing might be the occasion for their services. With all their faults and errors, it is impossible to read the history of the revolution without feeling respect for their courage, and for the unconquerable spirit which bore them up under the most dreadful privations and reverses.

In June 1835 King Otho assumed the reins of government, in which he was assisted by a council of state, nominated by himself. The whole territory was divided into communes of three classes: the first, those containing a population of 10,000 and upwards; the second, those from 2000 to 10,000; the third, of less than 2000. The communes of the first class were governed by a demarchos or mayor, 46 paredroi or aldermen, and a municipal council of 18; the smaller communes, by a demarchos, with proportionably fewer aldermen, and a less numerous council. The election of the municipal officers was vested in the male inhabitants above 25 years of age, and every commune was responsible for the acts of violence and robbery committed within its jurisdiction.

So necessary was repose to all classes of the people after the ravages of a long war, that the first years of Otho's reign passed in comparative tranquillity, although the sullen murmur of discontent was frequently heard, especially with reference to the state appointments, which were filled by the king's German friends, to the exclusion of the native Greeks. Otho refused to establish a representative system of government till September 1843, when the people rose and accomplished a revolution which has hardly any parallel for the skill and success with which it was executed. There was neither bloodshed nor violence, nor was the personal safety of the king in anywise endangered. But the plans being matured, and the army gained over, the ministers were arrested, and the people, assembling in front of the palace in the middle of the night, demanded a constitution. The king appeared at a low window, and they presented to him a charter including a representative government and other popular objects, and enforcing the dismissal of the Bavarian and other foreign officers. The king was required either to sign this charter or to quit the shores of Greece at once and for ever, in a vessel which had been equipped, and was lying ready for his embarkation. At first he promised to consider the demand and consult his ministers; but he was informed that the ministers were no longer recognised, and that an immediate decision was necessary. The king now acceded with as good a grace as he could; the obnoxious ministers were released, and the new ministry, selected by the constitutionalists, repaired to the palace, where they afterwards appeared with his Majesty on the balcony, while the people cried "Long live the constitutional King;" and the affair terminated apparently to the satisfaction of all parties. It is said, however, that before long the constitution had become a veritable farce, the deputies being in every case direct nominees of the king, and military force being employed, when necessary, to carry the candidate of the government. Not only the chambers, but the whole civil and military administration, had become little else than a refined system of corruption. The judges likewise, the professors of the university, and the masters of the gymnasia and inferior schools, fell under the unlimited control of the government, being all removable at pleasure.

The only subsequent events of general interest have been the interventions of foreign powers, rendered necessary by the duplicity of the government. The first of these was in 1850, when a British fleet blockaded the Greek ports for three months before the government would consent to compensate certain British subjects for injuries which had been inflicted on them. The other interference occurred at the commencement of the war between Turkey and Russia in 1854. In order to understand this movement, it is necessary to remember that two passions are predominant in the Greek mind—implacable hatred against the Turks, and an ardent desire to extend the kingdom of Greece. These feelings, which animate every Hellenic breast, received a further impulse from the consent of the king. On this subject foreign political opinions were divided as to whether the revolution was of Russian instigation. That the mass of the people believed in Russian assistance, and also that, through her influence, they would acquire an extension of their territory, there is no doubt; but we believe that the higher classes in Greece would not have advised such a revolution had they been at all aware that the Western Powers would have taken arms against Russia. They cannot be accused for their miscalculations, because higher authorities in Europe could not believe in the war at that early period. Besides, they knew well enough that Russia urged them to rise several times in the last century against the Turks, and, after she had accomplished her designs, left them to the revengeful sword of their masters. They had, therefore, little confidence in her. But the time chosen was so propitious, that an impartial judge would have accused them of being apathetic if they had not arisen. There appeared also an adverse feeling towards the allies, because we were in the peculiar position as defenders of their implacable enemies; but they forgot that, in defending Turkey, we served their interests by keeping their inheritance intact, out of the reach of the powerful hand of Russia.

We are of opinion, therefore, that the Greek nation has no sympathy with Russia more than with any other people who would make war against Turkey; and we believe, that if to-day we were to proclaim war against Turkey, there would be little necessity for sending our soldiers there, inasmuch as it would be sufficient to raise the standard of liberty for the Greek race, and we should have round us in a few weeks 100,000 well-armed Greeks, needing little more than ammunition.

The accusation, therefore, heaped upon the Greek nation, as being partizans of Russia, is unfair. Neither do we believe that either the king or queen of Greece stimulated the revolution to serve Russian interests. We cannot see what inducement they could have to endanger the throne they possess. Their ambition to extend their power was, we believe, the only reason; and how far that was their policy, and harmonized with the wishes of their subjects, is evidenced by the strong attachment towards them. The revolution, however, after the interference of the allies in favour of Turkey, was incompatible with their proclamation; and seeing that neither the revolutionists nor the king took heed of their advice, they were obliged to land some French and English troops at Piræus, and to send a few British ships into the Ægean.

The king was obliged to comply with their demands, dismissed his ministers, recalled his officers, issued proclamations to all Greeks that took up arms to return to their homes, and consented, on his own part, to submit the conduct of his government to the surveillance of the allies for a time. The ministers imposed upon him have been lately dismissed, and a new ministry formed, who conduct the affairs of the kingdom in a satisfactory manner. Severe measures have been taken against the scourge of the country—brigandage; and it is hoped that this time at least we shall see an end to their depredations.

It was only in 1816 that the first Greek house—E. Ralli and Co.—was established in London. In 1818 four more were established; and there are now 61 firms in London, 65 in Manchester, 30 in Liverpool, besides a few in Glasgow, and other parts of the United Kingdom. The statistics would be interesting if we could give an account of all the trade this small body of merchants is doing with this country and all other markets, but it is exceedingly difficult to get them. We only know that the exports of manufactured goods to Turkey in 1830 was L.1,028,447, whereas now it is above L.4,000,000, the increase of which is almost solely due to Greek enterprise.

The following statistics show that the progress which the Greek nation has made is highly creditable.

STATISTICS OF GREECE.

1. *Cultivated Land in* 1854.

	Stremata.		Stremata.
For Cereal	3,649,870	For Mulberry trees	240,000
... Olive trees	600,000	... Fig trees	150,000
... Vines	1,000,000		5,659,870

Cattle.

Sheep and goats	5,600,000	Mules	30,000
Oxen	160,000	Asses	7,000
Buffaloes	2,000		
Horses	90,000		5,889,000

Produce.

	Kilo.		Okes.
Wheat	2,669,000	Oil	1,600,000
Barley	1,223,600	Wine	16,200,000
Indian corn	2,830,000	Silk	70,000
Maize	281,900	Currants	60,000,000
Oats and other kinds of cereal	1,258,000	Valonia	14,000
		Wool	1,500,000
	8,262,500		79,384,000

Persons Employed in Agriculture.

Proprietors	52,590	Other labourers and servants	35,089
Field labourers	111,330		
Shepherds	37,669		

2. *Statistics of Silk.*

	Okes.	Drs.	Average price per oke.
1851	48,282	991,947	= 20·54 drs.
1852	60,771	1,999,970	= 32·91 ...
1853	56,770	1,774,063	= 31·25 ...
1854	—	1,353,018	
1855	70,000	—	

This proves not only an increase of production, but also an improvement in the quality; for, though the quantity has nearly doubled since 1851, instead of reducing the price, Greek silks are fifty per cent. dearer.

3. *Commercial Navy of Greece.*

	Vessels.	Tons.		Vessels.	Tons.
1821	440	61,449	1844	3414	146,703
1834	2891	—	1845	3584	161,103
1835	3370	—	1848	3983	255,233
1838	3269	88,502	1850	4016	266,201
1839	3345	89,642	1851	4327	257,093
1840	3384	110,690	1852	4230	247,661
1843	3469	137,558	1853	4143	247,991

We have no accounts of 1854; but there is no doubt it will show an increase on 1853, in consequence of the permission of the Czar for the Greek flag to enter the Danube.

4. *Population.*

1821	675,646	1852	1,002,118
1832	712,008	1853	1,041,527
1843	863,003	1854	1,142,227

5. *Imports and Exports of Greece.*

	Exports.		Imports.
1851	13,995,195 drs.	1851	—
1852	10,402,212 ...	1852	24,982,151 drs.
1853	8,988,890 ...	1853	20,209,960 ...
1854	6,799,211 ...	1854	21,270,182 ...

The minister of finance states that the great decrease in exports for the last three years is owing principally to the failure in the currant crops, the result of the disease in the vine.

Of the 13,995,195 drs. exported in 1851, 8,359,196 drs. were of Corinthian currants alone. In 1852 the exports of currants were 2,844,058 drs. only, or nearly six millions less than 1851; in 1853 there is no account of the currants exported inserted; and in 1854 only the small amount of 9046 drs. are included in the amount of 6,799,211 drs.

Countries trading with Greece.

	Importation.	Exportation.
England	4,029,641 drs.	908,279 drs.
America	73,850 ...	— ...
Austria and Germany	4,448,266 ...	1,918,650 ...
Egypt and Candia	966,897 ...	99,946 ...
France	1,640,567 ...	1,052,516 ...
Ionian Islands	1,146,176 ...	774,863 ...
Russia	34,163 ...	—
Turkey	7,240,149 ...	1,443,581 ...
Other countries	1,552,393 ...	160,882 ...
Total, 1854	21,270,185	6,799,211

Judicial Statistics (1852).

Cases before the judges of the peace, 22,602, of which 4753 were amicably adjusted by the judges, it being their duty to conciliate the adversaries before bringing their dispute into court; and 1035 were carried to a superior court. The civil tribunals in the same year had 17,268 cases brought before them; but 2108 were left for decision in the following year. The court of the last resort, or Areopagus, had, in 1852, 702 cases; at the end of the year 55 were left undecided, 187 were abandoned by the parties, and 519 were decided.

GREEK CHURCH, The. Western Christendom has for many centuries been so much engrossed with its own concerns that it has paid little attention to the Greek Church, and knows little about the distinctive character or position of that large section of professing Christians. But recent events have rendered it necessary to give a somewhat more minute account of the origin, progress, and present position of the Greek Church than formerly.

Those who have paid attention to the effect upon human opinion of diversities in race and language, will be prepared to expect a considerable difference to appear in certain points between the churches of the Eastern and Western divisions of Christendom. In the Eastern division the chief seats of influence, from the earliest period, were Jerusalem, Antioch, and Alexandria. In the Western division Rome naturally obtained pre-eminence, as being the seat of imperial power, though not on account of any special right as a church. The peculiar claims of Alexandria arose out of the reputation which that city had obtained as a seat of learning and philosophy. Nearly all the doctrinal controversies which agitated the church for the first three centuries, were more or less directly connected with Alexandria; but while thus African as to their locality, they were Oriental in their real source and character. The tendency of the Oriental mind was very evidently displayed in its proneness to speculative inquiries into the spiritual mysteries and metaphysical regions of thought, and the dim theosophic mysticisms, which seemed to be connected with the great and primary truths of Christianity. On the other hand, the tendency of the Western mind to the steady pursuit of power, manifested the result of that training which the stern Roman republic and domineering Roman empire had given to Europe. It was not as having been the bishopric of the Apostle Peter, either in fact or in pretence, that Rome *at first* sought and began to acquire pre-eminence; but it was as the abode of secular dominion, the imperial city, in whose inhabitants ambition and love of power had become both a universal passion and an imagined right. The Eastern mind delighted in intellectual subtleties, and strove to gain the high position of supremacy in the regions of thought. The Western mind was characterized by a stern, invincible *will*, and sought the tangible dominion of absolute power and personal supremacy. These leading and characteristic distinctions may assist us in tracing the subject of investigation.

It was not till after Constantine the Great had resolved to raise Byzantium into the rank of an imperial city, to give it his own name, to divide the empire into two, and to make Constantinople the seat of the Eastern empire, that the characteristic distinctions already stated began to manifest their antagonistic tendencies. The Bishop of Constantinople became then the metropolitan in a second seat of empire, and ere long greatly absorbed the influence of the elder metropolitans of Jerusalem, Antioch, and Alexandria. The title of metropolitan was raised to that of patriarch in all these apostolic seats, as they were beginning to be termed, but still the seat of Eastern empire gave pre-eminence to the Patriarch of Constantinople above the other Eastern patriarchs.

At length the great barbarian invasion of Huns, Goths, and Vandals overthrew imperial Rome, and reduced it to a simple monarchy. This event gave opportunity to the Bishop of Rome to assume and exercise a large measure of civil influence and power. In him seemed to be vested the heritage of imperial Rome's fallen greatness; and on that very account the Western nations readily acceded to the Pope of Rome the pre-eminence which had been wielded by the previous emperors. The very name of Rome was still a word of power, a spell wherewith to evoke the demon of ambition, and the Pope was the mighty magician to whom alone that word of power belonged. The popes, as already remarked, seemed naturally to imbibe the spirit of ambition and love of power by which the haughty city had been so long possessed. They were, therefore, very ready to avail themselves of the opportunity thus presented; and as the empire passed away, the popedom arose, grew, and succeeded to all the proud pretensions of the imperial Cæsars.

In the meantime the Eastern seat of power, Constantinople, seemed to be, at least in secular affairs, the proper successor of imperial Rome; but in consequence of its position, it looked more like the successor of the empire founded by Alexander the Great. It began, therefore, to receive designations indicative of that position, and to be called the *second*, or the Lower Greek Empire. At a subsequent period, when the Eastern Church and the Western became separate, and hostile or rival bodies, the designation Greek Church, was given to the Eastern division, from that of Lower Greek Empire, which had become distinctive.

The ambitious tendencies of the Bishops of Rome were very early manifested. The first instance of that arrogance which produced a general disturbance in the church, and introduced the element of strife, causing a permanent difference, was that respecting the celebration of Easter. The Oriental churches followed the reckoning of the Jews as to the time of the Passover. The Western or Latin Church adopted a different computation. In the year 196, Victor, Bishop of Rome, addressed a letter to the Asiatics, expressly commanding them to conform to the practice of Rome. They convoked a synod, deliberated on the question, and refused to comply. Victor issued an edict of excommunication against the Oriental churches, which they indignantly repelled. The assumption of supremacy thus displayed by Rome was not admitted by the rest of the Christian Church; but neither was it withdrawn by Rome. Roman ambition appeared in the attempt repeatedly made by successive Popes to claim the right of ultimate jurisdiction, by having it conceded that in difficult or disputed cases there should be an appeal to Rome. This claim was, of course, favoured by parties who thought themselves injured, or who, in their desire to gain some peculiar point, sought the support of Rome—a support which she was willing to grant to any case, provided she could thereby obtain confirmation to her claim of appellate jurisdiction.

Early in the fifth century, the metropolitan jurisdiction of Constantinople was considerably extended, and the jealousy of Rome thereby excited. This was greatly increased when, in 451, the council of Chalcedon conferred on the Bishop of Constantinople the same honours and privileges which were already possessed by the Bishop of Rome, notwithstanding the strenuous opposition of Leo the Great, who was at that time Pope. Leo perceived very clearly the advantage which the rival pontiff enjoyed from the residence of the emperor; and to counteract that influence he appointed a resident legate in Constantinople to watch over the Papal interests, and to maintain a constant correspondence with the Vatican. The contest continued for nearly a century and a half, keeping the whole church in a state of incessant intrigue and agitation—the advantage on the whole inclining to Rome, chiefly in consequence of the ready countenance and support which the Popes gave to the discontented and turbulent who sought her aid, and thereby strove to strengthen the claim to appellate jurisdiction, in which supremacy was necessarily involved. In the year 588, in a synod held at Constantinople, John the Faster, Patriarch of Constantinople, adopted the title of UNIVERSAL BISHOP, a title which was vehemently condemned by Pope Gregory, although it does not seem to have been intended to confer any authority by that title at first, but to be merely an empty honour. In the possession of a Patriarch of Constantinople it could not indeed, confer power; because the emperor himself always contrived to retain all power, even ecclesiastical, in his own hands. The result was very different when the same title was conferred on the next Pope, Boniface III., by the emperor Phocas in 606, which no subsequent emperor could recal, nor in any great degree control, in consequence of the independent position and residence of the Popes.

The contest for supremacy which had so long been waged between the Eastern and Western Churches, became at length a schism, in consequence of the introduction of a *doctrinal element* into the dispute. The most important doctrinal controversies which agitated the early church were those relating to the doctrine of the Trinity. The Arian heresy was a denial of the divinity of Christ. This was condemned in the council of Nice in 325. The divinity of the Holy Spirit was also disputed, but was affirmed in the council of Constantinople in 381, when also the *Nicene Creed* was revived and enlarged, so as to contain a clear statement and definition of the faith of the church. In that creed, so revived and authenticated, the definition of the Holy Spirit contained the words "proceeding from the Father." But at the council of Toledo, held in 447, the following words were added, "and the Son" (*Filioque*) so that the definition became, "proceeding from the Father and the Son." This clause did not attract much attention for some time; but when it did, it was immediately opposed by the Greek Church. It was, however, favourably received by the Western Church; was affirmed by a council held at Gentilli, near Paris, in 767; and was re-affirmed at the council of Aix-la-Chapelle in 809, where Pope Leo III. admitted the truth of the doctrine, but objected to making it an article of faith. Rome, however, soon adopted the expression; and in order to defend it by authority, falsified the canons of the council of Constantinople by interpolating the very clause in dispute. This was of course easily detected, and added greatly to the bitterness of the controversy. But Rome adhered to the favourite maxim of Papal policy, *never to retract any statement or assumption however false;* because answers and refutations may be forgotten, but the incessant repetition of the false statement will finally lodge it in men's minds, by the mere force of iteration and re-iteration.

Some time after the rise of this controversy, a person of the name of Photius, a layman of great learning and ability, was made Patriarch of Constantinople by the Emperor Michael, who deposed Ignatius to make room for Photius. The deposed Patriarch appealed to Rome. Pope Nicholas assembled a council at Rome in 862, pronounced the elevation of Photius illegal, and excommunicated him and all his supporters. Photius retaliated, held a council at Constantinople, and pronounced deposition and excommunication on the Pope. From that time the contention between the Roman and the Greek Churches may be fairly said to have assumed the character of a schism; and, indeed, it is called by Romanist authors the Photian schism. But there was another event at a later period from which the actual schism is more commonly dated. About the middle of the eleventh century, when the power of Rome had been established over all the Western Churches, ambition urged on the proud claim of the Pope to universal supremacy; and Leo IX. attempted to induce the Patriarchs of Alexandria and Antioch to submit to his sway. This drew forth the indignant opposition and remonstrances of Michael Cerularius, Patriarch of Constantinople; and after some angry correspondence with Rome, the Pope pronounced on him the sentence of excommunication. This was not at once final. The Papal legates were invited to Constantinople, with a view to heal the schism; but their insolence provoked severe retorts. The breach widened; and, at length, in the church of St Sophia, they publicly excommunicated the Patriarch and all his adherents, deposited their written sentence on the great altar, shook off the dust from their feet, and departed. This event took place on the 16th of June 1054; and the schism between Rome and Greece was completed.

From that time forward the Greek and Roman Churches have continued in a state of separation from each other, and generally in a state of considerable hostility. One attempt to obtain a reconciliation between them was made at the council of Florence in the year 1438. At that time the Greek Patriarch and his friends seemed disposed to concede almost everything in dispute for the sake of a re-union with Rome. Constantinople was then violently assailed by the Turks; and as the Greek empire was not able to resist the formidable enemy, the idea was entertained of attempting to organize a new crusade for its relief. But great as was the political danger, greater still was the ecclesiastical rivalry; and although the parties who attended the council at Florence would have yielded everything for the sake of a crusade, the Greek Church as a body was not disposed to ratify such extensive concessions, and the attempt proved abortive. The Greek Church would not admit the insertion of the *Filioque* clause, nor the supremacy of Rome, and nothing less could satisfy Rome. At a later period, when the Reformation had shaken the power of Rome in Europe, she was inclined to adopt a more conciliatory course with the Greek Church, and seemed really desirous of reunion. But it may easily be perceived that no such union is practicable, unless the Greek Church submit to the supremacy of the Pope, which is not only a necessary principle, but *the* necessary principle with Rome. And, as the *Filioque* clause is inserted in the creed of Rome, it also must be admitted by the Greek Church, and with it every other Papal innovation. This would not be union, but absorption—the extinction of the Greek Church, and the extension of Papal Rome.

But there is another element of a very formidable character which has greatly increased the impracticability of such a union or absorption. Christianity was introduced into Russia from Constantinople about the year 866. The Church of Russia thus received its creed and ritual from the Greek Church before the schism between the Greek and Latin Churches had been consummated, yet so near the period of that schism as to receive with its creed a dislike to Rome. During several centuries the Russian Church was governed by a metropolitan bishop, whose seat was successively at Kieff, Vladimir, and Moscow. At length, in 1589, the Patriarch Jeremiah of Constantinople, on whose patriarchate the Russian Church had been dependent, went to Moscow, and consecrated the metropolitan bishop, Job, to the rank of Patriarch of all Russia. From that period the Church of Russia ceased to be dependent on the Greek Patriarch, though it continued to be identical in doctrine and ritual with the Greek Church. This was in many respects a very important event. The Lower Greek Empire had been overthrown when Constantinople was taken by the Turks in 1453. From that time forward, although the Patriarch of Constantinople was allowed by the Sultan to reside in that city as the official head of the Greek Church, yet his power and influence had undergone a sad decline. It was no longer possible that he could exercise much authority in the East, or maintain Christianity against the sway of the haughty Moslem. In the meanwhile Russia, relieved from the Mongolian domination, had begun to emerge out of barbarism, and to assume the position of an independent and growing power in the northern regions of both Asia and Europe. All the other Oriental patriarchates had also fallen under the Mohammedan power. Alexandria, Jerusalem, and Antioch were little more than names, once venerated, but now sinking into oblivion. If, then, the Greek Church was to continue in the enjoyment of an independent existence, that was possible only by its seat of power being transferred to Russia. And when so transferred, it became possible not only that its independent existence could be prolonged, but that as the church of a great and rapidly-increasing nation its own influence might also increase.

There was still another change awaiting the Greek Church in Russia. The patriarchate had continued for little more than a century, when, on the death of the tenth Patriarch, Adrian, in the year 1700, a new crisis came. The sceptre of Russia was at that time swayed by the vigorous arm of that sublime barbarian Peter the Great. The genius of that marvellous man was set on the vast achievement of raising Russia at once to the rank of a great and even of a civilized power. For the accomplishment of such an enterprise, the possession of all power, civil and ecclesiastical, in the most absolute form, was necessary, that he might, by his sole unfettered energy, do the work of centuries in a lifetime. He prevented the election of another Patriarch, made himself head alike of both state and church, and appointed Stephen Yavorsky to the nominal rank of *Guardian of the Patriarchate.* Through this novel agency he ruled the church at his will, as he was also ruling the state. Finding a little disposable leisure in the year 1721, Peter set himself to frame a new constitution for the church. He constituted a supreme court for its government, called the MOST HOLY SYNOD, of which he appointed himself president, and delegated a procurator to occupy his position in his absence, without whom no meeting of the synod could be held, and without whose consent no decision could be valid. Since that time the emperors of Russia have held the most absolute supremacy over the Church of Russia. It may be added, that as the Greek Church has no means of maintaining its independent existence in either Papal or Mohammedan countries, but must look to Russia as the only powerful country that adheres to its faith, the Russian autocrat may be said to hold the most absolute supremacy over the Greek Church wherever it exists, or at least to be naturally regarded as its protector.

From this historical survey we can mark the relations of the Greek Church to other Christian churches. Its relations to that of Rome may be very easily seen and understood. Till the period of the fifth century there was no other essential ground of difference between them than what arose from their conflicting claims of supremacy. In doctrinal matters they were nearly identical. They had not borrowed from each other, but both held the doctrines which had been declared by the general councils. From that position the Greek Church has scarcely moved. An accurate knowledge of the doctrines and ritual of the Church in the FIFTH CENTURY will therefore adequately represent and explain all that is common to the Churches of Greece and Rome. The schism which took place at a later period has rendered the Greek Church a standing testimony against Rome with regard to the subsequent errors and corruptions of that rival system—a testimony with which Papal controversialists find it very difficult to deal.

The controversy between the Greek Church and Rome must needs be interminable as a ground of separation, unless Rome renounce her claims both of universal supremacy and of infallibility,—that is, unless she cease to be Papal; or unless the Greek Church submit so entirely to all the claims of Rome, that she would cease to have any independent existence. But, still more, the position which the Greek Church so long held, as independent of Rome, was almost entirely the result of its direct connection with the Lower Greek Empire, and its dependence upon the emperors. Throughout all the period of its existence the Greek Church has been subservient to the civil power. Its elevation to patriarchate dignity was due solely to its connection with the seat of empire. Its Russian branch obtained similar rank in consequence of the rise of Russia into a great monarchy. The absorption of all ecclesiastical power by the state under Peter the Great, though placing it in a condition of greater subserviency than it had ever before experienced, was nevertheless only the extreme development of its hereditary servitude. It is not, therefore, now in the power of the Greek Church to unite with Rome without the permission of the Emperor of Russia. The memory of her former intercourse with Rome can have left no such favourable impression on Russia as to make her willing to resume it. About the year 1590, Ignatius Potsi, Bishop of Vladimir, commenced a series of intrigues for the purpose of effecting a union between the Russian Church and that of Rome; and, in 1596, a strong party was formed in the Polish and Lithuanian provinces, termed Uniates, from their support of the proposed union, whose adherents soon amounted to four millions. Every effort of force, fraud, treachery, and rebellion—all that Jesuits could suggest, and traitors accomplish—was tried by the Uniates for many years, causing incessant turmoil and bloodshed in the large district which they inhabited—making Lithuania an Ireland to Russia. This continued till so recent a period as the year 1839, when three millions of the Uniates were reconciled to the Russian Church, to the great delight of the Emperor Nicholas. The sufferings inflicted on the nuns of Minsk may testify by what peculiarly Russian persuasives this reconciliation was effected. It may be very confidently believed that there is not the slightest probability of any cordial agreement between the Roman Church and the Russian element, now the ruling one, of the Greek Church.

There is one other point to which reference may be made, rather as a matter of curiosity than on account of its public importance. About the year 1723 there was a proposal made by certain Anglican bishops respecting the possibility of union with the Greek Church. But when the creed of the Church of England was examined, it was found to be far too deeply imbued with the principles of the Reformation to suit the views of the Eastern Church; and though there was no formal rejection, the proposal was laid aside. It is of some interest also to know that similar notions about a possible union with the Greek Church have been promulgated by certain Puseyite clergymen at present. Their attempt, it may be anticipated, will prove equally abortive, though it may somewhat embarrass British statesmen.

The chief points of difference between the Greek Church and that of Rome are the following:—The Greek Church does not admit—1. The supremacy of Rome. 2. The *Filioque* clause in the creed. 3. The enforced celibacy of the parochial clergy; though monks and bishops must be unmarried. (The reason of this is, that although the monastic system had begun before the schism, the celibacy of the regular clergy had not been enforced till a later period, and this was not adopted by the Greek Church.) 4. The doctrine of transubstantiation, in the Papal sense of that term, is not held by the Greek Church. (Rome itself did not adopt this strange tenet till the council of Lateran in 1215.) 5. The dogmas of purgatory and penance, as taught by Rome, are not held by the Greek Church; yet some of their views bear a close resemblance to the Papal theories on these points. 6. The Greek Church disagrees with that of Rome about the use of leaven in the Eucharist. In almost all other respects there is little difference between the Greek and Roman Churches, because both are as corrupt as the church of the fifth century, and both have hitherto rejected the Reformation. The Greek Church is thoroughly hierarchical; holds the monastic system; worships pictures, although it rejects the worship of images; gives to the Virgin Mary as high a degree of worship as even Rome can—its theory of the Panagia being scarcely distinguishable from that of the Immaculate Conception.

The following inferences, of some importance in the present state of European and Eastern affairs, may be fairly drawn:—1. The Greek Church cannot unite with Rome, in consequence of Rome's claim of supremacy, and the hereditary rivalry of the two on that point. 2. The Greek Church cannot submit to Rome, because the ecclesiastical supremacy of the Emperor of Russia is the exact counterpart and express antagonism of the Pope. 3. The errors which the Greek Church holds in common with Rome are not derived from Rome, but are those common to the whole church in the fifth century. 4. The Greek Church could become Protestant, because it never has denied, and cannot, consistently with its own creed, deny, either the authority or the free circulation of the Scriptures. 6. One single Christian-minded and wise Russian emperor could place the Greek Church in Russia in friendly relation with evangelical Protestantism, which, indeed, the Emperor Alexander I. seemed inclined to do. Even in Russia there is one element looking in that direction, namely, the *Starowers*, or *Starovertze*, or "Old Believers," who dissent from the doctrine of *Imperial Supremacy*, and are active in diffusing the Bible. That body amounts, it is said, to about five millions of native Russians. They are, however, discountenanced, depressed, and to some extent persecuted by the Czar. But although there is no necessary antagonism between the Greek and Protestant Churches, yet the Greek Church hates, opposes, and persecutes Protestants, so far as it can.

The Greek Church bears, in its organization and external forms, a very close resemblance to that of Rome, as might be expected from their mutual origin in the corrupt Christianity of the fifth century. The Patriarch of Constantinople was the virtual Pope of the Eastern Church till the taking of Constantinople by the Turks, with this special difference, that the Patriarch was never allowed to exercise any civil authority. Since that period the Sultan has allowed the existence of the Patriarch, and recognised his religious superiority over those of his own creed; but has himself held the power of appointing to, or deposing from, that office, for which he exacts a tribute or purchase before investiture. Archbishops and bishops also are required to purchase their official dignity by the payment of a tribute to the Turkish government. The officiating clergy of the Greek Church are the Patriarch, archbishops, and bishops, and subordinate to these are the papades or parish priests. All the dignitaries are taken from among the caloyers or monastic orders, and are not allowed to marry; but the papades may be married, with these special limitations—that they be married previous to their consecration, and may not marry a second time, should they become widowers. Hence they are commonly married before taking orders, and invariably select young and healthy women for their wives. The revenues of the dignitaries are raised by a tax imposed on each family, while the parish priests are supported chiefly by means of what they can wring from the superstitions of the people as perquisites of office, such as money paid for absolutions, benedictions, exorcisms, ceremonial sanctifyings of water, sprinklings of streets and tombs, granting divorces, and innumerable ritualistic observances. They are almost universally a base and degraded class themselves, extremely ignorant, and they keep the people in equal degradation and ignorance, partly because such is their own state, and partly that they may secure their influence.

Their places of worship are built generally in form of a cross. The choir is always placed towards the east; and the people turn their faces in that direction when they pray. Their public religious service is liturgical and exceedingly protracted. They have four liturgies; and the service consists chiefly of prayers, hymns, recitative chants, and frequent crossings, with such numerous repetitions that it often occupies five or six hours, without any sermon. During this long service the people stand leaning on the supports of the few seats in the church, or on a kind of crutches provided for that purpose. No images are allowed within their churches; but they are plentifully decorated with rough and glaring paintings, and the more rough and glaring these are, the better are they in the estimation of the worshippers. Their music is without any aid from instruments, and is chiefly a kind of chanting, but is said to be often beautiful and touchingly plaintive, although monotonous. The vestments of the clergy are very varied in form, and often of fine texture, gorgeous in colour, and ornamented with jewellery of great value. Each of these vestments has its mystic meaning and virtue, to which great importance is attached. The worship of saints, angels, and the Virgin Mary is carried to as great an excess as it can be at Rome; and it is long since the Greek Church held that the "Mother of God," as they term her, was without original sin. It may be said, indeed, that the *Panagia*, or Holy Virgin, is the peculiar deity of the Greeks, as much as ever Pallas Athene was of the ancient Athenians. Everywhere, in church, palace, or cottage, a little coarse picture, intended to represent the Holy Virgin, may be seen, often with a lamp burning before it as the object of special adoration.

The Greek Church is also burdened by an immense number of fasts and saints' days. The secular Greeks observe four Lents, and the caloyers or monks, two more. The first of these lasts two months, the second forty days, the third is variable, and the fourth continues from the 1st of August till the festival of the Assumption, on the 15th. All Wednesdays and Fridays are fasts, and a vast number of saints' days are also observed, so that of the whole year there are only about 130 days free from fasts or festivals, by means of which the common people are either crushed into idleness and poverty, or rendered regardless of religion.

The Russian division of the Greek Church has nearly absorbed the whole, so far as regards its relation to other communities. The Patriarch of Constantinople has long been dependent on the Sultan. The Patriarch of Alexandria is obeyed by only two churches. In Antioch the adherents of the patriarchate can be all accommodated in a single room in a dwelling-house. The Patriarch of Jerusalem resides chiefly at Constantinople, and owes any power he possesses to the holy places held by Greek monks in Palestine, which the Romanists, by means of a French agent, recently attempted to seize, an attempt which tended to precipitate the present war, in consequence of the intervention of Russia as the avowed protector of the Greek Church.

An approximation is all that can be made towards an estimate of the numbers adhering to the several divisions of the Greek Church; and in this we follow Marouvieff and Neale,—chiefly the latter, as the most recent authority.

In Russia	50,000,000
In Turkey	12,000,000
In Greece, Montenegro, &c.	800,000
In the Austrian dominions	2,800,000
In the Patriarchate of Alexandria	5,000
In Asia Minor and Cyprus	150,000
In the Patriarchate of Jerusalem	15,000
Total, about	65,770,000

Of these, as will be seen, at least 50,000,000 belong to Russia alone, forming the only division of this ancient nominally Christian Church, which has now any degree of power for good or evil, and possessing that power only as the Russian autocrat may please to permit, or may think proper to employ it, as an engine of despotism. The jurisdiction of the Patriarch of Constantinople extends nominally over the Greek Church in Turkey, Sclavonia, Galicia, Anatolia, and the Ionian Isles; but his influence has sunk to the merest semblance of power in all these countries. In Servia the metropolitan Bishop of Belgrade maintains an independent authority. There seems no probability that the Greek Church, either in Turkey or Asia, can again be united under one Patriarch, so as to become active and powerful; and it may be hoped the course of modern events will so protect and encourage the progress of a sound and free Bible Christianity, as to rescue from superstition, enlighten, and elevate the inhabitants of that lovely and fertile region of the earth, the ancient home of freedom, and closely connected with the birth-place of true religion. (W. M. H.)

GREEK FIRE. See FIRE, *Greek.*

GREEN, one of the prismatic colours. It is composed of blue and yellow rays, which, mixed in different proportions, exhibit various shades.

GREEN BAY, a large arm or bay on the west side of Lake Michigan, forming a part of the boundary between Wisconsin and the upper peninsula of Michigan. It is above 100 miles long, and from 15 to 35 broad. The epithet "Green" has been applied to it on account of the colour of the water, which is said to exceed 500 feet in depth. At the head of the bay, on the right bank of the Neenah, or Fox River, is a thriving town of the same name. The bay and river afford a perfectly secure harbour, and the largest steamers of Lake Michigan stop here, making it the principal place of deposit and transit for the imports and exports of Northern Wisconsin. Pop. (1853) about 2500.

GREENCASTLE, a flourishing post village, capital of Putnam county, state of Indiana, North America. It is on the great line of railway extending through the centre of Indiana from east to west; and another line of railway is in progress which will cross the former at Greencastle, and connect it with South Chicago and with the Ohio River at New Albany. It is the seat of Asbury University, a flourishing institution belonging to the Methodists, and has several high schools. Pop. (1850) 1382.

GREEN CLOTH, BOARD OF. See HOUSEHOLD, *Royal.*

GREENE, ROBERT, a dramatist and prolific miscellaneous writer of the latter portion of the brilliant Elizabethan era, was a native of Norwich, and born about the year 1560. He graduated in St John's College, Cambridge in 1578, and took his degree of M.A. at Clare Hall in 1583. Subsequently, in 1588, he seems to have studied at Oxford. From the period of his leaving Cambridge his life was that of an author by profession, marked no less by the extraordinary fertility of his talents than by the profligacy of his conduct, of which he has himself left many curious and affecting records. Of the forty or fifty plays, pamphlets, and poems of Greene which have come down to us, a few of his pieces are interesting as specimens of dramatic blank verse, and as illustrating the state of the English stage at a time contemporary with, or immediately preceding, the early dramas of Shakspeare. Greene was destitute of the fire and energy of genius, but he had a fine play of poetical fancy and command of classic imagery, with a smooth and copious diction, and considerable powers of invention. The true dramatic power, as evinced in the delineation of character and in depicting contrasts of situation and passion, he certainly did not possess, nor was there any approach to this on the stage before Shakspeare, excepting in the case of Marlowe. Greene's tragedy of *Orlando* has, however, many striking and elegant passages, and in his light comedies are scenes of low humour, interspersed with descriptions of English rural life and scenery. The play of *George à Greene, the Pinner of Wakefield*, doubtfully ascribed to Greene, introduces us to the forest scenes of merry Sherwood, to Robin Hood and Maid Marian. His numerous pamphlets throw light on the manners of the times, besides detailing his own adventures, knaveries, follies, and repentance. But the most popular of his works are those which borrow a lustre from their connection with Shakspeare. His tale entitled *Pandosto, or the Historie of Dorastus and Fawnia*, is memorable as the story on which Shakspeare founded his delightful drama of *The Winter's Tale.* The original story was published in 1588, and was so popular as to have gone through thirteen editions before 1632, when a fourteenth was printed. Shakspeare followed closely the outline of Greene's novel, excepting in the miraculous last scene where Hermione is restored. The geographical blunders of making Bohemia a maritime country, and placing the temple of Apollo at Delphi in an island, were copied from his prototype, as in *As You Like It* the poet placed a lioness in his forest of Arden, because he found a lion in Lodge's *Euphues,* whence he derived the groundwork of his play. Such anachronisms are common in the old dramatists and romance writers. Their fabulous stories are quite removed from the region of the literal and possible, but geographical blunders may perhaps be ascribed to ignorance and haste. It must be regarded as one of the idiosyncracies of Shakspeare's mighty mind, that one so boundless in knowledge, and so illimitable in his intellectual resources, should have had recourse to obscure writers and legends for the plots of his dramas. But no one, as Coleridge has remarked, can understand Shakspeare's superiority fully "until he has ascertained by comparison all that he possessed in common with others of his age, and has then calculated the surplus which is entirely Shakspeare's own." In the *Winter's Tale* the fascinating character of Perdita, the humour of Autolycus, and the exquisite sheep-shearing scene, are Shakspearian creations—and among his very finest.[1] To pass from the drama of Greene, Peele, Lyly, and Marlowe, into the drama of Shakspeare, is to pass into a new world. Characters, blank verse, language, sentiment, and action—all are different, and all new.

> "Changed like the world's great scene, when without noise
> The rising sun night's vulgar lights destroys."

In his latest work, *A Groat's-worth of Wit bought with a Million of Repentance*, Greene makes a well-known allusion to Shakspeare of the highest interest and value as connected with Shakspeare's dramatic progress. He addresses those gentlemen, "his quondam acquaintance, that spend their wits in making plays," and tells them "there is an upstart crow beautified with our feathers, that with his *tiger's heart wrapt in a player's hide*, supposes he is as well able to bombast out a blank verse as the best of you; and being an absolute *Johannes Fac-totum*, is, in his own conceit, the only *Shake-scene* in a country." There is no mistaking this reference; and the words "tiger's heart," &c., are a parody upon a line in an old play, the *True Tragedie of Richard Duke of York*, which line, with many others in the same old drama, Shakspeare adopted in his Third Part of *King Henry VI.* The obvious inference is that Greene, or some of his "quondam acquaintance," the makers of plays, was singly or jointly author of the *True Tragedy*, which Shakspeare had altered and adopted for his own theatre. Greene's *Groat's-worth of Wit* was published late in 1592 immediately after his death; at this time, therefore, Shakspeare appeared to his rival dramatist an "upstart," who had recently shot up into public notice, and commenced his career by remodelling and improving inferior and old plays. How he "bombasted out a blank verse" we all know, but the verses so written before September 1592 cannot now be ascertained. The questions, What were the plays? and How much in them was original? start to the mind; but as yet there is none to answer. If Greene could be proved to be the author of the *True Tragedy* and the *First Part of the contention betwixt the two famous houses of York and Lancaster*, which Shakspeare also remodelled, his character as a dramatist would be materially advanced. But they seem to us much beyond the pitch of Greene, and have more of the manner of Marlowe. The tragedies of *King John* and *Henry V.* are also founded upon old plays; and Greene, or some of his associates—Marlowe, Peele, Lodge, and Nash—may have written them. The charge of plagiarism is at all events distinctly brought forward—the great dramatist was "beautified with some of the feathers" of his contemporaries; but we must always recollect that it was Shakspeare's original editors that claimed for him the undivided authorship of the historical plays, not the poet himself. His dramas "*outlived him*," as Heminge and Condell finely remark in their dedication, "*he not having the fate, common with some, to be executor to his own writings*." If the *Winter's Tale* could be proved to have been produced before 1592, Greene's charge against Shakspeare would be easily understood; but all the evidence, internal and external, shows that it was a much later production. The point, therefore, must remain in obscurity; and however interesting it may be to curious investigators, it does not weigh one straw in the balance as respects Shakspeare's genius or fame. Greene died in great misery on the 3d of September 1592. At a supper the previous month, in company with Nash and some others of his associates, he had indulged to excess in pickled herrings and Rhenish wine, which brought on an illness that proved mortal. According to Gabriel Harvey, all Greene's gay companions forsook him in his last sickness, and he was maintained by a poor cordwainer and his wife in their house near Dowgate. This humble pair supported and nursed the miserable poet, decked his corpse with a garland of bays, *pursuant to his own request*, and paid ten shillings and fourpence for his winding sheet and burial. There is nothing in Greene's plays so impressive or dramatic as this last scene, nor anything more strange than the combination which his life presents of incurable folly, meanness, and vice, united to great literary industry. His associates did not benefit by his example; some of them sank under personal irregularities in early manhood; and it is lamentable to see how little classic acquirements and university honours, with all the aids of genius and popular favour, could effect in elevating the tastes and habits of these men, or saving them from the lowest moral degradation. (R. C—S.)

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[1] Greene's reputation for scholarship—one who had "two gowns," like Dogberry, being master of arts in both universities—no doubt led Shakspeare to follow him in his geographical and classical allusions. In the *Pandosto* Greene makes Dorastus excuse his shepherd's disguise in this pedantic style:—"Shame not at thy shepherd's weed. The heavenly gods have sometimes earthly thoughts. Neptune became a ram, Jupiter a bull, Apollo a shepherd; they gods, and yet in love." Shakspeare thus paraphrases the passage:—

> "The gods themselves,
> Humbling their deities to love, have taken
> The shapes of beasts upon them: Jupiter
> Became a bull and bellow'd; the green Neptune
> A ram and bleated; and the fire-robed god,
> Golden Apollo, a poor humble swain
> As I seem now."

GREENHOUSE, or *Conservatory*. See HORTICULTURE.

GREEN MOUNTAINS, a mountain range of North America, commencing near New Haven in Connecticut, and extending through Massachusetts and Vermont into Canada. It attains its greatest elevation in Vermont, to which it gives name (*verts monts*, i.e., green mountains). Mansfield North Peak, the culminating point of these mountains, rises to the height of about 4300 feet above the level of the sea.

GREENLAND.

GREENLAND, or GROENLAND, a very large island, or, probably, assemblage of islands, lying to the north-east of North America, and for the most part comprehended within the Arctic Circle. In early times it was supposed to form a part of the American continent; but the discoveries of modern navigators have proved, what indeed the very idea of a north-west passage from the Atlantic to the Pacific Ocean supposed, its insularity. And the latest discoveries have, moreover, shown, or all but proved, the entire separation of the lands on the west side of Baffin's Bay, or rather, what we would now venture to designate *Baffin's Sea*, from those of the opposite shores, so as to limit Greenland to the country on the eastern side of that great channel. From Cape Farewell, in lat. 59° 49′ N., it stretches on the west side in a north-north-westerly direction through Smith's Sound, and then more easterly into a high northern latitude. On the other side, the Greenland coast runs first north-north-easterly, then north-easterly, and finally (so far as yet traced), in a northerly direction, bending eastward in the 75th and 76th parallels of latitude. It expands from Cape Farewell, the southern point, up to latitude 70°, where it attains a width of about 600 miles, which is pretty evenly maintained to the northern extent of our researches on the eastern side. This side of Greenland has been denominated East or Old Greenland, the other West Greenland.

In general, the discoveries which have been effected in this quarter of the globe have resulted from attempts made to discover a north-west passage to India through the Arctic Sea. The existence of such a communication is a subject which from time to time has occupied the attention of the British government for the last three centuries; and although much valuable information had been obtained by means of these voyages, the great problem remained unsolved until the very recent researches after the fate of our lamented voyager Sir John Franklin, when Capt. M'Clure, in his researches, *viâ* Behring's Strait, eastward, determined the fact of a sea communication between the Pacific and Atlantic Oceans. This he effected by sailing till within sight of Capt. Parry's discoveries at Melville Island, and thence completing the personal transit by ice-travelling and voyaging to the shores whence he had departed. But beyond the determination of the geographical fact, it was found, as had been confidently predicted, that no practical use could be made of a channel so thickly encumbered with impenetrable, or all but impenetrable ices.

Greenland was first discovered by an Icelander named Gunbiörn, who was driven by storm upon this coast, about the beginning of the tenth century, and carried back intelligence of its existence to Iceland. Towards the end of the same century,—according to some writers in 983,—an Icelandic chief named Eric Raude, or Eric the Red, having killed another powerful chief, and being obliged to quit the country, determined to follow up Gunbiörn's discovery. After having spent two or three years in exploring the country, he returned to Iceland, giving an exaggerated account of the freshness and verdure of the country, which he called Greenland. In consequence of this, a fleet of twenty-five sail was equipped and sent out, laden with persons of both sexes, cattle, and other necessaries for forming a settlement. Only about the half of the vessels reached their destination; but other adventurers setting out, not only from Iceland, but from Norway, the Orkneys, and other islands, in a few years a considerable colony was formed, and a regular trade established. The real position of these early adventures has been a subject of much learned investigation and no little controversy. But it seems highly probable that the original colony of Greenland began about the southern promontory, near Cape Farewell, and gradually extended itself along the coast in a north-westerly direction. Beyond this first settlement another proceeded farther to the west. The former was called *Œstre Bygd*, or the eastern settlement, and the latter *Vestre Bygd*, or the western settlement. Christianity having been introduced about the beginning of the eleventh century, numerous churches and convents were built, and the country was divided into regular parishes, to which monks and other spiritual instructors were attached. The colonists, although compelled to lead a life of severe privation and hardship, continued to increase, and to extend to the north. The zeal with which the early Scandinavians pushed their settlements to the northernmost parts of Greenland is strikingly attested by a curious monument which was discovered in 1824. It consists of a stone carved with Runic characters, which was found standing erect in the ground on the island of Kingiktorsoak, under the parallel of 73°.[1]

For some centuries the commercial intercourse between Greenland and Norway was kept up; but about the beginning of the fifteenth century all intercourse ceased, and the unfortunate colonists were cut off from the rest of mankind. The Esquimaux, the natives of the country, whom in derision the Norwegians called Scrœllings, or Dwarfs, on account of their diminutive stature, attacked the western colony, which was compelled to seek assistance from that which lay to the south-east. There can be little doubt that the scanty population was reduced by these savage invaders; but it was more effectually thinned by that dreadful pestilence called the *black death*, which desolated Europe from the year 1402 to 1404, and which extended its ravages even to Greenland. Those who escaped the plague probably soon fell victims to the Esquimaux; at least, nothing is known of them after the commencement of the fifteenth century. The terms eastern and western being used in reference to the original settlements, naturally led to the belief that the eastern as well as the western side of Greenland had been colonized; and a notion very generally prevailed for a long time that the western settlement only had perished, the eastern one having escaped the calamity, but, from the vast accumulation of ice, had been secluded from all communication with the rest of the world. During the last century the court of Denmark repeatedly despatched ships to ascertain if any settlers still remained on that part of the coast which is now called East or Old Greenland, but without success. A more recent boating expedition in 1829–30, under Captain W. A. Graah, of the Danish royal navy, has, however, in extent of research on the eastern side of Cape Farewell, yielded by far the most satisfactory information. He examined the coast as far north as 65° 45′ but found nothing to indicate that this coast had ever been colonized; and we are thus led to the conclusion that the notion of any of the Norwegians having settled on the eastern shores must be a mistake; a mistake arising from a misapprehension of the words *east* and *west*. In 1721 Hans Egede, a clergyman from Vaagen, in Norway, accompanied by his wife and family, left his native country to settle as a missionary in Greenland. He landed at Baals River in N. Lat. 64°, and called the place Godthaab, or Good Hope. Since that time the Danes have established numerous settlements upon the western coast of Greenland, lying between 60° and 73′ N. Lat. The whale fisheries have greatly contributed to the advancement of the colonies; and from the intimate intercourse which is now kept up with Europeans, their condition is at present more flourishing than at any former period.

There are, at present, thirteen Danish colonies in Greenland, besides some smaller establishments termed factories. For administrative purposes they are formed into two inspectorships, called respectively North and South Greenland. South Greenland lies south of N. lat. 67°, and comprises six colonies, as follows :—

	Founded.	Pop. 1845.	Of whom Danes.
1. Julianehaab, or Juliana's Hope........	1775	2336	41
2. Fredrickshaab, or Frederick's Hope	1742	650	10
3. Fiskenæset, or Fish Point..............	1754	485	20
4. Godthaab, or Good Hope...............	1721	801	25
5. Lukkertoppen..........................	1775	640	18
6. Holsteinborg..........................	1759	744	10
		5656	124

Julianehaab is the most southern as well as the most important of these. Its district extends to the most southern point of Greenland, Statenhuk, and beyond it for some distance along the east side. At Piskenæset the Danes carry on an extensive seal fishery by means of nets, &c. In its vicinity is the Moravian station of Lichtenfels, founded in 1758. Godthaab is the residence of the inspector of South Greenland; and in the vicinity is the Moravian settlement of New Herrnhut. Lukkertoppen takes its name from three pointed hills in the vicinity, resembling sugar loaves, and has one of the best and safest harbours in the country. North Greenland lies north of N. lat. 67°, and comprises seven colonies, as follows :—

	Founded.	Pop. 1845.	Of whom Danes.
1. Egedesminde, or Egede's Memory....	1759	767	15
2. Christianshaab, or Christian's Hope..	1734	420	14
3. Jacobshavn, or Jacob's Haven.........	1741	275	14
4. Rittenbenk..............................	1725	435	11
5. Godhavn, or Good Haven...............	—	249	17
6. Omenak..................................	1758	528	21
7. Upernivik...............................	—	405	18
		3079	110

Egedesminde, in Disco Bay, was founded by Captain Egede, and named in memory of his father Hans Egede. It comprises a number of large and small islands, but the proper settlement is on the island of Ausiet. Between this and Fox Island (Rævoe) there is a very secure harbour. A great many seals are caught here, especially in nets; but the collecting of eider-down forms the most important branch of industry. Godhavn, or Good Haven, in the southern extremity of the island of Disco, N. Lat. 69. 12., is the seat of the inspector of North Greenland, and has a coal-mine, which supplies the other settlements on Disco Bay with that article. Omenak is noted for its extensive seal fishery, which is carried on by the Greenlanders in their kaijaks or small boats and upon the ice, and by the Danes with nets which are let down the openings between the ice. There are here coal-mines which supply the colony. Upernivik is the most northern of these colonies, being in about N. Lat. 73., and though of recent formation, it is already one of the most important in North Greenland. The population of Greenland on 31st December 1845 thus amounted to 8735, being 8501 natives, and 234 Danes; and in 1851 is given at 9400, of whom 250 were Danes. This includes only those subject to the Danish crown; of those that may be scattered over the country, no conjecture can be formed.

We shall now give a brief outline of the discovery of the various sections of the coasts of Greenland, with occasional references to researches about proximate lands with which those on Greenland were more or less mixed up. This will lead us again to notice the enterprises of the sixteenth century in search of a passage by the north-west from the Atlantic into the Pacific Ocean.

During the reign of Queen Elizabeth, Frobisher, a distinguished English navigator, made several voyages to this quarter of the globe. In 1577 he discovered the straits which have been called after him. In the year 1585, Davis, another able seaman, came in sight of high land, which he called Mount Raleigh, supposed to lie somewhere on the west of the straits bearing the discoverer's name. In 1610 Hudson discovered the straits and the bay which are called after him, in which he experienced a disastrous termination to his useful career. To certain rocky islands lying about the 64th parallel, he gave the name of Isles of God's Mercy. He also discovered two capes, one of which was called Digge's Cape, and the other Willoughby Cape. In 1616, Baffin, one of the most distinguished of our English navigators, discovered the large expanse northward of the Strait of Davis, now known as Baffin's Bay. Sailing in a little vessel only of about fifty-five tons burthen, he effected one of the most extraordinary voyages on record. Under the imperfect appliances of the age for navigation, Baffin, with one small vessel, circumnavigated to Smith's Sound, on the north of that bay or sea which, northward of "Hope Sanderson, the furthest land Master Davis reached, lying between 72 and 73 degrees," was an utterly unknown region,—thus adding some 1100 miles of discoveries, reckoned by the mere coasting line, to the knowledge of these ice-encumbered shores. His exploration northward reached, it would appear from the brief but graphically told story of his voyage, as given among the *Pilgrimages* of Purchas, as high as about 77° 47′ of latitude, where he obtained a clear view into Sir Thomas Smith's Sound, which he describes as running "to the north of 78 degrees, and being the greatest and largest in all the bay."

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[1] The following is a translation of the inscription by Dr Rafn, secretary of the Royal Antiquarian Society of Copenhagen:—"Erling Sigvatson, and Bjarne Thordarson, and Endride Oddson, erected these memorial stones, and cleared the place, on Saturday before Gagndag (the 25th of April), in the year 1135."

For 200 years from the time of Baffin the knowledge of this great inlet (excepting some limited and unpublished information obtained by occasional enterprises of the whalers) had not been advanced. In the year 1818, however, in consequence of information, we believe, communicated by Captain Scoresby to Sir Joseph Banks, the admiralty fitted out two expeditions; one of which, under the command of Captain Ross, was destined for the discovery of the north-west passage; and the other, at the head of which was Captain Buchan, had for its object to attempt a voyage across the pole. On the western side of Greenland, the first-named navigator discovered a high mountainous region to the north of Upernivik, to which, from national predilections, he gave the name of the Arctic Highlands. It is little else than a mass of rocks, intermingled with immense blocks of ice. He then proceeded towards the northern extremity of Baffin's Bay, which he explored as far as the ice would permit, looking from a distance into Smith's Sound. He surveyed the coast generally, ascertained the positions and the appearance of the land, the situation of the islands, and the general configuration of the great inlet, from the 78th down to the 65th parallel. The discoveries of Baffin, which some had disputed, were thus signally confirmed; for whilst the form of the bay, as given mainly from conjectural applications of Baffin's descriptions, was found to be thoroughly erroneous, the several deep inlets and other remarkable features of the coast-line, as noted by this admirable voyager, were not only easily recognised, but the latitudes and more striking particularities were found to be characteristically correct.

But the limited period of a mere summer's voyage having left several points in Ross's course defective and inconclusive, especially as to the supposed closing up of Lancaster Sound by continuous land, another expedition was sent out the year following under Captain Parry, who succeeded not only in passing through this famous inlet of Baffin, but in discovering a navigable channel among islands extending far westward, which was successfully pursued for about thirty degrees of longitude beyond Ross's furthest. But as these researches, with the general body of the discoveries since then made, fall beyond the limits of our present article, we must refer, for an abstract of them, to our general account of the Polar Regions. The chief additions to our knowledge of western Greenland which remain to be noticed consist of certain corrections of the coast-line incidentally made by the westerly exploring expeditions, and more accurate information of Smith's Sound and the coasts immediately beyond, resulting from Captain Inglefield's voyage in the summer of 1852, and from the very successful and interesting American exploration, still further north, under Dr Kane in 1853–5.

Captain Inglefield, in the Isabel, fitted out by Lady Franklin, having the advantage of an auxiliary steam power, made an advance northward of Baffin's furthest of about 50 miles, reaching within Smith's Sound to 78° 28′ N. latitude, and obtaining the view of a sea expanding again considerably beyond.

The exploration of this new expanse into the main Arctic Ocean (with which the Greenland sea in the east, and Behring Strait in the west, communicated), by the second American search expedition under Dr Kane, completes our sketch of the progress of discovery on the western side of Greenland. This hardy and intelligent adventurer, in a little solitary vessel, the brig *Advance*, pushed his way through Smith's Sound in the month of August 1853, and crawled along shore within a cram of dangerous ices which all but filled the passage, to a position higher in latitude (about 78° 40′) than had ever before been taken as a wintering station in these western regions by Europeans. In this position the brig was frozen in, early in September, and so remained throughout the succeeding summer, and with so little prospect of release as to occasion her abandonment, after a protracted adherence to her of above twenty months.

From this high position in latitude, explorations (furthered for a time by the effective aid of their Esquimaux dogs) were perseveringly made, and rewarded by results of the most interesting nature in geography, hydrography, and *glaciology*. The coast of Greenland, forming the *eastern* boundary of Smith's Sound, was traced northerly and easterly, until the exploration was diverted by a stupendous glacier of a vast extent, with a precipitous face about 500 feet in height abutting the sea. The geographical discoveries were pushed still further towards the pole, and new lands as high in latitude as 82° 30′ added to our charts. The lands on the two sides of this channel were found to be connected by apparently perpetual ices, having, at the time of the examination, an open sea beyond entirely free from visible encumbrance, whose waves were dashing with sublime action and force against the face of the icy barrier. Here an area of about 3000 square miles was seen entirely free from ice, the commencement and margin, as has been inferred, of an open *unfreezing* polar sea. On this question, however, which comes in more fitly for discussion in our article on the Polar Regions, we here only remark cautionarily against a premature conclusion, that Captain Scoresby, in his account of the arctic regions, describes an open sea, which he himself once observed and navigated, to the northward of Spitzbergen, running about E.N.E. and W.S.W. for 300 miles within the latitudes of 80° and 81° 30′, and having an area of from 15,000 to 20,000 square miles, or from five to six times the extent of that traced by Dr Kane; yet this apparently open polar ocean was found to be but a mid-glacial sea! Besides, the extreme lowness of the temperature in Dr Kane's case—being the lowest, on the mean, ever observed on the face of the globe—afforded sufficient evidence that there could be no such sea remaining open to the pole, beyond an incidental lake.

It does not come within the scope of our present article to dwell on the particular facts, and incidents, and processes of this admirable research by Dr Kane, except to notice the falling in with Esquimaux living in a region further north than any they had before met with. Agreeing as these natives in their general characteristics do with other Greenlanders, they were found to have incidental peculiarities in their habits and modes of living. They employ dog-sledges of great efficiency in speed, but have no boats or kaijaks. They surround themselves in *winter* with walls of moss, and, at that season, live mainly upon raw walrus flesh—habits of life which, for the season, Dr Kane and his party found it expedient, and, after a little experience, not unpleasant, to imitate and adopt. Under this new dietary education, raw walrus flesh soon became palatable; and even tallow candles, when they could be *spared* for such a purpose, were pronounced by the chief of the expedition to be very good! Useful and friendly as these natives were in their intercourse with Dr Kane and his party, they unfortunately possessed the infirmity (shall we call it?) too characteristic of the Esquimaux, of an insatiable habit of self-appropriation—stealing unscrupulously whatever they could manage to secrete, equally regardless of the damage to the owners, or of any possible use of the articles to themselves.

We may just add that Dr Kane, in the *Advance*, started on his expedition from New York on the 31st of May 1853, having along with him, in crew and associates, seventeen men. Three of this number, the cook, carpenter, and a seaman, died in the arctic regions, and the remainder returned safe to port on the 11th October 1855. The party left their vessel still fast in the ice on the 20th of May, and travelled over the ice to the navigable waters of Baffin's Sea, whence by means of their boats they proceeded to the settlement of Upernivik. They there took passage in a Danish trader; and when, in their progress southward, they reached Lievely in Disco Island, they met with the expedition of Lieutenant H. J. Hartstein, which had been sent out by Congress in search of them.

As to the *eastern side* of Greenland, all our *accurate* knowledge, except a few particulars referring to the coast near Cape Farewell, is of recent attainment. A coast-line, indeed, of the more southern parallels was to be found in our charts of the Arctic Regions, and in maps by Egede and Crantz, traced to a considerable extent, with an elaborateness of flexure that would indicate real and careful examination; but subsequent researches have by no means verified the supposed configurations.

Northward of the 70th parallel of latitude, all the geographical information we had of that coast previous to the voyage of Captain Scoresby (now the Rev. Dr Scoresby) in 1822, consisted of the not very definite notification of certain points of land discovered by the adventurous Hudson in 1607, with a few touches on the coast, and notices of land being seen by whalers, chiefly Dutch, in 1654, 1665, and 1670. In 1822, however, Captain Scoresby, whilst engaged in the Greenland whale fishery, and successfully pursuing the commercial object of his voyage, penetrated the ice westward, as he had previously provided for attempting, to the coast of Eastern Greenland. But the position of the coast, and its line of direction, were found to be widely different from those ascribed to them in the charts, whether English or Dutch; for the real place of the land in latitude 74° was found to be from 8° to 15° of longitude further west, and the line of direction from 69° to 74° 30′ N. by E., instead of N.E. or E.N.E. as formerly laid down.

The first land seen by Captain Scoresby, stretching from N.W. by N. to N., extended to about 74° 30′ N., the nearest headland being estimated at 50 miles distance. This was on the 7th of June, and so early in the season as to prevent any near approach to the coast, from the intervention of a chain of heavy field ice northward of 73°. But after tracing a proximate outline of the more northern part of the coast, Captain Scoresby was gradually enabled to approach the shore as, with the advance of the season, he proceeded southward; and in the course of the exploration, succeeded in landing on four or five different positions between the 70th and 73d parallels. The coast from 74° 30′ to 69° 10′ was generally surveyed, and names were given to the more particular headlands, islands, and inlets. Two very remarkable inlets were observed and partially examined, one in latitude 72° which was named *Davy's Sound*, and the other in 70° 15′, which received the name of *Scoresby's Sound*, on account of the first examination of it ever known to have been made having just been accomplished by the investigator's father. In this way, single-handed, and without cost to the country, some 600 miles of new coast line (reckoning its various flexures and inlets) were added to our Greenland charts; and much novel information on the geography, hydrography, and natural history of those regions was communicated to the public in the Journal of the Voyage, which appeared in the succeeding spring. One circumstance of geographical interest it may be proper more particularly to notice, viz., the conviction conveyed to the mind of Captain Scoresby by his observations on the current setting into Davy's Sound and Scoresby's Sound, that these fine expanses of water, which, in certain westerly directions, were clear of ice or land to the utmost extent of vision, were actual channels of communication between the sea of Greenland on the east, and that of Baffin on the west. Hence the great probability of the supposition already noticed, that Greenland consists of an *assemblage* of islands.

In the year 1823, Captain Clavering, in command of the Griper sloop-of-war, under admiralty orders for pendulum experiments, advanced on the same coast as that first approached by Captain Scoresby; and, being about a month later in the season, was enabled to get close in shore, and to enter a considerable bay in lat. 74°, supposed to be that originally discovered by Gael Hamkes, a Dutch navigator, in 1654. The line of the more northerly part of the coast, as laid down by Scoresby, was now corrected, and new coast-line, including Shannon Island, with dottings of headlands reaching from 74° 30′ to 76°, added to our charts. Southward of Gael Hamke's Bay the coast was traced pretty close along to Cape Parry of Scoresby, and then finally left. The general configuration of the coast, excepting some ten or fifteen leagues in the furthest north, seen by Captain Scoresby only in the distant horizon, was singularly verified by Captain Clavering's inshore researches. For though the first explorer was not able to approach the land between 73° 30′ and 74° 30′ N., nearer than from 40 to 45 geographical miles, the positions ascribed by the two navigators to the headlands of Gael Hamke's Bay, and other leading points (with Jackson's Island, which had been first laid down at about 30 miles distance), proved to be all but identical.

This coast presents many remarkable and interesting features. On the Liverpool coast of Scoresby there is a mountainous chain of 3000 to 4000 feet in height, forming precipitous cliffs, which terminate in numerous peaks, cones, pyramids, or series of perpendicular serrated points. In the interior were seen peaks supposed to be almost twice the elevation of the lofty coast. The coal formation of Jameson's Island, in Scoresby's Sound, was among the most interesting of the geographical particulars observed.

The final researches, which terminate our description of the eastern coast of Greenland, were those made by Captain Graah in the years 1829 and 1830, by order of the king of Denmark. The leading object was to search for the lost colonies, and trace the coast, if practicable, in boats, from Cape Farewell up to latitude 69° N., the southernmost point discovered by Captain Scoresby. The expedition consisted of two *women's boats* of the country, rowed by women, carrying the Danes of the party (Captain Graah and three others), and attended by five men in their kaijaks. From the southern island, Cape Farewell, up to latitude 65°, the coast was found to trend about N.N.E.; and from thence, for 60 to 80 miles (as far as they were able to trace it), the line was about N.E. The highest point on Captain Graah's chart extends to 65° 45′, leaving the interval of about 340 miles (in a north-easterly direction) yet uncertified and unknown. The pressing of the ice in close contact upon the land prevented the further navigation of these eastern shores.

The aspect of a country subjected during the greater part of the year to an intense degree of cold, and also for several months deprived of the light of the sun, must of course be dreary and desolate in the extreme. A fall of snow in the midst of what is here called summer, only because it is not so dismal as the other parts of the year, is by no means uncommon. Towards the end of autumn it begins to descend in a regular succession of showers, which continue until every object is buried beneath a sheet of dazzling whiteness. Ice also begins to form about this time, first upon small streams and lakes, then upon larger ones and inlets of the sea, and finally upon the ocean itself, a vast extent of the surface of which becomes a solid frozen mass.

Ere the frost has reached its highest degree of intensity, the air deposits its moisture in the form of a fog, which freezes into a fine gossamer netting or into spicular icicles. The surface of the ocean also assumes a very remarkable aspect. It steams like a lime kiln, a phenomenon called *frost rime*, and caused, as in other instances of the production of vapour, by the water being still warmer than the superincumbent atmosphere. As the cold increases both these appearances vanish; the air clears; and the sea, cooled down to the same standard, becomes a solid floor of congealed salt water. Winter now broods over the frozen regions of the higher latitudes in darkness unbroken save by the light of the moon and the stars, which serves to reveal the desolation of the scene. Halos and luminous meteors are also more numerous here than in lower latitudes. But the aurora borealis, in particular, is highly serviceable in breaking the monotonous gloom of an arctic winter. This brilliant meteor plays almost incessantly in fantastic coruscations, which have the appearance of very vivid sheet lightning, and keep up an almost constant illumination. Captain Parry observes, "The sound of voices, which, during the cold weather, could be heard at a much greater distance than usual, served now and then to break the silence which reigned around us; a silence far different from that peaceable composure which characterizes the landscape of a cultivated country; it was the death-like stillness of the most dreary desolation, and the total absence of animated existence." During this cheerless period of the year, the natives, thickly covered with skins, remain generally immured in their miserable huts; and, crowding around the stove or lamp, contrive, as far as possible, to doze away the long and tedious night. The inside of the hut, all openings in the walls of which are carefully stopped to exclude the piercing cold, becomes covered with a crust of ice; and if for an instant an aperture be made so as to admit the external air, the moisture within becomes precipitated in a shower of snow. It may be remarked, however, that the external darkness prevails only during a part of the day. Twilight exists whenever the sun is less depressed than eighteen degrees below the horizon: the limits of total obscuration occur in the latitude of $84\frac{1}{2}°$, at mid-day in the winter solstice. Captain Parry's party, when in latitude 74° 40′, could see to read the smallest print at noon in the middle of winter. After the sun has appeared above the horizon, the half-famished inhabitants venture forth in search of food about the shores of the sea. In June and July the sun is always above the horizon. The heat, thus greatly augmented, gradually dissolves the perennial ice. The icy covering of the ocean breaks, and, separated into vast masses, is driven about, dissevered, and dispersed by the winds and currents. In particular situations the snow and ice of successive years are cast into immense glaciers, the foundations of which being sapped by the sea, break off in prodigious masses, and, floating far into the ocean, present to the mariner a bright but fearful spectacle, reflecting in varied tints the rays of light, yet threatening, if come in contact with, to crush to pieces the stoutest vessel. Not unfrequently they are borne to a great distance into lower latitudes. In these high latitudes, although the summer is short, the temperature is frequently oppressively sultry on land, which causes great humidity in the atmosphere; a characteristic of the arctic regions.

The mineral productions of the arctic regions are of considerable interest. Only the shores of the country, however, have been examined, the interior remaining unexplored, on account of the eternal ice and snow under which it is buried. The rocks, as far as they have been examined, are principally of the primitive formation, consisting of granite, gneiss, mica slate, hornblende slate, syenite, and clay slate. Among the secondary rocks is found the secondary sandstone, or coal formation; similar to that which abounds in the vicinity of Edinburgh, and containing impressions of plants. Specimens of the coal formation, collected by Captain Scoresby, were found by Professor Jameson to contain impressions of tropical plants; a very interesting fact, as connected with the change of temperature which the earth appears to have undergone. The most northern part of the coast of East Greenland examined by Captain Clavering was mountainous, and principally composed of trap rocks; lower down Captain Scoresby found the primitive rocks the prevailing ones among a large and very general range of geological series. The west coast of Greenland is similar to that above described. The elevated parts of the country are for the most part covered with snow or ice; and in summer, although rivers appear, which are fed by the melting of the ice and snow, they are few and inconsiderable in size. There are also lakes, some of which are of considerable magnitude, and supplied from the same source as the rivers. Springs likewise burst forth; and Giesecke mentions a tidal spring (rising and falling with the tide), and a thermal spring, which maintains a temperature of 104°, and flows uninterruptedly during the whole of the year. The islands upon this coast, the largest of which is called Disco, are similar in formation to the continent, and present the same bleak and wintry sterility. Four formations have been found on the coast of West Greenland; namely, primitive, secondary, tertiary, and alluvial. In the first of these, various curious and rare minerals occur, such as the cryolite, gadolinite, zircon and sodalite, tourmaline, and numerous precious stones, such as garnets, iolite, rock-crystal, and the like; and in the secondary and tertiary rocks, limestone containing fishes, and imbedded amber, have been found. Copper-ore is said to be abundant in various parts; and plumbago, iron-ore, and tin-stone, are found. The lands bordering on Baffin's Bay, and the islands lying at the northern extremity of it, are not much elevated above the level of the sea, the average height being 800 feet, and the highest elevations seldom exceeding 1500 feet.

The vegetation of a soil which for two-thirds of the year is bound together by intense frost, and covered with snow several feet thick, cannot be supposed to present much variety or beauty. Even the hardy race of pine trees, which in North America during severe cold withstand the fury of the northern tempest, if they make their appearance at all within the Arctic Circle, dwindle into stunted shrubs, which only rise a few feet above the ground, throwing out lateral branches. But to supply this deficiency, and afford to the Esquimaux the means of making their arms and utensils, considerable quantities of drift timber are frequently thrown up on the barren shores. The most abundant plants are mosses and lichens; and these are not only copiously produced, but they possess a nutritious and salutary quality, which does not characterize those of the same species that grow in more temperate climates. Mushrooms and ferns also find the means of subsistence here; and there is a thick tufted juicy plant, of extreme fecundity, emphatically called scurvy-grass, on account of its acting as an antidote to scurvy. The different species of sorrel, especially the *Rumex digynus*, are found flourishing under the snow at the very furthest limits of vegetation. These are likewise antidotes to scurvy. During the short gleam of summer some beautiful specimens of the floral tribe adorn the vegetative patches, but little of vegetable production useful as food can be raised under this ungenial sky. The order *algæ*, especially the species or tribe *fucus* or sea-weed, grows in great abundance, and covers the Greenland coast with submarine meadows. The singular phenomenon of *red snow*, which has excited so much interest, is now supposed to result from an assemblage of very minute vegetable bodies belonging to the class of cryptogamic plants, and is termed *Uredo nivalis.* The arctic mountains on which Captain Ross observed the red snow are about 800 feet high, and extend eight miles in length. Captain Scoresby observed the same phenomenon on Rathbone Island on the eastern coast in 1823. Although snow is not the natural situation of this plant, it possesses a great tenacity of life, and not only preserves its vitality in winter, but, during the partial thawing of the snow it multiplies so as to cover a vast expanse with red suffusion.

Although vegetation be scanty and unimportant in the arctic regions, there is a remarkable profusion of animal life. The sea, in particular, swarms with living beings, some of which are of a magnitude far surpassing anything to be met with elsewhere. One of the grand articles of food for supporting these numerous tribes is the genus *Medusa* of Linnæus, graphically called by seamen sea-blubber. These animals are of a soft, gelatinous consistence, and they abound to an extraordinary extent. By far the most numerous of the medusan tribes, however, are very minute; but so plentiful are they, that about a fourth part of the Greenland sea is tinged of an olive-green colour by them. This portion of the ocean is considered as the polar pasture ground, where whales used to be met with in greatest numbers. Animals of the class *Crustacea* stand next in number and importance as food for the whale. Here various species of the crab occur in large numbers, as well as of the shrimp, whose carnivorous propensities, as observed by Parry, are remarkably strong. Many of the zoophitical and molluscous orders, and several species of marine worms, also abound. But the cetaceous tribes are by far the largest in size, and most important to mankind, of the numerous living beings which inhabit the northern seas. The largest of these is the whale, the *mysticetus* being sometimes sixty feet in length, and the *rorqual* nearly a hundred. Of whales there is a considerable variety; and the catching of them has long been a lucrative speculation, on account of the oil and whalebone derived from them. All the shores and borders of the arctic zone are frequented by huge amphibious races, which seem to form an intermediate link between whales and quadrupeds, between the mammalia of the ocean and those of the land. Amongst these is the morse or walrus, a large and unwieldy creature, measuring from twelve to fifteen feet in length, and from eight to ten in circumference. Seals are very numerous, and constitute both the food and the clothing of the Esquimaux, and a profitable fishery to Europeans. Amongst land animals is the polar bear, whose ferocity and daring render him one of the most formidable of quadrupeds. The rein-deer are pretty numerous in some parts of Greenland during summer, and afford a favourite object of chase. Their flesh is good, and the skin forms a very comfortable article of clothing. The arctic fox is met with in considerable numbers. The dog, however, is the most important quadruped, and the most valuable to the Esquimaux, who have succeeded in taming and rendering it subservient to them in travelling and in hunting. Yoked to a sledge, these animals can draw a great weight with very considerable rapidity. Land birds are not numerous, but the number of sea-fowl is incredible. The auk, the petrel, and the gull, in clustered myriads darken the sky, and make the rocks and shores re-echo with their wild clang. The goose and the duck are also met with in these regions; and great flocks of that species of duck called the eider, whose down is so valuable, arrive in spring on the most northern shores of Greenland. Amongst other arctic birds are terns, which produce the most delicate eggs of any water bird; the *colymbus* (guillemot), whose skin affords a comfortable article of clothing; the *tringa* (sand-piper); the *charadrius* (plover); and the *tetrao* (grouse and ptarmigan).

The native inhabitants of these countries are the Esquimaux, a race widely diffused over the shores of the Northern Ocean.

Like the vegetation of these high latitudes, the human figure is dwarfish in size, and decidedly below the European standard. A man five feet nine inches in height is considered as a person of gigantic stature, and, compared with the average altitude to which they attain, as possessing amongst them the same superiority of size which a person six feet two or three inches in height does amongst us. The body is somewhat thick, but the hands and feet are small, and the fingers short. The face is generally round and flat, with prominent cheek bones, but full and plump cheeks. They are tolerably well shaped; and the female countenance, although destitute of all pretensions to regular beauty, has a frank and good-humoured expression; and if they would allow it to be purified of its thick incrustation of grease and dirt, it might even be accounted handsome. The flesh of these people is soft and flabby, and they have a phlegmatic constitution corresponding to this habit. The dress of the men consists chiefly in a double coat of seal-skin or rein-deer; the hairy side of the inner one being placed next the skin, whilst to the outer one there is an ample hood attached, which is drawn over the head. Their breeches are also double, and of the same material, overlapping the boots, which extend to the knee; the latter are composed either of deer skin, or, if for hunting or travelling, of the hide of the seal or the walrus. The dress of the females is very nearly the same, with some slight variations in form. The chief distinction lies in their boots, which are of capacious dimensions, and, like those of Hudibras, receptacles for whatever sort of goods may come in the way of the wearer. These habiliments are very neatly sewed together, an art in which the women display considerable dexterity. The thread they use is the sinews and some other parts of animals. There is also some taste shown in decorating them with parti-coloured stripes of skins. Like other savages, they are fond of ornaments, and contrive also to paint their bodies.

Under such a rigorous climate, much labour is necessary to secure subsistence. For nine months the ground is locked up in frost, and rendered incapable of producing any root or herb which can constitute a staple article of diet. They are, moreover, improvident; in consequence of which, combined with the precarious supply of food, they are often subjected to severe privation. Yet they are proof against the lessons of experience, and so happy is their disposition, that a moment's gratification of their wants makes them forget that they had ever suffered from hunger, or that on the morrow they may again be in the same distress. Hunting and fishing are their only resources, and of course their time is spent in pursuing, by land or sea, the wild animals by which these are inhabited. During summer, the deer is pursued with bow and arrow or the gun, and their flesh and skin are highly prized. But for the greater part of the year the Esquimaux must seek their food in the waters, from the seal, the walrus, and sometimes the whale. For the purposes of respiration, these animals rise above the water, and the moment they become visible, the Esquimaux attack them with dart or harpoon, to which they have sometimes a long line attached. The capture of a whale is the greatest and rarest of their marine achievements. On these occasions a large body of men assemble armed with a variety of weapons. The animal, when struck, plunges under water; but being obliged to rise for air, a fresh attack is made upon him with their lances, until, exhausted by fatigue and loss of blood, he falls their prey.

These captures are shared amongst the inhabitants of the village, all the cooking pots in which are put in requisition when the arrival of one is announced, for the purpose of boiling the flesh of the animal, which is cut up into dainty slices. The cooking being finished, the feast commences by a person first extracting a large piece from the pot, and, after severing with his teeth as much as the mouth will hold, handing it to a second person, who does the same. and he to a third, and so on till the whole is devoured. There seems to be no assignable limit to the capacity of an Esquimaux stomach. He has been known to devour, in twenty-four hours, ten pounds four ounces of solid food, more than a pint of strong soup, and a gallon and a pint of water.

A single Esquimaux, assisted only by his dogs, will attack the polar bear without the slightest fear or hesitation; which indicates no small amount of personal courage. The dogs keep the ferocious animal at bay, assailing him on all sides, whilst the master attacks him with his spear, and avoids, with astonishing adroitness, the furious springs of the enraged monster. In reflective intellect the Esquimaux have little to boast of. Although some of them are arch, ingenious, and jocular, no manifestations of a profound understanding have yet been discovered amongst them. In arithmetical skill they are lamentably deficient, being scarcely capable of counting as far as ten; and their taste for music is nearly at as low an ebb. Some of them, however, display a constructive talent, in exercising which the principal tool employed is the knife. Their houses are built of various forms and materials, according to the season and the region of their residence. Some of their winter houses are of stone and earth, partly sunk in the ground. Others are of snow and ice. Those of ice are built in the following manner: When winter approaches, the ice is cut into tall square blocks, with which they construct regular spacious domes, connected with other smaller ones, for the purposes of domestic economy. For the admission of light, a round hole is cut on one side of the roof of each apartment, and a circular plate of ice, three or four inches thick, and two or three feet in diameter, is inserted in it. The light is soft and agreeable, similar to that which is transmitted by ground glass, and is quite sufficient for every purpose as long as there is any light to be derived from without. The inside of the tenement is shaped with care, and a glossy surface is then given to it by the effusion of water. The wall soon becomes a solid mass, which, being a slow conductor, checks the access of cold. As soon as the snow melts, the Greenlanders quit their wintry habitations, and erect their tents, which are of two kinds; one of these is of a pretty solid construction, and such as forms a fixed summer residence; the other is of a lighter nature, and can easily be removed from place to place. It generally consists of poles, upon which the skins of animals are stretched. Their boats consist of a light frame-work of wood or bone, which is covered with seal-skins. There are two kinds of them; one large for the transport of goods and for the conveyance of women; the other small, and fitted to hold only one man. The top of the latter, which is called a kaijak, is covered over with seal-skin, but in the middle there is a round opening for the reception of the Greenlander, who, here seated, propels himself through the deep by means of an oar, which is furnished with a broad blade at each end. With this slender vessel he swims over the billows like a sea bird, and without much dread of tempests.

In their moral character the Esquimaux inherit more than an average share of human frailty. Few savage tribes have made themselves more notorious for dishonest and thievish dispositions. They will steal the most useless things. Little respect indeed is entertained for the rights of property; gratitude is a virtue almost unknown amongst them; and in their habits they are exceedingly licentious, connubial infidelity being winked at as a very unimportant matter. But some tribes, especially those seen by Captain Graah, appeared to possess a much higher moral character. They also display little or no sympathy or regret for the sufferings and death of neighbours, or even of relations. The Esquimaux, however, are not inclined to war; they are neither irascible nor revengeful; and they treat their offspring with the greatest tenderness. In their domestic economy, however, they are uniformly filthy, and disgusting in the extreme.

These descriptions, however, only apply in their full extent to original Esquimaux who have had little or no intercourse with Europeans. In the various missionary stations the grosser aspect has been much modified and changed by the influence of Christian teaching. And among a no inconsiderable number of the people the true principles of the gospel have taken root, and the effects of it have become apparent in their lives, so as to yield an improvement generally among the population around, and very many individual examples of the true Christian character.

Their language is remarkable for the copiousness of its grammatical forms. Their particles are as numerous and as varied as in the Greek; but the rule which directs them to introduce into the verb all the parts of the sentence gives rise to words of a disproportionate length. The consonants *r*, *k*, and *t* predominate in this language, and produce harsh sounds by their frequent recurrence. The Greenlanders of the north speak a dialect unintelligible to those of the south; according to Captain Ross it is called *Kumooke*. The Greenlanders sometimes call themselves *Innouk*, or brothers; but their real national name appears to be *Kalalit*, and they commonly designate their country by the name of *Kalalit Nounet*. The trade of Greenland is a monopoly in the hands of the Danish government. Five or six vessels are annually sent from Copenhagen, about the beginning of May, with manufactures of various kinds, as well as colonial produce, as coffee, sugar, tobacco, &c. The exports from Greenland in 1847-9 averaged about L.17,000 annually, and consisted chiefly of seal-skin, deer-skin, oil, whalebone, and eider-down. (W. S—Y.)

GREENOCK, a seaport town of Renfrewshire, Scotland, on the south bank of the Firth of Clyde, 22 miles below Glasgow, in N. Lat. 55. 57. 2., W. Long. 4. 45. 30. In front of the town there is a fine and extensive bay, formerly known by the name of the Bay of St Lawrence, from a religious house that anciently stood there. Behind the town the land rises into a picturesque ridge of hills, about 800 feet high, between which and the bay Greenock stretches for upwards of two miles and a half along the shore, but its breadth is inconsiderable. Its name is supposed to be derived from the compound Gaelic word *Grianaig*,—*Grian* signifying sun, and *Aig* port or bay,—the bay being directly opposite to the rising sun.

In the earlier part of the 17th century Greenock was an obscure fishing village, consisting of one row of thatched cottages; and in 1716 there were only six slated houses in the place. In 1589 James VI. granted leave to Schaw, the proprietor, to erect a place of worship for the convenience of the inhabitants of the district.

In a charter, dated 5th June 1635, granted by Charles I. as administrator-in-law to his son Charles, Prince of Scotland, in favour of "Johne Schaw of Greinock, and Helen Houston, his spouse," a novodamus grant is made

"To the saids Johne Schaw, his spouse, and thair foresaids, off the toune or village of Greinock, in ane frie brugh of barronie, to be callit, now and in all tyme cuming, the brugh of Greinock." This charter, which was ratified by the Scottish parliament in 1641, appears to have excited the jealousy of the neighbouring *royal* burgh of Renfrew, whose representative, John Spreule, "protested, in name of the Provost, Bailzies, Counsel, and Communitie of the brugh of Renfrew," that any ratification of the charter "be nae ways prejudiciall to our said brugh liberties, and priviledges thereof, contenit in our antient infeftments as accords of law."

Being merely a burgh of barony, and thereby excluded from the right of foreign trade, Greenock had to contend with the royal burghs in its immediate neighbourhood, Dumbarton, Renfrew, and Glasgow, to which alone this privilege was accorded. A second charter by Charles II., and dated 11th July 1670, grants in favour of "John Schaw of Greenock in liferent, and of Sir John Schaw, now of Greenock, designed therein his eldest lawful son in fee" of the lands and barony of Greenock, "with the *harbour* built and erected thereupon;" a new grant is made "to the said Sir John Schaw, younger, of Greenock, and his airs male," of all casualties of superiority which might have accrued to His Majesty, "by reason of ward, nonentrie, forfaulture, *purpresture* . . . . or for building and edifieing the foresaid *Harbourie.*"

It is evident from these extracts that in the interval between 1635 and 1670, John Schaw, the elder, had built a harbour at Greenock; and as he had thereby incurred the penalty of purpresture by encroaching on the ground between the ebb and flow of the Clyde, the last charter was necessary to exonerate him therefrom. It further conveyed "special and full power and libertie to the said umgl. John Schaw, and his said sone, and their foresaids, to repair and build *free Ports, Harbouries,* and *Havening-places,* upon any part of the grounds of the said lands." John Schaw, the younger, had distinguished himself in the royal cause at the battle of Worcester, for which the honour of knighthood had been conferred upon him, as was subsequently that of baronetcy; and to this may probably be attributed the favourable provisions of the charter.

For upwards of a quarter of a century the original harbour appears to have remained little more than an insufficient and insecure landing-place; but on 22d September 1696, an overture was made in the Scottish parliament "for building ane harbour at Greenock;—read, and remitted to the committee of trade." To this overture reference is made as follows, in the minute of parliament of 29th November 1700:—"Petition; Sir John and John Schaw's, elder and younger, of Greenock, craving that the act brought in from the committee of trade, allowing the imposition therein-contained for building ane harbour at Greenock, be now passed; and the draft of the said act being also read, *it was ordered to lye on the table.*" The petition and draft were again read on 23d December, but nothing further was done.

Sir John Schaw died in 1702, and was succeeded by his son of the same name, who, with equal zeal, prosecuted the erection of a harbour. Notwithstanding the refusal of the legislature to aid the undertaking, he resolved to accomplish it by advancing his own money, and encouraging his feuars to advance theirs. To secure repayment an assessment was voluntarily imposed, and a regular contract to this end entered into in 1703. The harbour thus originated underwent, in the progress of its construction, many alterations and additions, of which no record now remains; it was not finished till 1734. It then comprised an area of 8 acres, 3 roods, and 10 falls; was contained within two quays, east and west, and equally divided in the centre by a middle quay.

The prosperity of Greenock had continued to advance from the period of the Union in 1707; and in 1710 it was established a custom-house port, and a branch of Port-Glasgow. In 1751 application was made to parliament, and an act (25 Geo. II.) was procured whereby an imposition of two pennies Scots, over and above the duty of excise payable to his Majesty, was laid upon every Scots pint of ale or beer that should "either be brewed, brought in, tapped, or sold within the said town of Greenock"—made payable to certain trustees—"for cleaning, deepening, building, and repairing the said harbour and piers." This tax continued to be levied for thirty years.

Prior to 1772 the harbour had been leased to the town by the superior; in that year, however, the magistrates received a feu-right thereof from John Shaw Stewart, Esq., who had succeeded to the Greenock estate on the death of Sir John Schaw on 5th April 1752. On the completion of this transaction, the magistrates having resolved on the erection of a new quay, a plan of the ground requisite for a new harbour was prepared under the engineering superintendence of James Watt; and a feu-right thereof was granted to the magistrates by Lord Cathcart, who was the grandson of Marion, the only child of the last Sir John Schaw, and inherited thereby a part of the Greenock estate. The transaction is dated 3d March 1773; and at the same time the magistrates and council brought their first bill into parliament, "for deepening, cleansing, and making more commodious the harbour of Greenock." This act received the royal assent on the 1st of April following; and the works it contemplated were prosecuted during many subsequent years.

Various acts of parliament having reference to successive enlargements and alterations of the harbours were from time to time procured as the increase of trade rendered such necessary, so that now of the original erections scarcely a vestige remains. In 1785 a dry dock was built in the western division of the old harbour, the expense of which was defrayed by subscription; and in 1818 the magistrates and council contracted for and built another, and greatly larger, entering from what is now known as the East India Harbour, and which was finished in 1824 at an expense of L.20,000.

On the 29th day of May 1805 was laid the foundation-stone of the East India Harbour; and almost contemporaneously with this large addition to the dock accommodation of Greenock, a general improvement and renovation of the quays and breasts of the older portions of the harbour were undertaken. These works, which were very extensive, and involved an expenditure of upwards of L.120,000, were not completed till September 1819.

The steadily increasing trade of the port rendered a further extension of dock accommodation absolutely necessary; and in 1840 an act was procured for the construction of an entirely new harbour and dock. Six years subsequently, the work was commenced on a site directly east of the East India Harbour, and on the 17th October 1850 the new dock was formally opened, under the designation of Victoria Harbour.

It consists of a tidal basin, covering an area of about 6 acres, and exceeding 30 feet in depth. The east and west walls are each 563 feet long; and the outer quay wall, divided by the entrance, 150 feet wide, is 176 feet long on the west, and 60 on the east side. The average width of the quays on the east, west, and south, is upwards of 85 feet, and on the north, toward the river, it is 70. The depth of water within the basin is 26 feet at high tide, and 14 feet at low water. The whole work, which is of the most substantial character, cost upwards of L.120,000; and, as a tidal harbour, has not, in respect of its size and depth, its equal in the world. On the east side a massive crane, capable of lifting from 70 to 80 tons, has been erected; and here many of those gigantic steam vessels, for which the Clyde has become universally famous, are fitted with their engines. A crane has also been erected at the East India Harbour capable of lifting 40 tons.

With the clay and earth dug out of the Victoria Harbour an embankment was formed toward the west end of the town, reclaiming upwards of 4 acres of ground between high and low water-mark. The walls, which are founded 6 feet beneath low water, extend 600 lineal feet parallel with the river, and upwards of 300 feet on the east and west. A landing slip is formed on the eastern side. The depth of water hereby secured is at high tide from 16 to 18 feet. This embankment is denominated Albert Quay, and is used for the discharge of timber-laden vessels: a portion has recently been leased for a ship-building yard.

The old graving docks having become altogether inadequate, the harbour trustees have recently purchased, for upwards of L.30,000 several acres of ground adjoining Albert Quay, and here it is in contemplation to construct a new harbour, with the requisite dock accommodation for repairing the largest vessels.

The following measurements show the extent of the existing dock and quay accommodation:—

Albert quay and slip.....	906 lineal feet.
West harbour and quays	3940 feet, girthed.

Entrance to harbour	130	feet wide.
Custom-house quay	990	... ...
East India harbour and quays	3200	... girthed.
Entrance to harbour	170	... wide.
Victoria harbour and quays	2200	... girthed.
Entrance to harbour	150	... wide.

The harbour trustees, who manage the affairs of the docks, consist of the town-council, and commissioners annually elected. Greenock enjoys coasting and foreign trade to a very considerable extent. In 1719 a vessel from this port first crossed the Atlantic; but shortly afterwards the shipping rapidly increased, for the Union had now opened full prospects to Scottish industry. With such rapidity did Greenock extend her maritime relations that the jealousy of the traders of London, Liverpool, and Bristol was excited. They accused the merchants of Greenock and Port-Glasgow of defrauding the revenue, but the charge was triumphantly refuted. The earliest trade seems to have been in herrings, and it is still continued, the amount cured annually averaging about 19,000 barrels. Trading in tobacco was also carried on at a very early period. It was first brought from the colonies, and then exported to the Continent. The Greenland whale-fishing commenced as far back as 1752, but it never rose to be of any importance, and is now discontinued. The American War greatly interrupted the progress of Greenock, as the principal trade of the port was then with that country; but after the peace in 1783 it speedily revived, and within the seven following years the shipping trade was tripled in amount. At present the principal intercourse is with the East and West Indies, Australia, and North America. Newfoundland and South America have also employed a considerable quantity of shipping. The gradual increase of trade is shown by the following tables:—

Account of the gross receipt of customs at the port of Greenock during 1728, *and various subsequent years.*

1728	L.15,231	1839	L.315,084
1770	57,336	1846	324,477
1802	211,087	1848	407,083
1822	263,464	1851	410,206
1831	592,008	1852	429,535

The stationary state of the duties of late years is ascribed partly to their reduction, and partly to the improvements effected in the navigation of the Clyde, which enable vessels that formerly had to load and unload here or at Port-Glasgow, to ascend to Glasgow.

Account of the number of registered vessels belonging to the Port of Greenock during the years 1825, 1834, 1845, *and* 1853.

	No.	Tons.
1825	241	29,054
1834	367	40,733
1845	428	82,744
1853	418	73,898

Of these last, 14 vessels, with an aggregate of 2012 tons, were steamers.

Account of the number and tonnage of vessels that entered and cleared from and to foreign ports in various years since 1784.

	INWARDS.				OUTWARDS.			
	British.		Foreign.		British.		Foreign.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
1784...	52	6,569	4	530	63	7,297	3	520
1804 ..	165	30,802	25	5,120	155	31,896	20	5,965
1824...	188	46,162	11	3,054	188	46,857	9	2,699
1834...	277	69,843	10	2,073	284	71,698	8	2,140
1853...	274	94,575	44	13,764	153	55,630	45	11,975

In 1830, 684 vessels of 67,884 tons entered, and 796 vessels of 81,988 tons cleared coastwise at the port.

In 1853, 574 sailing vessels of 38,328 tons, and 214 steam vessels of 39,511 tons entered, and 162 sailing vessels of 8662 tons, and 102 steam vessels of 10,752 tons cleared at the port.

Prior to 1741 the police and burgh affairs of Greenock were exclusively in the hands of the superior, through whose baron-bailie they were ministerially discharged. By a series of charters, however, dated respectively 30th January 1741, 10th April, and 2d September 1751, Sir John Schaw conferred power upon the feuars and sub-feuars to elect nine trustees from among themselves, whereof two to be bailies, one to be treasurer, and the other six to be councillors for the good government of the town, and public funds thereof. Authority was given to hold weekly courts, to punish delinquents, to make laws for maintaining order, and to admit merchants and tradesmen to the privilege of burgesses. The burghal affairs of the town continued to be administered under the charter of September 1751 till 14th November 1833, when the election of councillors took place under the provisions of the Reform Act. That act conferred no special benefit upon Greenock in respect of the election of councillors, as under the charter referred to, the qualified electors of Greenock formed the most numerous constituency in Scotland. The town is divided into 5 municipal wards; and the town-council consists of a provost, 4 bailies, a treasurer, and ten councillors. A sheriff criminal court, sheriff small-debt court, and justice-of-peace court respectively are held every week.

Greenock has a very irregular appearance, and, until lately, the drainage of the town was very defective. A thorough system of drainage, however, has recently been instituted, and a corresponding improvement in the healthiness of the place is the result. The town is rapidly extending on the east by the increase of ship-building yards and other public works; and on the west a series of elegant and handsome villas stretch along the shore. The view from the heights above the town is exceedingly beautiful. Amongst the public structures which deserve to be noticed is the custom-house, a handsome edifice in a good Doric style, erected in 1818, at a cost of L.30,000. It is seen to much advantage, being situated in the centre of the quay. The tontine is a substantial and handsome building, erected in 1801, at a cost of L.10,000, and containing one large hall, and many smaller rooms. Besides these, the town can boast of several other handsome buildings. The railway to Paisley and Glasgow was opened in 1841. The line is 22½ miles in length. In 1828, a gas work was constructed at an expense of nearly L.9000, and being exclusively the property of the corporation, has hitherto been conducted with great advantage to the inhabitants. The West Parish church is a graceful and elegant structure. The Watt monument was erected in Union Street in 1838 to commemorate the genius of James Watt, who was born in Greenock. It is in the early English style of architecture, after a design by Blore, and has cost upwards of L.8000, of which the son of Watt contributed L.3000. It contains an exquisitely finished statue of the philosopher by Chantrey.

Within this building also is the public library, founded in 1783, and now containing upwards of 12,000 volumes. A mechanics' library was founded in 1832; and a mechanics' institution erected in 1840.

On the high ground between Greenock and Gourock stands the Wood Mariners' Asylum, a very handsome and extensive erection in the style of the Tudor period. It is the fruit of the generosity of the late commissary-general Sir Gabriel Wood, a native of Greenock, who died in 1845. It was founded for the benefit of decayed master mariners and seamen belonging to the various seaports on the Clyde. This building, which cost L.10,000, was begun in 1850, and opened in 1854. It provides accommodation for 50 inmates, although in the meantime only 25 have been admitted.

Greenock grammar-school was founded in the middle of last century. Its business was conducted in hired school-rooms till the present year (1855), when a handsome building in the old monastic style, erected by public subscription, was opened.

The Highlanders' Academy, a substantial and handsome building, was erected in 1836. There are various other educational institutions in Greenock adapted to every class.

The town is plentifully supplied with water, brought by an aqueduct 6½ miles in length, from an artificial lake in the neighbouring highlands, which receives the waters of a number of small streams. For several miles it runs at an elevation of 500 feet above the level of the sea, and in the vicinity of the town it pours down a torrent of water in successive falls, affording water-power to a number of mills erected on its course. There is also a compensation reservoir covering 40 acres of ground, besides other smaller basins: Also a series of self-acting sluices, constructed in a most ingenious manner, not only obviating all danger of an overflow, but preserving every drop of water even during the greatest floods. The whole of this magnificent public work, including two expensive filters, was planned by Mr Thom, an ingenious engineer, and executed under his directions at an expense of L.90,000.

The mill of the Shaws Water Cotton Spinning Company, erected in connection with the preceding works, was founded in June 1838, and opened in March 1841. It is an oblong building, 300 feet long, 65 wide, and 4 stories high. The centre portion projects, with a pediment on the top, surmounted by an octagon belfry. Each room is 215 feet long, and 61 broad, and the ceilings are supported by two ranges of cast-iron pillars, 20 in each. The wheel-house, which stands at a little distance from the main building, is 90 feet long and 33 broad. The base of the building is nearly 50 feet below, while the roof is about 35 feet above, the level of the road. The wheel itself is, in respect of its size and structure, unequalled in the world. It measures 70 feet 2 inches in diameter, or 220 feet 6 inches in circumference; the axle is of cast-iron, and weighs 11 tons; the centres or naves, into which the arms and braces are fitted with gibs and cutters, are 10 feet in diameter, and weigh 8½ tons each; the sole of the wheel is constructed of iron plates, fastened with 20,000 rivets; the buckets are 160 in number, and each contains 100 gallons of water; the wheel revolves once in a fraction more than a minute, and, with a full supply of water, is equal to 200 horse power. The weight of the whole is 117 tons. The spur wheel, with its shaft, weighs 23 tons, measures upwards of 18 feet in diameter, and revolves at the rate of 600 feet per minute. The wheel, with all its accompanying apparatus, was the workmanship of the late Mr Smith of Deanston. The mill, when fully engaged, occupies 600 hands.

A new cemetery, in the south-western part of the town, was opened in 1846. It contains upwards of 20 imperial acres, the carriage ways and walks alone considerably exceeding five miles.

On the high ground at the eastern end of the town, and commanding an extensive view of the river and adjacent country, stands the mansion-house, the old residence of the Schaw family. Adjoining this building lies the Well Park, an extensive piece of table-land overlooking the town, and inclosing the old well, on which is the date 1629. In 1851 this was generously given to the public by Sir M. R. S. Stewart. It is finely laid out with plants and evergreens, and forms an agreeable promenade ground. Another and larger park, the Wellington Park, has since been appropriated by the same donor exclusively to the use of the working classes; and here bowling, quoiting, and other athletic exercises, for which it has been adapted at the expense of the town, are zealously prosecuted.

Greenock is divided into three parishes, named respectively the Old or West, the Middle, and the East. The first church was built in 1591 on a piece of ground which at that period lay close to the shore. It was condemned in 1837. Its ruins now stand in the centre of a venerable burying-ground, near the spot where a part of the rebel forces raised by the Earl of Argyle landed in 1685. Within the burying-ground lie the remains of Burns' Highland Mary, and over the spot a public monument, bearing an appropriate inscription, was erected in 1842.

The New or Middle Parish was dissociated from the Old in 1741. The church, a plain but elegant edifice, was erected in 1757.

The East Parish was disjoined from the Old, and constituted a separate parish in 1809. The original church, which was built as a chapel of ease in 1774, was condemned in 1851, and a plain but elegant structure was erected by the town-council in 1853.

A church, containing nearly 1200 sittings, was built by subscription as a chapel of ease in the north-western part of the town in 1823, and subsequently designated the North Parish Church. Having stood empty since 1843, it has recently been sold, and is about to be converted into a public bazaar and hall for public meetings. There are also in Greenock 6 Free Church places of worship, 4 United Presbyterian, a Congregational, an Episcopalian, an Evangelical Union, a Roman Catholic, a Methodist, a Baptist, an Irvingite, and a Reformed Presbyterian chapel. A sailors' home, capable of accommodating 40 inmates, was opened in 1852. In connection with this there is a chapel containing 300 sittings, in which divine service is regularly conducted by a chaplain. Attached to the institution are a school, reading-room, library, and other advantages.

The manufactures of Greenock are various, but the principal are those immediately connected with the commercial interests of the port. Shipbuilding, of which there are seven large establishments, was introduced at an early period, and has largely increased of late years in connection with the use of iron in the construction of vessels. Four yards employ iron almost exclusively; and several of the largest steamers and merchant ships afloat have been built here. There is one patent slip which is large enough to admit a vessel of 400 tons register. Boat building is also extensively carried on; and in connection with these naval establishments are 2 sail-cloth factories, 5 rope-works, and 5 sail-making sheds. There are also several extensive engineering establishments, machine manufactories, and forges. Greenock is the chief seat of sugar-refining in Scotland, in which department there are 11 houses. In addition to the cotton mill formerly described, there are two woollen factories, a flax mill, a paper mill, 3 dyewood mills, 6 grain mills, 4 steam-saw mills, a distillery, 2 breweries, 5 tanneries, a pottery, several chemical works, and various other establishments common to large towns. The manufacture of straw-plait was extensively prosecuted for some years, but has gradually declined, and is now almost extinct. Letter-press printing was introduced in 1765, but the first book was not printed till 1810. There are 2 bi-weekly newspapers. During summer steamers arrive and depart from and to the principal places on the coast several times each day; there is also daily communication by steamboat with Liverpool, and various Irish ports. Trains run to and from Glasgow almost every hour, and the time occupied by express is 40 minutes. The philanthropic and benevolent institutions of the town are numerous, and comprehend various objects, domestic and foreign. A man-of-war is permanently stationed in the roadstead to receive volunteers for the navy.

The opposition to the monopoly of the East India Company originated with the merchants of Greenock in 1812, who were the first publicly to petition against that abuse. Greenock confers the second title of the noble family of Cathcart, who are descended from Marion, the only child of the last Sir John Schaw. The population in 1741 was 4100; in 1841, 38,846; in 1851, 39,391. (J. M. J.)

GREENWICH, a market-town of the county of Kent, in the hundred of Blackheath, within the lathe of Sutton, and five miles from London. It is situated on the south bank of the Thames, and extends along the shore of it. Though extensive, it is a single parish, and is at the present time well furnished with places of worship, having two large churches in the central part of the parish, and two others, one at the eastern and the other at the western extremity, besides other churches and chapels of the established religion, and several others belonging to various denominations of dissenters.

The most attractive object is the royal hospital for aged, decayed, or wounded seamen, built on a plan formed by Sir Christopher Wren, and devoted by William III. to this purpose. The building consists of four piles detached from each other, but so arranged as to form a complete square, open towards the river. The several divisions are occupied either as the residences of the governor or other officers; and there are a hall, a chapel, and apartments for the accommodation of the pensioners. The latter are appropriated for seamen, consisting of a cabin with a single bed, and a long gallery into which each cabin opens, where free air and recreation may be enjoyed. The hall is a magnificent apartment, decorated with excellent paintings on allegorical subjects connected with naval affairs, by Sir James Thornhill. This establishment has at present upwards of 3000 pensioners, besides between 5000 and 6000 others, called out-pensioners, who receive stipends at various rates. There is connected with it an infirmary, a school for several hundred boys, and other institutions, but without the walls. The pensioners are amply supplied with food, are well and uniformly clothed and warmly lodged, and are, besides, supplied with the sailor's most indispensable luxury, tobacco. The whole expense of maintenance is about L.26, 10s. a head, but varying with the fluctuation of the prices of bread, meat, and malt. See GREENWICH HOSPITAL.

Next to the Royal Hospital, the most remarkable institution is the Royal Observatory, primarily established in the reign of Charles the Second, for the advancement of navigation and nautical astronomy, but which has, since that time, under its successive able directors, Flamsteed, Bradley, Maskelyne, Pond, and Airy, won an unrivalled reputation for the excellence and variety of its observations, and for the advancement which it has given to all branches of astronomical science. Its organization at present is very complete, and it is enabled to take under its charge the

Greenwich Hospital.

control of magnetical and meteorological science, together with the transmission of time throughout England by means of electro-magnetic circuits, in addition to the usual work of an astronomical observatory. The chief astronomical instruments in use at present are a very large transit circle, and an altitude and azimuth instrument of sufficient firmness to produce lunar observations of first-rate excellence. To carry out the various details of the observations and processes employed, including the general use of photographic and electric manipulations, a large staff of assistants and computers is required, amounting on the whole to fourteen or fifteen persons.

The Park of Greenwich is an object of great attraction, and the hill behind commands a prospect over London and the plains of Essex. There are well-supplied markets on Wednesday and Saturday. It returns two members to parliament. In 1851 the population of the parish was 35,028, and of the parliamentary borough, 105,784.

Greenwich has always been famed for the excellence of its local charities, amongst which those most deserving of notice are—the Jubilee Almshouses, for the maintenance of a certain number of aged women; the Bluecoat Girls' School for boarding, clothing, and educating as many girls as the funds will allow; and the Bluecoat Boys' School. It has also two branches of the National School for boys and girls.

From the salubrity of the air and the beauty of the scenery around Greenwich, its neighbourhood has always possessed a great number of boarding schools and other educational institutions of a superior class. Of these may be mentioned a very large proprietary school for boys intended for commercial or professional pursuits.

Greenwich Park and Blackheath form the pleasure-ground of the population of London; and on every public holiday, especially at the two fairs held at Easter and Whitsuntide, a very large number of persons crowd to Greenwich by the steamboats, railroads, and other means of conveyance, partly to partake in the amusements that are to be found there, and partly, we may presume, to enjoy the fresh air and delightful views attainable from the Park and its neighbourhood. Under the metropolitan police regulations the good order uniformly preserved amongst so large a concourse of people is very remarkable; scenes of riot and confusion rarely occur; and nothing is needed but a little co-operation of the wealthier classes to render these periodical gatherings at Greenwich a source of profitable delight, as well as of mere amusement to the numerous visitors.

Greenwich Hospital is a royal foundation, erected by the munificence of William and Mary (originating, as is generally believed, with the queen), by letters patent of 25th October 1694. The hospital occupies the site of the old palace, called *Greenwich House*, which was from very early times a residence of our sovereigns. Edward III. had a palace there. Henry IV. resided much at Greenwich, and his will is dated from his manor of Greenwich. It was granted by Henry V. to the youngest son of John of Gaunt, and reverted again to the crown on his death (25th Henry VI.). Edward IV. took great delight in the palace, and enlarged it at much cost. He granted it to his queen, Elizabeth. It afterwards came into the possession of Henry VII., who enlarged and beautified it, and resided much there. Henry VIII. was at great expense to render the palace worthy of his sumptuous court. He called this his manor of pleazaunce, and held there many great banquets and royal ceremonies. Queen Elizabeth made many additions to the building, and resided much there. James I. laid the foundation of the *House of Delight*, which afterwards became the residence of the governor of the hospital. Charles I. resided frequently at the palace; and his queen furnished, with extraordinary magnificence, the building begun by his predecessor. At his death, it was taken possession of by the officers of the Commonwealth, who excepted it, for their own use, from the general ordinance passed 16th July 1649 for the sale of the crown lands; but upon their subsequent necessities for the support of the navy, it was ordered by the House of Commons, 27th November 1652, to be immediately sold for ready money. Preparations to give effect to this order were made, and some small part of the outbuildings was sold. The palace and park were, however (with other of the royal palaces), assigned by the House of Commons for the accommodation of the Lord Protector, and happily reverted to the crown on the restoration of Charles II., by whom the west wing of the present hospital buildings was added, as part of an extensive design. (Hasted's *History of Kent.*) The palace remained in the unfinished state in which Charles II. left it, when it was assigned by the patent of William and Mary to certain of the great officers of state, as commissioners for its conversion into an hospital for seamen. This was followed in the succeeding year by a patent, dated 10th September 1695, which recited that the object of the institution was to make some competent provision that seamen who, by age, wounds, or other accidents, should become disabled for further service at sea, and should not be in a condition to maintain themselves comfortably, might not fall under hardships and miseries, but might be supported at the public charge; and that children of such disabled seamen, and the widows and children of such seamen as should happen to be slain in the king's service, might, in some reasonable manner, be provided for and educated. The patent appointed Prince George of Denmark, several of the great officers of state, nobility, bishops, and others, to be commissioners for these purposes; and required them to consider how they might be best carried out, and the palace best converted for the charitable object to which it was assigned, and also to frame for his majesty's approval a charter of foundation. The government of the hospital has been continued in similar commissions in subsequent reigns, and the most distinguished persons have been appointed commissioners. George III., by his charter of 5th December 1775, incorporated the commissioners, vesting the goods and revenues of the hospital in them, and gave to them and their successors a perpetual succession.

Greenwich Hospital.

The revenues of the hospital have been derived from several sources. William III. contributed by grant L.2000 a-year towards perfecting the work, and authorized the commissioners to receive voluntary gifts and subscriptions in aid. Above L.50,000 had been expended, on Queen Anne's accession, upon the buildings, which though still very incomplete, were so far in a state of readiness that, in December 1705, 100 disabled seamen were taken into the hospital. On the 1st July 1708, the number amounted to 350, and the income was estimated at L.12,000 a-year; half of which was applied to the maintenance of the seamen, and the other half to the completion of the buildings.

By statute 7th and 8th Will. III., cap. 21 (1696), seamen in the royal navy and the merchant service were compelled to contribute 6d. per month from their wages to the support of the hospital, and the advantages of the institution were extended to both services. The latter, perhaps, did not receive their share of these advantages, for in the following year it was provided, by 8th and 9th Will. III., cap. 23, that, for avoiding all partiality and favour, any persons entitled shall be admitted in succession, one after the other, according to their priority of registration. But this did not last long, for we find it enacted in 1703 (2d and 3d Anne, cap. 6), that the admiralty shall thenceforth have full power to appoint disabled seamen and their widows and children, and the widows and children of seamen killed in the service, notwithstanding the provisions of the two preceding statutes in favour of the merchant seamen who made compulsory contribution to the support of the hospital. The funds of the hospital in its infancy were also supported by occasional grants. By 4th Anne, cap. 12, the queen was authorized to appropriate to its use L.6472, the proceeds of the goods of Kidd the notorious pirate. By 8th Geo. II., the forfeited estates of the Earl of Derwentwater, attainted of high treason (estimated to produce L.6000 a-year), were devoted to its completion and support; and by statutes of the same reign, six sums of L.10,000 were devoted to the same objects. Shares of prize money, of penalties in certain cases, percentage upon bounty money, upon freightage of treasure, and forfeited seamen's pay, were also assigned to the support of the hospital.

Within the last five years great changes have been made in the management of the hospital and its revenues. In 1825, by statute 5th Geo. IV., cap. 26, the Royal Naval Asylum (a school for the education of 800 boys, the children of seamen of the royal and the merchant navy) was consolidated in its government and funds with the hospital. In 1829 the corporation was dissolved by statute 10th Geo. IV., cap. 25, and the estates were vested in the treasurer of the navy, the first commissioner of woods, and three other persons named in the statute, whose appointments were during pleasure, and to whom the crown is empowered to appoint successors, while the lords of the admiralty assign their salaries. In 1834 the contribution out of seamen's wages was abolished, and in lieu thereof a sum of L.20,000 annually towards the support of the hospital was charged upon the consolidated fund.

The management of the civil affairs of the hospital is now vested in the five commissioners appointed under the above statute. Subject to the control and direction of the lords of the admiralty, they have power to make all contracts for the supply of the establishment, to execute all agreements, mortgages, and bonds relating to the corporate property, to grant leases, and to purchase, sell, and convey land. The governor of the hospital is charged with the maintenance of discipline and good order. The civil department consists of the five commissioners who are appointed by the crown on the nomination of the prime minister,—the two *ex-officio* commissioners receiving no salary, the other three L.600 a-year each—a secretary, clerks, and other officers. The military department consists of the governor, salary L.1500 a-year, lieutenant-governor, salary L.800 a-year, appointed in the same manner as the commissioners, four captains, four commanders, eight lieutenants, two masters, chaplains, surgeons, and other officers. With the above exceptions, all the appointments, civil and military, and the presentation to livings belonging to the hospital property, are in the gift of the first lord of the admiralty. The number of pensioners maintained in 1849 was 2710.

The revenue of the hospital in 1849 (for which year the latest accounts are printed) was—

Net produce of the estates	L.29,219
Rents in Greenwich	2,531
Interest on invested property	82,491
From consolidated fund, in lieu of merchant-seamen's sixpences	20,000
Freightage of treasure	10,406
Other small contingent receipts, including sale of L.3000 stock to purchase river frontage	3,736
	L.148,383

And the expenditure for the same year was—

Household and contingent expenses, comprising the maintenance, clothing, and allowances to 2710 pensioners and 97 nurses, with salaries and wages to the subordinate officers and servants, and all works and repairs	L.112,375
Charge for the royal naval schools	18,684
Parochial and assessed taxes	1,341
Annuity pursuant to 28th Geo. III., cap. 63, to Lady Newburgh	1,000
Purchase of river frontage and property for improvements	12,890
Other small charges	667
	L.146,957

It is stated that under the arrangements made pursuant to the acts of 1829 and 1834, the hospital surrendered L.42,000 a-year of its revenues.—(*Ho. Comm. Return*, 1850. No. 495.) (S. R.)

GREET, in England, a small picturesque trout river in the centre of Nottinghamshire. It rises in Jenkin's Carr, near Farnsfield, and falls into the Trent close by the village of Fiskerton.

GREGORIAN CALENDAR, one which shows the new and full moon, with the time of Easter, and the moveable feasts, by means of epacts disposed through the several months of the Gregorian year. See CALENDAR, vol. vi., p. 85–89; CHRONOLOGY, vol. vi., p. 668.

GREGORY I., called THE GREAT, elected Pope in 590, was born at Rome about the middle of the sixth century. His family was both wealthy and noble, and in his thirtieth year he was appointed prætor of Rome. He soon abdicated office, however; and on his father's death he surrendered his whole fortune to the church, building six monasteries in Sicily and one at Rome, to which he himself retired, intending for the future to lead a strictly ascetic life. Seeing one day some English slaves of striking beauty exposed for sale in the market, he suddenly cried out that their countrymen would be not "Angli" but "Angeli," if they were only Christians, and straightway formed the resolution of evangelizing Britain. He set out secretly on his mission; but his friends, who had been watching his movements, speedily brought him back. The Pope of that day, Pelagius II., then sent him on an embassy to Constantinople to beg assistance against the Longobardi who were threatening Rome. On Gregory's return from the Eastern capital, Pelagius died of the plague, and he was unanimously chosen to succeed him. He strongly deprecated the honour, and wrote to the Emperor Maurice imploring him not to confirm his nomination. A pious fraud committed by the city prætor then in office prevented these letters from reaching their destination; and though Gregory even hid himself for a time, he was at length obliged to yield to the instances of his friends and accept the Papal crown. As soon as he was seated on the throne he began with vigour the work of reform, and not only put an end to the corruptions and abuses that had been creeping into the church since the days of St Paul, but sent out his missionaries to the ends of the known world. In Lombardy he crushed the remains of Arianism; in Africa he weakened the sect of the Donatists; in Spain he effected the conversion of the monarch; and in England he gained many thousands of converts among all classes of the people. When John the Abstinent of Constantinople assumed the title of "Œcumenic Patriarch," Gregory protested strongly, alleging that the Pope himself had declined the title when offered him by the council of Chalcedon, and that for his part he gloried in being called the "Servant of God's Servants." On this principle he contented himself with advising the bishops without dictating to them. Though he was unweariedly zealous in propagating the gospel, he strictly abstained from using cruel or dishonest means to gain his end. He was perfectly tolerant of Jews and heretics; set a good example in liberating his slaves; and when master of all the wealth of the Roman see, remained till his death as austere an ascetic as when he was a simple deacon in the monastery of St Andrew. He died at Rome in 604.

Of Gregory's works the most important are his *Moralium Libri xxxv*, and his two books of homilies on *Ezekiel* and the *Gospels*; his *Letters*, which, as might have been expected, throw much light on the history of the times; and his *Dialogues*, in which are described the miraculous works of several saints—all related with the artless naïveté of entire belief. Some grave imputations have been cast upon Gregory, but, as is now known, on very insufficient grounds. He has been accused, for instance, of burning all the remains of ancient literature in the Palatine library. It is known, indeed, that he looked upon such works with suspicion, and forbade them to be read by the faithful; but the sacrilege attributed to him was not perpetrated till many centuries after his time, as is proved in the admirable *Art de Vérifier les Dates*. Equally unfounded is the charge brought against him of destroying the monuments of ancient Roman art, a crime which rather lay at the door of the countless pilgrims who used to visit the Eternal City. So far indeed

Gregory VII.

is this accusation from being true as regards Gregory, that he is known to have reprimanded Serenus, bishop of Marseilles, for having given over the images in his church to the iconoclasts, and to have charged the missionaries whom he sent forth, to preserve and purify the pagan temples.

Gregory VII., one of the greatest of the Roman pontiffs, was born, about 1013, at Soano in Tuscany, where it was said that his father was a carpenter. His own name was Hildebrand. He is first met in history as prior of the Abbey of Clugni, where he was held in high esteem for the depth of his learning, the sanctity of his life, and the severity of his self-discipline. Some services which he rendered to Bruno, bishop of Toul, who was on his way to Rome to take possession of the chair of St Peter (which he occupied under the title of Leo IX.), were the immediate causes of his rise. The grateful Pope made him a cardinal, sub-deacon of Rome, and superintendent of the convent and church of St Paul. Leo's successors, Victor, Stephen, Nicholas, and Alexander, were in reality nothing but tools in Hildebrand's hands, chosen by his influence to wear the insignia of the Papal rule till the time when he believed that he might himself assume them. At length, in 1073, the moment seemed favourable. Alexander died; and Hildebrand, as if in obedience to the tumultuous demands of the mob, was compelled, as it seemed against his will, to mount the vacant throne. But he refused to put on the tiara of St Peter without first obtaining the sanction of the Emperor of Germany. As soon as, by an act of adroit humility, he had gained this point, he was proclaimed Pope, by the title of Gregory VII. Once firmly established, Gregory determined to give practical effect to the two leading ideas of his life. The first of these was the reformation of the Church, whose ministers, especially in Germany and the north of Italy, had long practised simony without let or hindrance, besides leading grossly immoral lives. The second was the total emancipation of the Church from the interference of the civil power. In this way he saw that the sole right of distributing the valuable patronage of the Church would come to be vested in the Church herself. The latter of these ideas he determined to work out through the former, and a pretext for immediate action was not long wanting. One of the most flagrant of the sinners whom Gregory was bent on punishing was Henry IV. of Germany, a man of naturally fine qualities, but vain, licentious, grasping, and always in want of money. To meet the expenses of the wars he was constantly waging with his rebellious barons, he openly sold the most valuable sees in his empire to men whose only qualification was a round sum of ready money. Gregory, resolved on putting an end to the practice, first warned the emperor by letter; and, when no heed was given to his admonitions, sent legate after legate to bring the imperial sinner to reason. When these means failed, Gregory's next step was to assemble a council at Rome, in which it was resolved to excommunicate persons guilty of simony, to expel from the Church all married priests and such as were guilty of personal licentiousness, and not to admit into it as ministers any who would not take the vow of celibacy. Gregory foresaw the fierce opposition that would be raised to these measures, but he was inflexible, and his perseverance was finally rewarded with success. The most obstinate of his opponents was the young Emperor of Germany, and an occasion was not long wanting to bring them into open collision. Henry, holding in contempt the decrees and councils of Gregory, continued to exercise the patronage of the Church as before, and that not in Germany only, but in Italy. The see of Milan had become vacant, and the Emperor and the Pope both claimed the right of appointing a successor. While the dispute was still pending, Henry's Saxon and Thuringian subjects had broken out in open rebellion against the tyranny of their ruler, and were encouraged in their disaffection by Gregory. The Pope even went so far as to summon the German emperor to Rome, to answer before him for his sins towards his subjects. Henry's rage at this assumption knew no bounds. He summoned a diet of the leading clerical functionaries of his empire at Worms, declared Gregory deposed, announced this fact to the clergy at Rome, and took steps for appointing a successor to the dethroned pontiff. Gregory, undaunted, assembled his counsellors, excommunicated the emperor, and absolved his subjects from their oath of allegiance to him. Henry's tyrannies had raised a host of enemies against him; and, backed by the authority of the Pope, they convened to elect a new emperor. Resistance was in the meantime impossible, and Henry hurried away to Rome to make his submission and obtain pardon for his contumacy. In the dead of winter, and amid hardships that might have appalled the chamois-hunter, Henry crossed the Alps, attended only by his wife and a few followers. Gregory was in waiting for him at Canossa; but when his humbled and suppliant rival reached that town he refused to admit him into his presence for three days, and compelled him, though it was the depth of winter, and intensely cold, to spend the time in an outer court of the palace without shoes, and with no clothes but a single woollen garment. The Pope was at length pleased to absolve his royal penitent, who had no sooner left the Papal presence than he began to plot his revenge. Stung to madness by his humiliation, he threw himself on the generosity of his Lombard vassals, and, supported by them, recrossed the Alps, defeated his rebel subjects in several battles, and finally conquered and slew Rudolf of Suabia, who had been chosen emperor in his stead. Having restored his fortunes at home, he determined to take a signal vengeance on him whom he believed to be the cause of all his disgraces. In 1081 he entered Italy at the head of a powerful army, declared Gregory deposed, elected as his successor Guibert, bishop of Ravenna, and would have taken the Eternal City itself, had not the scorching heats of summer, and the advance of Robert Guiscard with his Normans and Saracens from Apulia, forced him to retreat. In each of the two following years he renewed his attack upon Rome, but he did not gain possession of it till, in 1084, the treachery of some of the inhabitants threw open the gates to him, when Gregory was obliged to take refuge in the castle of St Angelo. After being publicly acknowledged by the Romans, and establishing Guibert on the pontifical throne, with the title of Clement III., Henry determined to return to Germany, especially as the terrible Robert Guiscard was again at hand. Gregory, at length released from his confinement by the arrival of this freebooter, excommunicated Henry and Clement; but not deeming himself secure at Rome, he retired to Salerno, where he died in 1085. His last words were, "I have loved righteousness and hated iniquity, and therefore I die in exile." Hildebrand has been called by Guizot the Czar Peter of the Roman Catholic Church. On this illustration it has been remarked that the Czar wrought in the spirit of an architect who invents, arranges, and executes his own plan; Hildebrand, in the spirit of a builder, erecting by the Divine command a temple of which the Divine hand had drawn the design and provided the materials. His faith in what he judged to be the purposes and the will of heaven was not merely sublime but astounding. He is everywhere depicted in his own letters the habitual denizen of that bright region which the damps of fear never penetrate and the shadows of doubt never overcast. Could we accept this self-subordination as genuine, it would go far to redeem a character, formidable indeed as a whole, but presenting some weak, and it may be a few base points. But if we grant that it subsisted at all, it must be in a very different measure, and of a very different quality, from that noble faith which sustained Luther, or Cromwell, or Knox, or even

Gregory.

the higher spirits of Hildebrand's own Church, such as Xavier and others of his type. It was alloyed, too, with a large admixture of dross, such as found no place in the moral natures of the men we have just named. They could not, like him, act a part. They could not, as he often did, turn round from denouncing the terrors of the Church against recusants discreetly selected for their weakness to cringe and fawn upon the mighty of the earth. His conduct towards William the Conqueror, Philip of France, Robert Guiscard, and others that might be named, puts it beyond a doubt that he seldom allowed his principles to interfere with his interests. But though we may deny him the praise of integrity, truthfulness, and the higher kinds of courage, we must still admit him to have been perhaps, on the whole, the ablest of all the successors of St Peter. The amount of work which he did, and the imprint which he stamped upon the Church, will more than bear out this assertion. In the words of Sir James Stephen,—"He found the papacy dependent on the empire; he sustained her by alliances almost commensurate with the Italian peninsula. He found the papacy electoral by the Roman people and clergy; he left it electoral by a college of papal nomination. He found the emperor the virtual patron of the holy see; he wrested that power from his hands. He found the secular clergy the allies and dependants of the secular power; he converted them into the inalienable auxiliaries of his own. He found the higher ecclesiastics in servitude to the temporal sovereigns; he delivered them from that yoke to subjugate them to the Roman tiara. He found the patronage of the Church the mere desecrated spoil and merchandise of princes; he reduced it within the dominion of the supreme pontiff. He is celebrated as the reformer of the impure and profane abuses of his age; he is more justly entitled to the praise of having left the impress of his own gigantic character on the history of all the ages which have succeeded him."

Fifteen Gregories in all have occupied the chair of St Peter. The name is one well adapted for a Pope as the Watchman of Sion, being derived from ’εγρήγορα (the 2 p. a. of ’εγείρω), which signifies to keep watch, to be wakeful or vigilant. Of the fifteen by far the most eminent are the first and the seventh, whose lives have been given above in some detail. The second and third, whose reigns fell within the first half of the eighth century, became involved in unprofitable broils with the Longobards. The fourth came to the throne in 827, and is known from his efforts to patch up the quarrels between Louis le Debonnaire of France and his rebellious sons. The fifth and sixth were not remarkable either for their personal qualities or the events that took place in their reign; and the eighth was equally characterless. The ninth was noted for the uncompromising haughtiness of his views on the subject of the Papal supremacy, which involved him in serious collision with the Emperor Frederick II. of Germany. Open war soon broke out between the two potentates, the Pope being supported by his Guelphic partizans on the one side, and the Emperor, assisted by the Ghibelline faction, on the other. The tenth Gregory was respected in his day for some reforms which he effected in the discipline of the church; while the eleventh, whose name was Pierre Roger, though personally nowise remarkable, is noteworthy as being the last Frenchman that sat on the Papal throne. It was in the time of Gregory XII. that the schism which had divided the Roman Church since 1379, by the simultaneous reign of two popes, was brought to a close. Gregory XIII. is renowned for his learning, his liberal spirit, and his reformation of the Calendar in 1582. He had no share in the massacre of St Bartholomew, which happened during his reign; but he is believed to have countenanced the conspiracies against the life of Elizabeth of England. His successor was the famous Sixtus V. Little is known of Gregory XIV.; but the last of the name, Gregory XV., was renowned for his learning, his piety, and his gentleness, and also as the founder of the College de Propaganda Fide at Rome. He died in 1623.

Gregory of Nazianzum.

GREGORY *of Nazianzum* was born about the beginning of the fourth century. Both the exact time and place of his birth, however, have been disputed. His father, bearing the same name, became ultimately Bishop of Nazianzum, in the south-east of Cappadocia, from which the more illustrious son derives his surname. His mother Nonna, an eminently pious woman, appears to have exercised a powerful influence over the opening mind of her son. He was dedicated by her to the service of God from his birth; and, trained up under this consciousness, he is said to have early manifested strongly religious feelings, and to have even shown as a boy that ascetic tendency which marked his riper years.

In pursuit of a more liberal and extended culture than he could procure in the insignificant little town of Nazianzum, he went first of all to Cæsarea, the capital of his native province, and then successively to Cæsarea in Palestine, to Alexandria, and finally to Athens. Having embarked for Athens at an unfavourable season of the year, he very nearly perished in a storm. Here he renewed his acquaintance with Basil of Cæsarea, between whom and himself sprang up that warm and devoted friendship which has closely associated their names in the history of the Church. Here also he formed acquaintance with another person of a very different character, the prince Julian, destined afterwards to play so prominent a part in the world's history. This acquaintance has special significance in relation to the future conduct of Gregory. He seems thus early to have penetrated the true character of Julian, and to have imbibed towards him that hostility (for it can scarcely receive any milder name) which he afterwards strongly manifested.

Gregory remained at Athens for a lengthened period. He entered it when a youth, and only quitted it when he was about thirty years old. He returned to his father's house at Nazianzum; and being now for the first time baptised, he renewed on his own part his dedication to the service of religion. He still continued, however, for some time, and indeed more or less throughout his whole life, in a state of hesitation as to the special form in which he should apply himself to this service. Strongly inclined by nature and education to a contemplative and ascetic life, he was yet continually urged by circumstances to active pastoral labour. The monastic spirit clung to him through life, and never ceased to struggle for the ascendency. It was strongly encouraged by his correspondence with his friend Basil, who, after various travels, had betaken himself to a solitude in Pontus, and there gathered around him a group of like-minded devotees. It is this continually recurring desire for a monastic life that alone explains the vacillation and inconsistencies of Gregory's public career.

In the meantime circumstances, apparently accidental, determined his lot. The Emperor Constantius, by a course of artful intrigue and intimidation, having succeeded in thrusting an Arian formula upon the Western bishops assembled at Ariminum in Italy, attempted the same course with the Eastern bishops. The aged Bishop of Nazianzum having yielded to the imperial threats, a great storm arose among the monks of the diocese, which was only quelled by the influence of the younger Gregory. Shortly after, with a view to his permanent assistance, his father came forward before the assembled congregation, and unexpectedly ordained him to the priesthood. It appears to have been during this period of his life, while he continued as a presbyter in his father's diocese, that he distinguished himself by his opposition to Julian, and sent forth his two *Invectives* against that emperor. Subsequently he allowed himself to be nominated Bishop of Sasima, a small town between Nazianzum and Tyana. But he seems scarcely to have assumed his duties here, as we find him almost immediately again at Nazianzum, sharing there the episcopal duties, now grown too burdensome to his aged parent.

But a more important scene of duty awaited him. The small and depressed remnant of the orthodox party in Constantinople sent him an urgent summons to undertake the task of resuscitating the cause of truth, so long persecuted and borne down by the dominant Arians of the capital. With the accession of Theodosius to the imperial throne, the prospect of success to this cause was opened up, if it could only find some courageous and devoted champion. The fame of Gregory pointed him out as such a champion, and he could not resist the appeal made to him, although he took the step sorely against his will, and was even obliged to be dragged forcibly from his retreat. Here, amid many contentions, he laboured so zealously that the orthodox party speedily gathered strength; and the small chapel in which they had been accustomed to meet became extended into a vast and celebrated church, which received the significant name of Anastasia, or the Church of the Resurrection. It bespeaks the true Christian character of Gregory, that his first object was to awaken among his flock a loving Christian spirit, and not merely to build up and defend their doctrinal position. This also, however, he did, and with such powerful success in his five famous Discourses on the Doctrine of the Trinity, that he received the distinctive appellation of ῾Ο Θεολογος, "the Divine." He laboured in the Eastern capital till the arrival of Theodosius, and with this the triumph of the orthodox cause. The metropolitan see was then temporarily thrust upon him; but a spirit of discord and envy in reference to the promotion soon springing up in the episcopal council assembled by the emperor, Gregory resigned his dignity, and withdrew again into retirement. The remainder of his days he appears to have passed peaceably on his patrimonial estate near Arianzum. Here he devoted himself to his favourite studies—poems, discourses, and epistles, still extant (Edit. Morelli, Paris 1615), attest his diligence and activity as a student. The best account of his life and writings is to be found in the monograph of Dr Ullmann—*Gregory of Nazianzus; a Contribution to the Ecclesiastical History of the Fourth Century*, Darmst. 1825; Translated by G. F. Cox, M.A., Oxon. London; J. W. Parker, 1851. (J. T—H.)

Gregory *of Nyssa*, one of the fathers of the church, was brother of St Basil, and was born probably at Cæsarea in Cappadocia about A.D. 331 or 332. He received the best education that could be got at that time; and when of suitable years, married Theosebia, a lady whose virtues are highly extolled by her husband's friend and namesake of Nazianzus. After his marriage Gregory entered the church, but after holding for some time the office of a reader he once more devoted himself to the pursuits of secular life. However, the remonstrances of Gregory of Nazianzus led him to reconsider this step; and he was finally ordained by his brother, the great Basil, to the bishopric of Nyssa, a small town of Cappadocia. Here he adopted the opinion then gaining ground in favour of the celibacy of the clergy, and his wife became a deaconess in the church. His stern orthodoxy made him obnoxious to the Arian faction, then on the ascendant through the protection of the Emperor Valens; and in 375 he was driven into exile, whence he did not return till Gratian ascended the throne in 378. In the following year he took part in the council of Antioch, and was commissioned by the synod of that city to inspect the churches of Arabia and Jerusalem. The results of his journey and the shocking discoveries he made regarding the state of religion and morality, he published in a letter, in which he inveighed against the practice of pilgrimages to the holy city. At the second œcumenical council, held at Constantinople in 381, Gregory made himself conspicuous by his zeal against the Arians, and read his elaborate work in twelve books against Eunomius, in which he establishes the divinity and consubstantiality of the Word. It was chiefly through his means that the Catholic doctrine on the subject of the Holy Spirit was added to the Nicene Creed. The exact date of his death is unknown. Some authorities refer it to 396; others to 400.

Gregory's works may be classified under six heads,—1st, Treatises chiefly on doctrinal theology, with especial reference to the Arian heresies; 2d, Homilies; 3d, Sermons; 4th, Controversial writings, including the refutation of the Manichæans and Apollinarists; 5th, Biographies and Funeral Orations; and 6th, Letters. There have been numerous editions of some of Gregory's separate works, but the only complete edition of the whole works is that by Fronton du Duc, Paris, 1615; reprinted with additions in 1618; and again, though less correctly, in 1638.

Gregory, *Thaumaturgus*, or worker of miracles, whose Christian name was Theodorus, was born of heathen parents at Neocæsarea, in Cappadocia, in the third century of the Christian era. He was destined by his parents for the bar, and after studying at Athens, Alexandria, and Berytus, removed to Cæsarea in Palestine, where he became the pupil and finally the convert of Origen. On returning to his native town he displayed so much learning, piety, and zeal, that Phædimus of Amaseia, his metropolitan, resolved to consecrate him to the episcopate. Gregory long declined the honour, and even fled into the desert to escape Phædimus' importunities. At length he yielded, and (about A.D. 240) became bishop of his native town. He worked in this new sphere with so much zeal and success that, whereas at the outset of his labours there were only seventeen Christians in the city, there were at his death only seventeen persons who had not embraced Christianity. This result he achieved in the face of the Decian persecution and the inroads of the barbarians, who laid waste his bishopric A.D. 260. Gregory was strictly orthodox in his creed, and in 264 was present at the council of Antioch, convoked to investigate the heresies of Paul of Samosata. To him also was due the extirpation of Sabellianism throughout the province of Pontus. The miracles which he wrought, and which earned for him the surname of Thaumaturgus, are attested by Gregory of Nyssa and St Basil. They caused him to be venerated as a second Moses, and would be beyond the sphere of human credence unless certified by testimony which it is difficult utterly to reject. Gregory is believed to have died in the reign of Aurelian about the year 270, though some accounts place his death six years earlier. His principal works are his *Panegyricus ad Originem*, which he wrote when on the point of leaving Origen's school; *Expositio Fidei*, a summary of the doctrine of the Trinity; *Metaphrasis in Ecclesiasten*, criticised by St Jerome as "short but useful;" and an *Epistola Canonica*, for the benefit of those converts who had relapsed into paganism and desired to be once more admitted into the church. There have been several editions of Gregory's works, of which may be mentioned that of Gerard Voss, in Greek and Latin, Mayence, 1604; the Paris edition of 1622; and that contained in Galland's *Bibliotheca Patrum*, Paris, 1788.

Gregory *of Tours*, who may be called the father of French history, was born in Auvergne in 539, or, according to other authorities, in 544. His family was noble and powerful, and his uncle Gallus, or St Gal, who took care of his education, was Bishop of Clermont. At the age of 34 he already enjoyed a wide reputation for piety and wisdom in virtue of which he was appointed Bishop of Tours. The new bishop distinguished himself by his unflinching opposition to the ambitious designs of Chilperic, king of Soissons, whom, in his *Historia Francorum*, he denounces as the Nero of his age, while his royal spouse Fredegonda is hardly more gently dealt with. After governing his diocese with great ability and success during many years, he died in 593 at the age of 54.

Gregory's *History* is the work of a truthful, impartial, and enlightened observer of men and manners. His style is indeed not only barbarous in its Latinity, but feeble and devoid of colour or expression; his descriptions are lifeless, and his reflections commonplace. The information, however, which he conveys is valuable; and his work, which embraces a period of 174 years after the first establishment of the Franks in Gaul, throws abundance of light on the origin of the French nation. Besides his *History*, Gregory has left some other works on the glory of martyrs, the glory of the confessors, the miracles of St Martin, &c. The best edition of his works is that of Ruinart, Paris, 1699.

Gregory, the name of a Scottish family, of which many members have attained the highest eminence in various departments of science. The first who thus distinguished himself was David Gregory, son of the minister of Drumoak in Aberdeenshire, and elder brother of the inventor of the reflecting telescope. He is said to have been the first person in Scotland who possessed a barometer; and his curious experiments with this instrument led his ignorant and superstitious neighbours to suspect him of being in league with the devil. He was accordingly tried for witchcraft, but pardoned, as it was proved that he had never exerted his powers except for the good of the sick and poor in his vicinity. His son David, more famous than himself, was born in Aberdeen in 1661, and was educated partly in his native city and partly in Edinburgh. At the early age of twenty-three he became professor of mathematics in the university of the latter town, and was the first who openly taught the Newtonian philosophy in Scotland. In 1691 he was appointed Savilian professor of astronomy at Oxford,[1] and held that situation till his death in 1708.

David Gregory's principal works are his *Exercitatio Geometrica de dimensione figurarum*, Edinb., 1684; *Catoptricæ et Dioptricæ Sphæricæ Elementa*, Oxon., 1695; *Astronomiæ Physicæ et Geometricæ Elementa*, Oxon., 1702. This last is his greatest work, and was highly esteemed by Newton himself, of whose system it is an illustration and a defence. Besides these works we owe to Gregory an excellent edition of Euclid in Greek and Latin; and at the time of his death he was engaged, conjointly with his colleague Halley, in editing the Conics of Apollonius. A treatise of Gregory's on Practical Geometry, which he left in manuscript, was published in 1745 by the celebrated Maclaurin.

Of Gregory's four sons, the eldest, David, became regius professor of modern history at Oxford. He died in 1767, after having been for many years dean of Christ Church College in that university.

Gregory, *James* (1638–1675), one of the greatest names in modern mathematical and optical science, was the son of the minister of Drumoak in Aberdeenshire. He was born and brought up in the city of Aberdeen, and at an early period manifested a strong inclination and capacity for scientific pursuits. Before completing his twenty-third year he had published his famous treatise *Optica Promota*, in which is explained the principle of the reflecting telescope, which is still called by his name and widely used. After the publication of this work, Gregory lost some precious time in making experiments, and allowed Newton to share with him the glory of perfecting his great invention. In telescopes of moderate size, the original or Gregorian form is still in use; but in those vast instruments adopted by the Herschels the improvements of Newton have been found indispensable. About the year 1665 Gregory went abroad and studied for some years at Padua, where he published his *Vera Circuli et Hyperbolæ Quadratura*, in which he propounded his method of an infinitely converging series for the areas of the circle and hyperbola. When this treatise was republished in 1668, the author appended to it another, entitled *Geometriæ pars Universalis*, in which he laid down with great elegance and originality a series of rules for the transmutation of curves, and the measurements of their solids of revolution. These and his other works brought Gregory into correspondence with the leading mathematicians of that day, Newton, Wallis, Halley, and Huygens, with the last of whom he carried on a discussion on the subject of his treatise on the quadrature of the circle and hyperbola. On returning to England, Gregory was elected a member of the Royal Society, and finally became professor of mathematics at St Andrews in 1669. In that same year he married a daughter of the famous painter Jameson, whom Walpole pronounced the "Scottish Vandyke." In 1674 he was transferred to the chair of mathematics in Edinburgh, which, however, he only held for about a year, when in October 1675 he was suddenly struck with blindness, while showing the satellites of the planet Jupiter to some of his students through one of his telescopes, and died a few days after at the early age of 37. James Gregory, according to Dr Hutton in his *Philosophical and Mathematical Dictionary*, was a man of very acute and penetrating genius. His temper was in some degree an irritable one; and, conscious of his merits as a discoverer, he seems to have been jealous of losing any portion of his reputation by the improvements of others on his inventions. He possessed one of the most amiable characters of a true philosopher, that of being content with his position in life. But the most brilliant part of his character is that of his mathematical genius as an inventor, which was of the first order.

Among the other works of Gregory, besides those we have already mentioned, are his *Exercitationes Geometricæ*, Lond. 1668; and, it is alleged, *The Great and New Art of Weighing Vanity*, written to ridicule Sinclair, the slanderer of Boyle and Saunders, and published under the name of "Patrick Mathers, Archbeadle of the University of St Andrews." This latter, if it be really Gregory's, which is almost certain, is quite unworthy of its author.

Gregory, *Dr John*, professor of medicine in the university of Edinburgh, was the son of Dr James Gregory, professor of medicine in King's College, Aberdeen, and grandson of James, the inventor of the Gregorian telescope. His father was married first to Catharine Forbes, daughter of Sir John Forbes of Monymusk, by whom he had six children, most of whom died in infancy; and afterwards to Ann Chalmers, only daughter of the Reverend George Chalmers, principal of King's College, by whom he had two sons and a daughter. John, the youngest of the three, was born at Aberdeen on the 3d of June 1724. Having lost his father when only in the seventh year of his age, the care of his education devolved on his grandfather Principal Chalmers, and on his elder brother Dr James Gregory, who, upon the resignation of their father a short time before his death, had been appointed to succeed him in the professorship in King's College. He likewise owed much in his infant years, and indeed during the whole course of his studies, to the care and attention of his cousin, the celebrated Dr Reid, afterwards of the university of Glasgow. The rudiments of his classical education he received at the grammar-school of Aberdeen; and under the eye of his grandfather he completed, in King's College, his studies in the Latin and Greek languages, and in the sciences of ethics, mathematics, and natural philosophy. His master in philosophy and in mathematics was Thomas Gordon, professor of philosophy in King's College, who ably filled an academical chair for above half a century.

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[1] On obtaining this professorship, he was succeeded in the mathematical chair at Edinburgh by his brother James, likewise an eminent mathematician, who held that office for thirty-three years, and when he retired in 1725, was succeeded by the celebrated Maclaurin. A daughter of this Professor James Gregory, a young lady of great beauty and accomplishments, was the victim of an unfortunate attachment, which furnished the subject of Mallet's well-known ballad of William and Margaret. In 1707, another brother, Charles, was appointed by Queen Anne professor of mathematics at St Andrews. This office he held with reputation and ability for thirty-two years; and, on his resignation in 1739, was succeeded by his son, who inherited the eminent talents of his family, and died in 1763.

In 1742 Mr Gregory went to Edinburgh, where the school of medicine was then rising into that celebrity for which it has since been so remarkably distinguished. Here he attended the anatomical lectures of the elder Dr Monro, of Dr Sinclair on the theory of medicine, and of Dr Rutherford on the practice of physic. He heard likewise the prelections of Dr Alston on the materia medica and botany, and of Dr Plummer on chemistry. The Medical Society of Edinburgh, instituted for the free discussion of all questions relative to medicine and philosophy, had begun to meet in 1737. Of this society we find Mr Gregory a member in 1742, at the time when Dr Mark Akenside, his fellow-student and intimate companion, was a member of the same institution.

In the year 1745 our author went to Leyden, and attended the lectures of Professors Gaubius, Albinus, and Van Royen. Whilst at this university he had the honour of receiving from the King's College of Aberdeen, his *alma mater*, an unsolicited degree of doctor of medicine; and soon afterwards, on his return from Holland, he was elected professor of philosophy in the same university. In this capacity he read lectures during the years 1747, 1748, and 1749, on mathematics, experimental philosophy, and ethics. In the end of 1749, however, he resigned his professorship of philosophy, his views being turned chiefly to the practice of physic, with which the duties of this professorship, occupying as they did a great portion of his time, too much interfered. Previously, however, to his settling as a physician at Aberdeen, he went for a few months to the Continent; a tour of which the chief motive was probably amusement, though to a mind like his certainly not without advantage in the enlargement of ideas, and an increased knowledge of mankind.

Some time after his return to Scotland, Dr Gregory married, in 1752, Elizabeth, daughter of William Lord Forbes, a young lady who, to the exterior endowments of great beauty and engaging manners, joined a very superior understanding and an uncommon share of wit. With her he received a handsome addition of fortune; and during the whole period of their union, which was only for the space of nine years, he enjoyed the highest portion of domestic happiness. Of her character it is enough to say, that her husband, in the admired little work, A Father's Legacy to his Daughters, the last proof of his affection for them, declares, that "while he endeavours to point out what they should be, he draws but a very faint and imperfect picture of what their mother was." The field of medical practice at Aberdeen being at that time in a great measure pre-occupied by his elder brother Dr James Gregory, and others of some note in their profession, our author determined to try his fortune in London. Thither accordingly he proceeded in 1754; and being already known by reputation as a man of genius, he found an easy introduction to many persons of distinction, both in the literary and polite world. Amongst these may be mentioned George Lord Lyttleton, who became his friend and patron. An acquaintance, which had been founded on a striking similarity of manners, tastes, and dispositions, grew up into a firm and permanent friendship; and to that nobleman, to whom Dr Gregory was accustomed to communicate all his literary productions, the world is indebted for the publication of the Comparative View of the State and Faculties of Man, which made him first known as an author. Dr Gregory likewise enjoyed the friendship of Edward Montagu and his lady, the celebrated champion of the fame of Shakspeare, against the cavils and calumnies of Voltaire.

In 1754 Dr Gregory was chosen fellow of the Royal Society of London; and as he made daily advances in the public esteem, it is not to be doubted that, had he continued his residence in the metropolis, his professional talents would have found their reward in an extensive practice. But the death of his brother, Dr James Gregory, in November 1755, having occasioned a vacancy in the professorship of medicine in King's College, Aberdeen, which he was solicited to fill, he returned to his native country in the beginning of the following year, and took upon him the duties of that office, to which he had been elected in his absence.

Here he remained until the end of the year 1764, when, urged by a laudable ambition, and presuming on the reputation he had acquired as affording a reasonable prospect of success in a more extended field of practice, he changed his place of residence for Edinburgh. His friends in that metropolis had represented to him the situation of the medical school as favourable to his views of filling a chair in that university; and this accordingly he obtained in 1766, on the resignation of Dr Rutherford, professor of the practice of physic. In the same year he had the honour of being appointed first physician to his majesty for Scotland on the death of Dr Whytt.

On his first establishment in the university of Edinburgh, Dr Gregory gave lectures on the practice of physic during the years 1767, 1768, and 1769. Afterwards, by agreement with Dr Cullen, professor of the theory of medicine, these two eminent men gave alternate courses on the theory and practice of physic. As a public speaker, Dr Gregory's manner was simple, natural, and animated. Without the graces of oratory, which the subject he had to treat in a great degree precluded, he expressed his ideas with uncommon perspicuity, and in a style happily attempered between the formality of studied composition and the ease of conversation. It was his custom to premeditate, for a short time before entering the college, the subject of his lecture, consulting those authors to whom he had occasion to refer, and marking in short notes the arrangement of his intended discourse; then, fully master of his subject, and confident of his own powers, he trusted to his natural facility of expression to convey those opinions which he had maturely deliberated. The only lectures which he committed fully to writing were those introductory discourses which he read at the beginning of his annual course, and which are published under the title of Lectures on the Duties and Qualifications of a Physician. Of these, which were written with no view to publication, many copies were taken by his pupils, and some from the original manuscript, which he freely lent for their perusal. On hearing that a copy had been offered for sale to a bookseller, it became necessary to anticipate a fraudulent, and perhaps a mutilated publication, by authorizing an impression from a corrected copy, of which he gave the profits to a favourite pupil. These lectures were first published in 1770, and afterwards in an enlarged and more perfect form in 1772.

In the same year, 1772, Dr Gregory published Elements of the Practice of Physic, for the use of Students; a work intended solely for his own pupils, and to be used by himself as a text-book to be commented upon in his course of lectures. In an advertisement prefixed to this work, he signified his intention of comprehending in it the whole series of diseases of which he had treated in his Lectures on the Practice of Physic; but this intention he did not live to accomplish, having brought down the work no further than to the end of the class of Febrile Diseases.

Dr Gregory became early a victim to the gout, which began to show itself at irregular intervals even from the eighteenth year of his age. His mother, from whom he inherited that disease, died suddenly in 1770, whilst sitting at table. Dr Gregory had prognosticated for himself a similar death; an event of which, amongst his friends, he often talked, but had no apprehension of the nearness of its approach. In the beginning of the year 1773, whilst in conversation with his son Dr James Gregory, the latter remarked, that having for the three preceding years had no return of an attack, he might expect a pretty severe shock that season; and he received the observation with some degree of anger, as he felt himself then in his usual state of health. The prediction, however, proved but too true; for having gone to bed on the 9th of February 1773, with no apparent disorder, he was found dead in the morning. His death had been instantaneous, and probably in his sleep; for there was not the smallest discomposure of limb or feature.

Gregory, *Dr James*, professor of the Practice of Medicine in the University of Edinburgh, and eldest son of the subject of the preceding notice, was born at Aberdeen in the year 1753, and there received the rudiments of his education. He accompanied his father to Edinburgh in 1764; and after going through the usual course of literary studies at Edinburgh, was for a short time a student at Christ Church College, Oxford, of which his relation Dr David Gregory had been dean. It was there probably that he acquired that taste for classical learning, and that admiration for the character of an accomplished classical scholar, which ever afterwards distinguished him. He entered early on the study of medicine at Edinburgh, and was a student in that faculty at the time of his father's sudden death, in February 1773. The extraordinary exertion which he then made to complete his father's course of lectures, was regarded by many of his friends as sufficient indication of his ability to continue and extend the hereditary reputation of his family. He took the degree of doctor of medicine at Edinburgh in 1774, and spent the greater part of the next two years in Holland, France, and Italy. It is worthy of notice, that his most intimate friend and companion on the Continent was Mr A. Macdonald, afterwards lord chief baron of the Court of Exchequer, in London.

After the death of Dr John Gregory, the chair of the Institutes of Medicine (then finally separated from that of the Practice of Medicine, of which Dr Cullen remained professor) was offered to Dr Drummond, who was at that time abroad, and who ultimately declined accepting it. For two winters the class was taught by Dr Duncan, whose appointment, however, was only temporary. In 1776 the chair was again declared vacant, and on the 1st of August of that year Dr Gregory was appointed professor. He began to lecture on the Institutes the next winter session, and in the succeeding year he commenced also the duty of teacher of Clinical Medicine in the Royal Infirmary, and continued to deliver at least one course of clinical lectures annually, for more than twenty years.

From the time of commencing his duties as professor Dr Gregory was continually engaged in medical practice; but his practice amongst the higher ranks of society was not extensive until many of his pupils had been settled in business, and were desirous of availing themselves of his assistance. For the last twenty-five years of his life he was much engaged in consulting practice; and for the last ten he was decidedly at the head of his profession in Scotland. Indeed, the boldness, originality, and strength of his intellect, and the energy and decision of his character, were so strongly marked in his conversation, that, wherever his professional character was known, it could hardly fail to inspire general confidence.

In 1778 he published his *Conspectus Medicinæ Theoreticæ*, as a text-book for his lectures on the Institutes. This work passed through several editions, both during his lifetime and since his death, and has been very generally admired, partly on account of the accurate view which it affords of the state of medical science at the period when it was composed, and partly for the ease, perspicuity, and elegance of its Latinity. The greater part of the work is occupied by the principles of Therapeutics; and as it must be confessed that there has been less improvement since that time in the investigation of the powers of remedies, than of the principles either of Physiology or Pathology, that portion of it may still be studied with advantage by all medical men.

On the illness of Dr Cullen in 1790, he was appointed joint-professor of the Practice of Medicine; he became sole professor on the death of Dr Cullen in the same year; and continued to deliver lectures on that subject, to audiences almost regularly increasing, until his last illness in 1821. He died on the 2d of April of that year.

As a practitioner and teacher of medicine, it may be stated that Dr Gregory was chiefly distinguished by his clear perception, and constant application, of the truth contained in a maxim which he was accustomed to quote from a favourite Greek author: "The best physician is he who can distinguish what he can do from what he cannot do." He distrusted all theories in regard to the intimate nature of diseased actions, as premature and visionary; but he had early and carefully studied the diagnostic and prognostic symptoms, and the various forms of the most important diseases, and the agency of the most powerful remedies; and, without entering into the minutiæ of morbid anatomy, he had a clear understanding of the changes of structure to be apprehended from disease in the different internal parts of the body. On these points, and their immediate practical bearing, he fixed all his attention. When he thought that these changes were approaching, and could be arrested by active treatment, he urged the truly effectual remedies with the peculiar energy of his character; restrained only by his strong good sense and ample experience, and despising all parade of nicety, or variety of prescription. When he was satisfied that the nature or the stage of the disease did not admit of effectual cure, his decision of character was equally shown in abstaining from useless interference, and confining his views to the relief of suffering.

As a teacher, he was always strongly impressed with the duty of fixing the attention of his pupils on those points in the history of disease, and in the application of remedies, the knowledge of which he had found by experience to be most practically important, and the ignorance of which he thought practically dangerous. The characteristic symptoms and varieties of inflammatory diseases, and the extent to which the antiphlogistic treatment might be carried in opposing them, were, therefore, subjects on which he dwelt with peculiar earnestness; and in regard to the use of those remedies in such diseases, he had acquired, by long and keen observation, a *tact* and decision which probably were never surpassed. On the other hand, in regard to those numerous chronic diseases, where *remedies* are so frequently ineffectual, he was equally zealous in inculcating those means of *prevention* which he thought most effectual and most attainable; and whilst he was incredulous as to the alleged virtue of most medicines in such diseases, he omitted no opportunity of illustrating the efficacy of temperance, even of abstinence, of bodily exertion without fatigue, and mental occupation without anxiety, in averting their approach, or even arresting their progress. From these great practical objects of his labours as a teacher, no consideration ever turned him aside. His extensive reading, particularly of the older authors, never led to pedantic displays of learning; his logical acuteness never beguiled him into useless controversies; his fertility of imagination never carried him beyond the simplest and most practical views of the subjects of which he treated.

As a lecturer, he possessed the great advantages of a command of language, which made him almost independent of any written notes, and of a tenacity of memory which enabled him to detail cases, in illustration of his principles, year after year, from the whole range of his experience, merely from having the names of the patients before him, without the slightest inaccuracy or omission. The commanding energy and quickness of intellect which his lectures displayed, the frank and fearless exposition of his opinions which they contained, the classical allusions with which they abounded, and the genuine humour by which they were often enlivened, rendered them peculiarly attractive and interesting, and acquired for him a remarkable ascendency over the minds of his pupils.

In the practice of the profession he was remarkable for the frankness and candour of his communications with the relations and friends of the sick; and for the zealous and even tender interest, always increasing with the difficulty and danger of the case, which he took in his patients. This made the more impression, as it contrasted with a certain roughness of external manner, and a constitutional hilarity and whimsical humour, which on some occasions, it must be owned, like that of a celebrated fictitious character, made him "not hesitate between his friend and his joke."

His conduct with his professional brethren in consultation was eminently distinguished by candour and liberality, and the total absence of all professional trick. He never attempted to make himself of importance, but was ever ready to give the strongest commendation to the treatment previously pursued, when he thought it judicious; always laying stress on the great and essential points of practice, and never giving an undue importance to favourite nostrums, or remedies of a secondary or frivolous kind. Thus the young practitioner, who was attentive to his duties, and honourable in his conduct, always found in him a zealous friend; those only had to dread coming into collision with him, who were wanting in professional zeal or professional integrity.

Dr Gregory's more intimate friends and connections were strongly attached to him on account of the warmth and steadiness of his attachments, of a generosity of disposition bordering on profusion, and of a high and somewhat aristocratic sense of honour, which made him instinctively shrink from any proceeding liable to the slightest imputation of meanness, selfishness, or duplicity.

He had therefore an utter detestation for all those professional arts by which the favour of the public is sometimes too successfully propitiated; and this was the true origin of various controversies in which he was at different times engaged with his professional brethren, and to which his strong sense of humour, his fondness for logical disputation, and (it must be confessed) a somewhat irascible temper, led him to devote more of his time and attention than their importance deserved. For the interests of the Medical School, and of the medical profession of Edinburgh, the continuance of these disputes was a matter of serious regret; but the feelings which led him to engage in them were too well understood and appreciated, to permit them to occasion him any loss, either of private friendships or of public estimation.

No medical teacher or practitioner of eminence was ever more ready to acknowledge the imperfection of his art, more distrustful of medical theories, or even of the alleged results of medical practice, when not in accordance with his own experience; or more careless of posthumous reputation. But none was ever more solicitous to give, both to his pupils and his patients, the full benefit of those principles of medical science, of the truth and importance of which he was himself convinced; and on this account his professional character had assumed, long before his death, a superiority over most of his contemporaries, of which those who judge of it only from his own contributions to medical science or literature cannot form an adequate conception.

Dr Gregory used to say, that whilst physic had been the business, metaphysics had been the amusement, of his life. Of this predilection we have a highly honourable testimony, in Dr Reid's Dedication to him and to his illustrious friend Mr Dugald Stewart, of his *Essays on the Intellectual Powers*, published in 1785; and, at a much later period of his life, in the cordial friendship which united him with the late Dr Thomas Brown, and the warm interest which he took in the appointment of that eminent metaphysician to the Chair of Moral Philosophy, on Mr Stewart's resignation of it, and retirement from the University. It is proper to add, however, that on some important metaphysical questions the opinions of Dr Brown were different from those of Dr Gregory, and probably never were the subject of discussion between them.

His own metaphysical and literary works are, *A Theory of the Moods of Verbs*, published in the Edinburgh Philosophical Transactions for 1787; and his *Literary and Philosophical Essays*, in two volumes, published in 1792. The main object of the latter work was to explain and defend a new argument on the old controversy as to the liberty or necessity of human actions; and whatever may be thought of the soundness of the argument, no one has ever disputed the acuteness and power of logical reasoning which he displayed in defence of it. It must be admitted, however, that his ideas of metaphysical inquiry were in some respects limited. He regarded metaphysics rather as a field for syllogistic reasoning, than as a subject of inquiry directed to the establishment of general principles by induction; and one of his favourite doctrines, that metaphysics admit of no *discoveries*, if admitted as literally correct, would almost imply that the study can lead to no useful practical results.

He retained throughout life a fervent admiration for the classical authors, and a severe and somewhat fastidious taste in literature, which was formed on the classical models. Several of the lighter and controversial writings with which he amused himself, particularly his Memorials on certain changes in the arrangements of the Royal Infirmary in 1800 and 1803, exhibit very numerous examples of his ready recollection and happy application of quotations from the classics; and a number of Latin epitaphs and inscriptions of various kinds, which he composed at different periods of his life, attest an accuracy of knowledge of the Latin language, and a purity of taste in Latin composition, which few men have the faculty of retaining throughout a lifetime of incessant professional labour.

Dr Gregory was married in 1782, to Miss Mary Ross; but within a few months after her marriage, this lady, to the extreme regret of all her friends, became decidedly consumptive, and survived only two years. After her death her two sisters continued to reside with their brother-in-law, until they both successively sunk under the same cruel disease. In 1796, he married one of the daughters of the late Mr M'Leod of Geanies, by whom he had a large family. His second son devoted himself with zeal and ability to the profession of medicine. He had entered on practice, had already been placed in several responsible situations in Edinburgh, and distinguished himself by some papers on medical subjects, when he was unfortunately carried off by a fever contracted in the course of his duties in 1832. (W. P. A.)

GREGORY, *Olinthus*, LL.D., was born in 1774 at Yaxley in Huntingdonshire. He first acquired distinction through his *Treatise on Astronomy*, and by his *Pantologia*, a sort of cyclopædia of the arts and sciences which he edited. In 1802 he was appointed mathematical master, and, some years later, professor, in the Military School at Woolwich, where he remained till 1838, when bad health compelled him to retire. During this long period of time he published a number of works, some of them of considerable value, such as his *Elements of Plane and Spherical Trigonometry; Mathematics for Practical Men; Letters on the Evidences of Christianity*, &c. His work on *Mechanics* is a good popular treatise on the subject, and one that has proved very valuable to many artizans whom want of mathematical knowledge has debarred from the perusal of more scientific works. Dr Gregory died in 1841.

GREIFFENBERG, a town in the Prussian province of Pomerania, and government of Stettin, on the Rega, 45 miles N.E. of Stettin. It is the capital of a cognominal circle, the seat of a court of justice, and has important manufactures of woollen and linen cloths, hats, and leather. Pop. (1849) 4975, including the military. There are several smaller towns of this name in Germany.

GREIFFENHAGEN, a town in the Prussian province of Pomerania, and government of Stettin, on the Reglitz, 12 miles S.S.W. of Stettin. It is the capital of a cognominal circle, the seat of a court of justice, and has manufactures of woollen and linen cloths, breweries, distilleries, fisheries, and some trade. Pop. (1851) 5591.

GREIFSWALD, or GREIFSWALDE, a town in the Prussian province of Pomerania, and government of Stralsund, on the Ryck, 3 miles from its mouth, in the Baltic, and 20 miles S. by E. of Stralsund. It is pretty well built, and is surrounded by promenades formed out of its old ramparts. It is capital of a cognominal circle, and the seat of several judicial tribunals. A university was founded here in 1456, but the number of students is inconsiderable, being in 1850 only 189. It has also a botanic garden, observatory, gymnasium, &c. There is a good harbour for small vessels at the mouth of the Ryck, and an active coasting-trade is carried on. It has building-docks, distilleries, salt-refineries, oil-mills, soapworks, and tobacco manufactories. Pop. (1849) 12,715, besides 524 military.

GREIZ, or GREITZ, a town of Germany, capital of the principality of Reuss-Greitz, in a valley on the right bank of the Elster, near the borders of Saxony, and 14 miles W. by S. of Zwickau. It is surrounded by walls, and is tolerably well built. It has a Latin, a normal, and other schools, and is the seat of the government and of a judicial consistory. The prince's palace occupies a hill adjoining the town, and is surrounded by fine gardens. Its manufactures are considerable, chiefly of woollen and cotton cloths. Pop. about 7000.

GRENADA (or rather GRANADA), the most southern of the Antilles, lies between N. Lat. 11. 58. and 12. 20., and W. Long. 61. 20. and 61. 35., being 60 miles N.W. of Tobago and about the same distance from the nearest point of South America. It is 25 miles in length from N. to S., and its greatest breadth is 12 miles; area 133 square miles. Grenada was discovered by Columbus in 1498, and at that time it was inhabited by a numerous and warlike race, the Caribbs. The Spaniards did not attempt to form a settlement, and the Caribbs remained in undisturbed possession of their territory until the year 1650, when Du Parquet, the French governor of Martinique, organized an expedition, consisting of 200 adventurers, for the purpose of seizing the island. These were received with the utmost kindness; and the few knives, glass-beads, and other trinkets presented to the natives, they subsequently asserted to be the price paid for the island. This afforded them a pretext for commencing hostilities against the Caribbs; and Du Parquet, who had returned to Martinique, sent a reinforcement of 300 men with orders to extirpate the natives altogether. The greatest cruelties were practised on the unfortunate natives—not even the women and children were spared. Father Du Tertre mentions that on one occasion "forty of the Caribbs were massacred on the spot. About forty others who had escaped the sword, ran towards a precipice, from whence they cast themselves headlong into the sea, and miserably perished." In a few years the island became vested in the crown of France; but for a long time the colony remained in a state of poverty and depression, so that, according to Abbé Raynal, the island in 1700 contained only 251 whites, and 525 blacks, who were employed on 3 plantations of sugar, and 52 of indigo. Subsequently the French turned their attention more particularly to their colonies, and Grenada rapidly increased. In 1753 it contained 1262 whites, 175 free blacks, 11,991 slaves, and 83 sugar plantations. Grenada surrendered on capitulation to Britain in 1762, and was formally ceded to that country by the definitive treaty of peace which took place in the following year. Certain stipulations were made in favour of the inhabitants; but the island does not seem to have prospered, and was retaken by the French in 1779. By the general peace, which took place in January 1783, it was restored to Britain, of which it has since been a dependency, although an insurrection of the slaves which took place towards the close of the last century is said to have been fermented by the French for the purpose of again obtaining possession of it.

Grenada is in general mountainous and picturesque. The interior and north-west coast consist of continuous ridges of hills rounded in their outline, and covered with vast forest trees and brushwood. An irregular but continuous range of mountains traverses the island from north to south, and in some parts rises to the height of 3000 feet above the level of the sea. From these several lesser ridges branch off, and form rich and picturesque valleys. The geology of the island is very complicated and irregular. The great mass of the mountains and some parts of the low lands consist of red and gray sandstone, greywacke, hornblende, and argillaceous schist; but the strata are very much diversified, being in one place horizontal, in another vertical, and in almost all suddenly and abruptly intersected by each other. Sulphur and fuller's earth are common; and porphyry, limestone, and basaltic rocks occur in certain places. The rivers are numerous but not large. In the centre of the island, and 1740 feet above the level of the sea, is the *Grand Etang*, a circular lake 2½ miles in circumference and 14 feet deep. Several hot chalybeate and sulphurous springs are met with in different parts. Along the coast are numerous excellent bays and harbours. The waters abound with fish; and game and various species of birds are abundant. Hurricanes are comparatively mild and unfrequent, but shocks of earthquakes are sometimes experienced. The medium temperature throughout the year is estimated at 82° Fahr. in the low country, but in the more elevated parts it is, of course, lower. A considerable quantity of rain falls, and throughout the year showers are frequent. Of late years the climate has been materially improved. The soil consists principally of a rich black or reddish coloured mould. The chief products are sugar, cocoa, coffee, and cotton; indigo and tobacco are also raised, together with luxuriant crops of fruits and vegetables, which grow here in great abundance and arrive at high perfection. In 1853, 17,722 acres were under cultivation. Grenada is divided into six parishes—St Patrick, St Andrew, St John, St Mark, St David, and St George. In the last of these is the capital

St George or George Town, which is built upon a peninsula projecting into a spacious bay on the west or lee side of the island, not far from the southern extremity. It is embosomed in an amphitheatre of hills, and stands principally on elevations which rise from the bay, and consequently the streets are steep. The houses are well built of brick or stone, and on the whole the town has a handsome appearance. It is divided by a ridge running into the sea, and forming on one side the Carenage, a large basin of water, surrounded by wharfs and stores. Here the ships lie land-locked and in deep water close to the wharfs. The entrance is defended by a citadel called Fort George, which stands upon a rocky eminence. On the left the land rises gradually to some height, the summit being crowned by the fortifications of Hospital Hill; and a long ridge, which falls towards the middle, connects this fort with Richmond Heights which constitute the background of the scene, and which are also fortified. The ridge which connects Fort George with Hospital Hill also separates the Carenage from the larger portion of the town, which contains the market-place and looks upon the bay. Upon this hill are built some of the principal houses of the town, the church, and the parsonage. At its extremity is the court-house, and nearly opposite is the Catholic chapel. Besides the Carenage there is another spacious sheet of water called the Lagoon, which is separated from the former by a reef passable only by boats. Among the public buildings of George Town are the court-house, a fine and commodious building, the jail, the church, a handsome building with a spire and clock, the Roman Catholic chapel, and the custom-house. The market-place is a square piece of ground of considerable dimensions, surrounded by houses, and having a public fountain. Pop. (1851) 4567. The other towns are unimportant.

Between St Vincent and Grenada there is a cluster of small islands called Grenadines, some of which are dependencies of Grenada. Of these Cariacou is the most important. It is about 19 miles in circumference, and contained, in 1851, 4461 inhabitants. The principal town is Hillsborough. It is fertile and well cultivated, but suffers occasionally from long-continued drought. Cotton was formerly the chief article of cultivation, but sugar is the staple article now raised.

The following return shows the different products of Grenada and the Grenadines in 1853:—Sugar, 11,293,851 lbs; rum, 326,808 galls.; molasses, 19,972 galls.; cocoa, 9318 lbs.; cotton, 73,633 lbs. The imports from Great Britain during that year amounted in value to L.71,981; from British colonies to L.44,181, and from foreign countries to L.22,898,—total L.139,060. Exports to Great Britain, L.104,432; to British colonies, L.14,289; to foreign countries, L.5234,—total, L.123,955. In 1853 the total revenue was L.15,038, L.9471 being custom duties, and L.5567 assessed and other taxes; and the expenditure, L.17,130, being—civil government, L.4122; judicial, L.820; ecclesiastical, L.2478; education, L.1097; police, L.2358; prisons, L.390; and miscellaneous, L.5865. In that year the revenue was L.2328 less, and the expenditure L.236 more, than in the preceding year. The population in 1851 was 32,671, of which 15,713 were males, and 16,958 females. In 1853 it was estimated at 34,077. There were then 11 Episcopalian churches, and 16 belonging to other denominations, with an average attendance of 11,916. The number of scholars attending Episcopalian schools was 967, other schools 1057. Crimes and offences—44 felonies, 50 misdemeanours, and 120 other offences.

GRENADE, in *Artillery*, a kind of small shell which, as soon as the fuze is lighted, is projected by the hand. It weighs about 1 lb. 13 oz., and is chiefly used for throwing into the ditch or covered way from the parapet. Grenades were first used in 1594.

GRENADIER, originally denoted a soldier who threw the grenade; but the term *grenadiers* came afterwards to be applied to certain troops of the line, distinguished from the latter chiefly by a high cap and some other peculiarities of dress. The term originated with the French, in 1667. In the infantry regiments of most European armies, the tallest and finest-looking men are selected to form a company of grenadiers who occupy the right of the battalion when in line, and lead in attack.

GRENOBLE (the ancient *Gratianopolis*), a fortified city of France, formerly capital of Dauphiné, now of the department of Isère, is pleasantly situated on the Isère, just above its confluence with the Drac, in a basin surrounded by lofty mountains, 58 miles S.E. of Lyons. The city proper, or larger portion, occupies the left bank of the river, and is connected with the opposite bank by two bridges, one of stone, the other an iron chain bridge. This portion of the town is surrounded by bastioned ramparts, and has a citadel; it contains several good squares, and the houses are three or four storeys in height, with flat, tiled roofs; but the streets are narrow, though well paved and regular. The portion on the right bank, called the Faubourg St Laurent, consists chiefly of one spacious street, immediately behind which rises an abrupt mountain studded with fortifications to the height of 918 feet above the river. From the summit of this mountain an extensive view of the surrounding country is obtained. This part of Grenoble was formerly surrounded by an ancient wall, which has recently been demolished, and its place is now occupied by a fine promenade. The river is bounded on both sides by handsome quays, along which extend lines of elegant houses. This town has been much enlarged and improved of late years; and it is proposed to extend it considerably, and reconstruct the fortifications so as to inclose a much larger space of ground. The public buildings are not remarkable. The cathedral is a heavy, ungainly structure, partly ancient and partly modern. There are several public walks and handsome fountains. The court-house is the most interesting old building in the town, having been originally the palace of the dauphin. One of the most pleasing features of the town is its extensive and well laid out public garden, on the left bank of the Isère. In the Place St André is a bronze colossal statue of Bayard the "*chevalier sans peur et sans reproche*," who was interred in a contiguous church. It has a public library, with 60,000 vols.; a college; museums of natural history and antiquities; a picture gallery; botanic garden; schools of medicine, artillery, and design; and societies of agriculture, science, art, &c. The chief manufactures are kid gloves, for which it is specially noted; chamois and other leathers; liqueurs, &c. It has some trade, by means of the river, in hemp, iron, timber, and marble. Grenoble occupies the site of the ancient Cularo, the name of which was subsequently changed to Gratianopolis in honour of the Emperor Gratian. This was the first place that openly received Napoleon on his return from Elba in 1815. Pop. (1851) 26,852.

GRENVILLE, LORD. See WYNDHAM, *Right Hon. William*.

GRENVILLE, *Richard*, Earl Temple, the most distinguished of a family of English politicians, was the eldest son of a country gentleman of the same name, who possessed the estate of Wotton, in Buckinghamshire. This Richard Grenville of Wotton was married to Hester Temple, a lady who succeeded to the title and estates of Lord Cobham, to whom Pope inscribed one of his epistles. Their son, the future Lord Temple, was born in 1711; and he partly owed his introduction to public life to the circumstance that his sister, Hester Grenville, was married to the celebrated William Pitt, afterwards Lord Chatham. When Pitt was, in 1755, dismissed from his office of paymaster of the forces, Lord Temple generously made him a present of L.1000. In the following year Pitt was secretary, and Temple was made first lord of the admiralty. In 1757

Grenville.

he was lord privy seal. He had various differences with his illustrious relative, and was latterly a sort of leader in opposition; but he ultimately retired from politics, and devoted himself to the embellishment of his seat of Stowe, so famed for its magnificence. He died in 1777. Mr Macaulay characterizes Temple as possessing no high talents for administration or debate, but as being formidable on account of his great possessions, his turbulent and unscrupulous character, his restless activity, and his skill in the most ignoble tactics of faction. Since Mr Macaulay wrote, the "tactics" of Earl Temple have received a new and interesting illustration. In 1852 were published *The Grenville Papers;* being the correspondence of Earl Temple and his brother, George Grenville, their friends and contemporaries. This correspondence—long known and mentioned as the "Stowe Papers"—commences in 1742, and terminates in 1777. It is important as explaining many of the political movements of the day, and exhibiting the sovereign, George III., in private communication with his ministers. The papers were believed to contain a solution of the mystery connected with the authorship of *Junius' Letters*, but this they failed to accomplish, though containing many interesting particulars relative to that curious and well-kept secret. Mr W. J. Smith, editor of the *Grenville Papers*, endeavours to establish the claim of Earl Temple to be Junius. The necessary information Earl Temple undoubtedly possessed, and Mr Smith assumes that Lady Temple was his amanuensis and assistant: "She had talent enough to assist him in the composition of his writings, and her praise was sufficient to support his vanity." The handwriting of this lady, it appears, bears a striking resemblance to that of Junius. Now, it is certain that the statements of Junius, made in his private communications to Woodfall, printer of the *Public Advertiser*, are not always consistent. He declared that he was the sole depositary of his secret, and that it should die with him; yet he writes to Woodfall—"The truth is, there are people about me whom I would wish not to contradict, and who would rather see Junius in the papers, ever so improperly, than not at all." On another occasion he speaks of the gentleman who manages the conveying department of the letters between himself and Woodfall. Junius also boasts of being above a common bribe, and asserts that he is a man of rank and fortune—assertions which seem to countenance the supposition that Earl Temple might be the author. But, militating against this theory, and against Junius' own assumption of superiority of position, is the information contained in three letters first published in this very work, the *Grenville Papers*. In 1768, before the writer had adopted the signature of Junius, he addressed private communications to Earl Temple, professing the warmest respect for his character and public spirit, and offering hints on political questions. The first relates to a report that Lord North was to introduce into his budget a tax of threepence in the pound on all articles sold by auction. In this letter, "C," or Junius, says—"It is not necessary or proper to make myself known to you at present; hereafter I may, perhaps, claim that honour." In the second letter he avows himself to be the author of papers signed "Lucius," but assures Earl Temple that he (the writer) "is a man quite unknown and unconnected," who had attached himself to the earl's cause, and to him alone, upon motives which, if he were of consequence enough to give weight to his judgment, would be thought honourable, &c. He adds, that at a proper time he would solicit the honour of being known, but that he had then important reasons for wishing to be concealed. The third letter is to the same effect. The writer states that a satire on the ministry, entitled "The Grand Council" (published in Woodfall's *Junius*) proceeded from his pen, as had "almost everything that, for two years past, attracted the attention of the public." He adds—"Until you are minister I must not permit myself to think of the honour of being known to you; when that happens, you will not find me a needy or a troublesome dependant." He further expresses the great desire he has to be honoured with Earl Temple's notice. Such is the substance of the three letters; they are by the same writer who afterwards used the signature of Junius, and they seem to prove that their author looked for patronage from Lord Temple, to whom he virtually offers his services as a political writer. Mr Smith supposes that hints and materials were forwarded to Lord Temple by his mysterious ally; and that from these, aided by his own knowledge of events and parties, his lordship wrote the letters signed Junius, Lady Temple acting as assistant and amanuensis. Exactly the reverse we take to have been the case. Lord Temple, and subsequently his brother, George Grenville (who became prime minister after the resignation of Lord Bute in 1762, and held office until dismissed to make way for the Rockingham administration in 1765), saw the importance of this brilliant and unscrupulous political writer, and supplied him with facts and scandal for his polished invectives and unmeasured vituperation. Lord Temple apparently had no talents as a writer, however active he may have been as a politician; and though Junius was of the Temple school, he assuredly was not Temple. (R. C. S.)

Gresham.

GRESHAM, Sir Thomas, the founder of the Royal Exchange and of the college called by his name in London, was born in 1519. His father had amassed great wealth and attained great eminence as a merchant and bill-broker in the reign of Henry VIII., and resolved to train his son to succeed him in his business. After a thorough education at Caius College, Cambridge, young Gresham was apprenticed to his uncle, a knight and a distinguished member of the Merchants Company. Under Edward VI. Gresham was employed on the same services as his father had performed for that king's father, and in the course of Edward's short reign he made no fewer than forty voyages to Antwerp on the royal business. By his financial skill and foresight he rendered great service to the revenues of the English crown, which he rescued from the extortions of Dutch and Jewish capitalists, and introduced with great effect the practice of raising money from native money-lenders, in preference to foreigners, who exacted a ruinous rate of interest. Mary and Elizabeth continued him in his employment, and the latter knighted him in 1559. He had now amassed an immense fortune, and built himself a splendid house in Bishopsgate Street (which, after his wife's death, was used as Gresham College, and the site of which is now occupied by the excise office), where he lived in great state, and where, by command of Elizabeth, he often entertained the ambassadors and visitors of rank that thronged her court. To these circumstances Gresham owed his title of the "Royal Merchant."

During his repeated visits to Antwerp, Gresham had seen and fully appreciated the value of a general place of rendezvous for the merchants of the city. Anxious to introduce something of the kind into London, he offered to build a suitable house if the citizens would furnish a site. A piece of ground was accordingly bought, and a building on the model of the Bourse of Antwerp was erected and ready for use in 1569. In the following year it was opened in state by Elizabeth, who, by a trumpet and herald, proclaimed it "The Royal Exchange." This building was burned down in the great fire of London, but was afterwards rebuilt on a larger scale and at a cost of nearly L.59,000. In 1838 this edifice was destroyed, like its predecessor, by fire; but on the same site a new exchange, of far greater dimensions and more splendid in style, was opened in 1844 by the Queen in state. See London.

Gresham invested a good deal of his wealth in landed property in various parts of England. At one of his estates, that of Osterlay near Brentford, he used sometimes to entertain Queen Elizabeth. Extant accounts describe the splendour and extravagance of these passages of her Majesty.

Gresham *College*. See London.

GRESSET, Jean Battiste Louis, the author of *Ver-Vert*, and many other poems, was one of the most original French writers of the eighteenth century. He was born at Amiens in 1709, and was educated there in the college of the Jesuits. In his seventeenth year he entered their order, and was sent to Paris to complete his studies at the Collège de Louis-le-Grand. He had not completed his twenty-third year when he wrote his inimitable little poem of *Ver-Vert*. There is not in the French language any badinage more pleasant or more graceful than the adventures of the famous parrot of Nevers. He next published the *Carême Impromptu* and the *Lutrin Vivant*, two brilliant trifles that display remarkable powers of narrative; and soon after, two charming epistles under the title of *La Chartreuse* and *Les Ombres*. Both of these epistles, but especially the first-named, are in their way as remarkable as the *Ver-Vert*. They are perhaps less correct; the copiousness of diction degenerates into luxuriance, and the *abandon* sometimes savours of carelessness. Yet the happy flow and pleasant cadences of the lines redeem the diffusion and the long sentences which have been often censured as the prevailing faults of almost all Gresset's compositions. An exception must be made in favour of his *Epître à ma sœur, sur ma convalescence*, which is in its way a perfect masterpiece, and far superior to many of the fugitive pieces of Voltaire in the same vein. Inferior in merit to these, yet still worthy of respectful mention, are the *Epître au père Bougeant*, *A ma muse*, *Epître d' un Chartreux*, &c. The fame of these works spread far and wide, and gained for their author the professorship of humanity at Tours. Here he had the misfortune to displease an influential and high-born religieuse, who accused him of doing mischief by the light and frivolous character of his poetry; and Gresset by way of punishment was transferred to La Flêche. To divert his thoughts, he set himself to translate the Eclogues of Virgil, which he accomplished, however, with very indifferent success. Finding his banishment intolerable, he applied for a recall; and when his superiors refused, he left the order. He always preserved a kindly remembrance of his connexion with it, however, as is evidenced by his *Adieu aux Jésuites*. He now removed to Paris, where he endeavoured to gain a reputation as a tragic writer. In 1740 he produced his drama of *Edouard III.*, which La Harpe pronounced a "roman sans vraisemblance, sans intérêt et sans aucune entente du théatre;" and his *Sidney*, played five years later, has no merits to save it from a like condemnation. Both were utter failures on the stage. Hardly more fortunate was his comedy of *Le Méchant*, which possesses very great merits, though these are more appreciable in the closet than on the stage. This comedy gives a most brilliant picture of the period which culminated in the Regency. Many of the lines are exquisitely finished, and many of them have become proverbs, but the plot is cold and commonplace. In 1748 Gresset obtained the much coveted honour of a seat in the French Academy; but a few years later he retired to his native town, where, with permission from the king, he founded an academy. The remainder of his life was spent in the neighbourhood of his beloved Amiens, which he never quitted unless business called him to the capital for a few days. One of these flying visits to Paris was made in 1774, to congratulate Louis XVI. on his accession, in the name of the French Academy. The new monarch ennobled him, and the dauphin (afterwards Louis XVIII.) made him historiographer of the order of St Lazarus. In his latter days Gresset became religiously disposed, and published a letter of regret for the mischief which he believed his comedies to have done. This retractation excited the wrath of Voltaire, who wrote of him in 1759—"Et ce polisson de Gresset qu' en dirons-nous? quel fat orgueilleux! quel plat fanatique!" This was at least ungrateful in the patriarch of Ferney; for Gresset had not only never joined in the outcry against him, but had even defended his *Zaïre* against its many assailants. Though it is hard to see what Gresset had to retract, or what evil influence he had exerted over French literature, he took great blame to himself for having multiplied editions of his works; and in deference to his religious advisers, he burned some unpublished plays, and two new cantos of *Ver-Vert*. Gresset died at Amiens, June 16, 1777.

Gresset, more than any other French poet, seems to have felt the influences of time and circumstance; and his works reflect to a surprising degree the influences by which he was surrounded at the time when each was written. He was the most original poet of his century in France, and neither belonged to any school nor followed any model. Not a trace of the Voltaireanism which was the ruling spirit of French literature in his day is to be found in his writings. His originality, refined humour, easy grace, and beautiful versification, will always secure for him an independent niche in the pantheon of French greatness. The best editions of his poems are those of Fayolle, Paris, 1803, 3 vols. 18mo; and Renouard, Paris, 1811, 3 vols. 8vo. The *Ver-Vert* has been twice translated into English, first by T. G. Cooper, and afterwards by Alexander Geddes; into German by J. M. Goetz; into Italian by L. A. Vincenzi; and into several other modern tongues.

GRETA, a river of England, in Cumberland. It rises in the mountain cove of Wythburn, and at the western base of Helvellyn enters the lake of Thirlmere or Leathes Water, through which it flows, and whence it emerges under the name of St John's Beck, flowing thence along the narrow but extremely picturesque valley of St John's, which is bounded on the W. by Naddle Fell, and on the E. by Great Dodd, a hill at the extremity of the Helvellyn chain. The lower end of the dale is closed by Saddleback, which rises on the N., with its deep ravines and rocky projections. This beautiful vale is the scene of Scott's poem of the *Bridal of Triermain*, and at its entrance from Thirlmere rise "the castled rocks," so graphically described by the poet. At the foot of Saddleback, which rears its summit above "the ruined towers of Threlkeld Hall," the stream is joined by the Glenderamaken, and takes thence the name of Greta. In its further course it receives the Glenderaterra, which comes bounding down between the mountains of Saddleback and Skiddaw. Thence the Greta passes under the woody side of Latrigg ("Skiddaw's Cub"), where its scenery is of the finest and most remarkable kind. Little more than a mile from the foot of Skiddaw stands the town of Keswick, on the left bank of this river, in the most beautiful vale. Quitting the town, the Greta falls into the Derwent at the foot of the noble lake of Derwentwater. The bed of the Greta is stony and rocky, but the channel immediately above Keswick has been to a great extent cleared of the immense stones which, by their concussion in high floods, produced the loud noises described in Wordsworth's sonnet on the Greta. Black's *Guide to the Lakes;* Works of Scott, Wordsworth, and Southey.

Greta, a romantic tributary of the Tees, in the N.W. part of the north-riding of Yorkshire. The valley of this stream was well known to the Roman conquerors; and in recent times its charms have been enhanced by the picturesque descriptions of Sir Walter Scott and other poets. The Greta rises by a few branches on the Stainmoor Forest and the northern slopes of Watercrag, the name first belonging to the branch that springs near Rere Cross on Stainmoor. These streams united flow past Bowes, a large village remarkable for its castle. Further down, the famous scenery which deservedly renders the Greta so remarkable, presents itself in the Cliff of Scargill and the woody and rocky banks of Brignall and Rokeby, so beautifully described in Sir Walter Scott's *Rokeby*. Quitting "Brignall's dark-wood glen," the river passes under Greta Bridge, and, flowing along the romantic ravine between Mortham Tower and Rokeby Park, it joins the Tees.

GRETA, "the rocky water," in the west riding of Yorkshire, and county of Lancaster, is a tributary of the Lune. It rises on the slope of the vast height of the Whernside, and flows along Chapeldale, a very remarkable valley bordered on one side by the towering elevation of Ingleborough, and on the other by the Ingleton Fells. In this secluded dale is Wethercoat Cave, one of the most astonishing natural curiosities in the kingdom—a waterfall of great depth and force, completely subterraneous, yet enlightened by the sun which sometimes forms a beautiful rainbow in the spray. The scenery at the village of Ingleton at the lower end of Chapeldale is truly magnificent, especially when viewed from the Burton Road. Here the roaring torrent is seen rushing through the deep chasm, the village church and tower rising far above on its brink, and Ingleborough rising immediately as from a base nearly to the distance of five miles. Here the Greta is joined by the stream of Kingsdale, a lonely glen between Ingleton Fells and the Ridge of Graygrath. In this moorland valley are the cavern of Yordas and the waterfall of Thornton Force. From Ingleton the Greta flows on to Black-Burton, and soon enters Lancashire, and terminates its rapid career in the broad channel of the Lune. Phillip's *Yorkshire*; Baines' *Lancashire*; and Lewis' *Rivers of England and Wales*.

GRETNA or GRAITNEY GREEN, a village of Scotland, county of Dumfries, 9 miles N.W. of Carlisle, and having a station on the Caledonian Railway. It has long been celebrated for its irregular marriages, noticed under BERWICKSHIRE.

GREVILLE, FULKE, Lord Brooke, an English poet of the brilliant Elizabethan period, was born in 1554, at Alcaster in Warwickshire. He was educated, along with his cousin Sir Philip Sydney, at Shrewsbury; and on leaving school, spent a considerable time at both the universities. After travelling on the Continent, and mastering some of the modern languages, he returned home; and through the influence of friends at court, obtained some honourable and lucrative employments, chiefly in connection with the government of Wales. In 1614 he was made under-treasurer and chancellor of the exchequer; and six years later, was raised to the peerage by the title of Lord Brooke of Beauchamp's Court. He was murdered in 1628, in a moment of rage, by an old servant of his own, who had no sooner done the deed than he threw himself upon the sword with which he had slain his master.

Fulke Greville's name is noteworthy in the history of English literature, both from his own contributions to it, and the services which he rendered to some of its needy cultivators in his day. Besides founding an historical lecture at Cambridge, he rendered much valuable aid to Davenant, Camden, Speed, and others, in their struggles with the hardships of a literary career. Of his own writings we may mention, *The Life of the Renowned Sir Philip Sidney*, Lond. 1652; *Certaine learned and elegant Workes of the Right Hon. Fulke Lord Brooke, written in his youth, and familiar exercise with Sir Philip Sidney*, Lond. 1633; *The Remains of Sir Fulke Greville, Lord Brooke, being Poems of Monarchy and Religion, never before printed*, Lond. 1670; *A Treatise of Human Learning; An Inquisition upon Fame and Honour; A Treatise of Wars*; &c. Greville's poems are remarkable for their depth of thought and masculine strength of expression. They abound, however, more in solemn ethical and philosophical thought than in poetic beauties, strictly so called; and the diction in which they are couched, though terse and powerful, is not unfrequently obscure. Southey calls Greville "the most difficult of all our poets," and adds, that "no writer of this or any other country appears to have reflected more deeply on momentous subjects." Charles Lamb, than whom few knew better the spirit of the Elizabethan era, says of Greville, that "he is nine parts Machiavel and Tacitus for one of Sophocles or Seneca. Whether we look into his plays or his most passionate love-poems, we shall find all frozen and made rigid with intellect."

The most noticeable feature of Lord Brooke's personal character was his friendship and admiration for his cousin Sir Philip Sidney. The inscription on his tomb-stone describes him as "The servant of Queen Elizabeth, the counsellor of King James, and the friend of Sir Philip Sydney."

GREW, NEHEMIAH, the earliest vegetable anatomist and physiologist of this country, was born at Coventry about 1628. He was educated as a Presbyterian; and on the change of the national form of religion, at the restoration of Charles II., he was sent to study at some foreign university, where he took his degree of doctor of physic. He settled first at Coventry, but removed afterwards to London, where he obtained considerable practice as a physician; and at length succeeded Mr Oldenburg in the office of secretary to the Royal Society. In this capacity, pursuant to an order of council, he drew up a catalogue of the natural and artificial rarities belonging to the society, under the title of *Musæum Regalis Societatis*, 1681. Besides several papers in the *Philosophical Transactions*, he also wrote—*The Comparative Anatomy of the Stomach and Guts*, fol.; *The Anatomy of Vegetables, of Roots, and of Trunks*, 1682, fol.; *Tractatus de Salis Cathartici Natura et Usu*; *Cosmologia Sacra*, or a *Discourse of the Universe, as it is the Creature and Kingdom of God*, fol. The works of Grew were translated into French and Latin; but, as it appears, by no means correctly, at least in the latter of these languages. He died suddenly, March 25, 1711. A genus of plants of the natural family of Tiliaceæ has been called "Grewia" in his honour.

GREY, EARL. The family from which Earl Grey sprung had been settled in Northumberland since the Conquest, and was at various times ennobled in its branches, giving birth to the Earls of Tankerville in Normandy and England, and the Barons Grey of Werk. Charles, first earl, son of Sir Henry Grey of Howick, was aide-de-camp to Prince Ferdinand at Minden, served long and well in the American War, and commanded the land forces at the reduction of Martinique, &c., in 1794. As the reward of his long service, he was created Baron Grey of Howick in 1801, and in 1806 Viscount Howick and Earl Grey. His eldest son Charles, the subject of this notice, was born at Falloden, near Alnwick, on the 13th of March 1764. He received his early education at Eton, and before he was sixteen entered King's College, Cambridge, where he studied with distinction for two years. He completed his education in the usual manner, by a continental tour, spending some time in France, Spain, and Italy. In 1786 he returned home, and soon after was sent to parliament by his native county. To the surprise of his friends, who belonged, of course, to the Tory party, the youthful member took his seat on the left of the speaker, and soon convinced the House that a formidable ally had been gained by the small but brilliant opposition that followed the banner of Fox. His maiden speech, Feb. 21, 1787, stamped his character as a speaker. The clearness and force of his argument, the animation and grace of his delivery, joined to a stately and aristocratic bearing, excited general admiration. The subject of debate was Mr Pitt's commercial treaty with France, which the young statesman followed his leader in opposing. A few years sufficed to show that he was capable of taking wider views, and shaping a course untrammelled by any docile subservience to a chief. He soon became a prominent man in the House; and to have commanded respect in a house where Fox, Burke, and Sheridan spoke on the same side with him, implied no common abilities. In the following year, though not yet twenty-four, he was appointed one of the managers in the trial of Warren Hastings.

From the very commencement of his political life, Mr Grey stood out as the champion of the principles which gave character to his whole career. The three words which summed up his ministerial programme in 1831, PEACE, RETRENCHMENT, and REFORM, constitute the main burden of his early parliamentary history. In the debates on the Regency Bill in 1789, indeed, he vigorously supported his party in defence of expenditure for one whom they "valued highly as an auxiliary." That Mr Grey's conduct, however, was guided by no servile partizanship was evinced by his subsequent resistance to the additional grant for liquidating the prince's debts. Of his principal appearances in the House from 1789 to 1792, it may suffice to notice his motion for inquiry into the convention with Spain in 1789, his opposition to a war with Russia (on the taking of Oczakow), and his efforts to mitigate the law of imprisonment for debt.

The outbreak of the French Revolution, and the rapid series of events from 1789 onwards, produced a schism in the camp of the Whigs. While Burke vehemently opposed the progress of the terrible phenomenon, and many of the Whigs consented to support the omnipotent minister, Fox and Grey, at the head of their small but resolute band, never swerved for a moment in their opposition to a war with France. Fearlessly committing himself to the advocacy of principles then regarded, not only by the order with which birth and feeling connected him, but by an immense majority of the people, as dangerous and revolutionary, Mr Grey became one of the chief promoters of a political confederacy, entitled "The Society of the Friends of the People." The very name smacked of revolution; and though most of the leading and more liberal Whigs joined this formidable association, Mr Fox declined to have anything to do with it, and even exerted himself privately against it. The avowed object was to obtain a reform in the system of parliamentary representation; and on the 30th April 1792 Mr Grey gave notice of a motion for next session, embodying the principle "that the evils which threaten the constitution can only be corrected by timely and temperate reform."

Before next session the aspect of parties had considerably altered. The general antipathy to everything known as "liberal"—a synonym to many minds for *Jacobinism*, *anarchy*, and *atheism*—had its due weight with timid and time-serving politicians, and a section of the Whigs were already meditating an alliance with the ministry. The demand for parliamentary reform was not indeed quite new. It had been for some time recognised as a valuable stock-cry for ambitious politicians, and so late as 1785 Mr Pitt himself spoke of it as "the great question which was nearest his heart." Mr Pitt had changed his sentiments, so persuasive was the French revolution; and it was no wonder that smaller men consented to leave things as they were. Of another stamp was Mr Grey. Amid almost universal selfishness and servility, he adhered to his principles from first to last, "unshaken, unseduced, unterrified." The faith of his youth continued to be the creed of his manhood, and its triumph was the glory of his old age.

On the 6th of May 1793, the House of Commons was inundated with petitions in favour of parliamentary reform. Among others, Colonel Macleod presented one from Edinburgh "of the whole length of the floor of the House." Last of all came Mr Grey with the petition of the People's Friends, a document "of such length as took nearly half an hour in the reading." It stated "with great precision and distinctness" the existing defects in the system of parliamentary representation, and the evils arising from the long duration of parliaments. It offered to prove that the treasury and the peers actually nominated 97 members, and influenced the return of 70 more, while 91 individual commoners procured the election of 139, in all 307—a majority of the entire House of Commons being thus returned by *one hundred and sixty individuals.* Mr Grey concluded his speech by moving for a select committee. After two long debates the motion was lost by 282 to 41. The House of Commons was well pleased with its own purity!

The war with France continued to meet with Mr Grey's determined opposition, even after it had come to be regarded by many of his party as a necessary evil. Acknowledging as he did (1794) that France "groaned under the most furious tyranny," and that "he would prefer the dominion of Nero or Caligula to the authority which now governed that nation," he made repeated motions (1795–96) for the opening of negotiations, dwelling always with great force on the ruinous expense of the war. The result was ever the same; "extended and animated speeches," able reasoning, and undeniable figures, were followed invariably by crushing minorities. The introduction of foreign troops into England, the suspension of the Habeas Corpus Act, the large addition to the grant for liquidating the debts of the Prince of Wales, and the "detestable" bill to restrain public meetings, were opposed with equal vigour and with as little success. His motions in 1796 (March 10 and May 6), on the state of the nation, and for an impeachment of ministers for malversation of public money, were lost in like manner by overwhelming majorities. His whole career was a desperate battle against invincible odds. On the 26th May 1797, he again brought forward a motion for parliamentary reform, and this time he put forth a plan. He proposed to leave the number of members unaltered, but to increase the county representation from 92 to 113; to extend the county franchise from freeholders to copyholders and leaseholders; the burgh franchise to all tax-paying householders; a voter only to vote for one member; the elections to be all on the same day; and, if the whole measure were carried, but not otherwise, triennial parliaments—a measure in principle little different from the Reform Bill of 1830. In concluding his speech, Mr Grey intimated that if his motion were lost he would despair of any further success in attempting to remedy the national ills, "and not again trouble the House with his observations." The motion was lost by 258 to 63, and the general question of parliamentary reform went to sleep for more than a generation. Mr Grey did not speak again in parliament till 1799, when he came forward in opposition to the Irish Union. For some years after this he made no public appearance of importance.

On the 23d of January 1806, Mr Pitt died, and the Whigs came into power under Grenville and Fox. Mr Grey, now Lord Howick, was made first lord of the admiralty. On the death of Mr Fox, a few months after his great rival, Lord Howick succeeded his departed chief as secretary for foreign affairs, and leader of the House of Commons. The time had now come for attempting with better hope some of the great reforms for which he had hitherto battled. One only of these the brief duration of his power permitted him to carry—the abolition of the slave trade. Early in March 1807, he moved the abolition of the oath which barred Roman Catholics and other dissenters from serving in the army and navy. The opposition shriek of horror at so latitudinarian a proposal, was more loud than edifying. The cries of "No Popery," "Church and King," &c., were raised with great effect from the expectant premier down to the orthodox street-sweeper. The old king took violent alarm, and demanded a written promise from his ministers not to meddle with the obnoxious topic. Mr Pitt had given him such a pledge, but Lord Howick and his colleagues respectfully declined to follow the example, and threw up their offices. A few years later their successors quietly passed the measure to the abjuration of which they owed their power.

On the dissolution of parliament, Lord Howick declining to contest the county of Northumberland, took his seat for Appleby. The death of his father in November of that year removed him to the House of Peers as Earl Grey, and for several years he enjoyed the calm pleasures of domestic retirement, steadily refusing the power which was more than once within his reach, while its acceptance involved the slightest compromise of the principles for the realization of which alone power had for him any charms. To the sweeter influences of family life, though outwardly a man of stiff and haughty reserve, he was keenly sensitive, and nowhere were these influences more attractively displayed than in the family circle at Howick. He had married in 1794 the only daughter of William, afterwards Lord Ponsonby, by whom he had ten sons and five daughters.

In 1809, 1810, and 1812, repeated overtures were made to Earl Grey and Lord Grenville to join the administration, but on each occasion the offers were unhesitatingly rejected. The Prince Regent was anxious to obtain the support of "some of those persons with whom the early habits of his public life were formed;" and after the last unsuccessful negotiation, on the death of Mr Perceval (May 1812), Lord Grey was careful to express his willingness that his friends should take office without him, promising his cordial support;—for himself untrammelled freedom was a stern necessity. During the eighteen succeeding years, Lord Grey headed the opposition in the House of Peers. In that time of depression and discontent which followed the peace, he opposed, consistently with his ancient policy, the harsh and coercive measures of the government, ever advocating, as the true and constitutional method of dealing with the existing evils, the removal of the causes from which they sprung. In no part of his public life did he earn higher honour than on the trial of Queen Caroline. His severe and dignified opposition to the Bill of Pains and Penalties had great weight in influencing the decision of the Peers, and alienated him for ever from a king who had been from the beginning unworthy of his friendship.

In 1827 Mr Canning became prime minister, and a shameful spectacle of place-hunting ensued. All the Whig leaders gave him their support. Earl Grey alone stood disdainfully aloof from a man whose tardy and doubtful liberalism contrasted so strongly with the unyielding consistency of his own political life. His utter distrust of Mr Canning's policy, and the severity with which he criticised his career, were sufficiently justified to his rigid sense of honour by that statesman's declaration of unqualified opposition to Reform and Roman Catholic Emancipation. In that session, in supporting the Duke of Wellington's unpopular amendment on the ministerial Corn Bill, he made the memorable declaration so characteristic of his severe patrician spirit. "If," said he, "there should come a contest between this house and a great portion of the people, my part is taken; and with that order to which I belong I will stand or fall." Coriolanus was not less "ambitious for poor knaves' caps and legs" than the lordly English reformer.

The time at last came for the triumphant realization of the great objects for which Earl Grey had so long and almost hopelessly contended. One of these—the relief of the Roman Catholics from civil disabilities—was granted by his opponents as a tardy concession to the imperious voice of the nation. In the debates on that question in the House of Lords, Earl Grey was said to have "excelled all others, and even himself." The long sleeping question of Reform was once more revived when disappointed politicians found that ministers were bidding for popular favour, and the exciting impulse of the French Revolution of 1830 gave new life to the agitation of grievances. The Iron Duke with fatal honesty scouted the necessity of change, and affirmed that the existing system of representation enjoyed "the full and entire confidence of the country." The country answered with a groan, and the Wellington ministry had to retire. The veteran leader of the Whigs was summoned to the helm of affairs; and on the 22d of November, Earl Grey, as prime minister, delivered his programme in the House of Peers. The history of the great event which crowned his long labours in the cause of Reform is elsewhere fully narrated (see BRITAIN). Throughout the whole of that trying and momentous time, the wisdom and firmness of the minister were manifested so conspicuously as to have earned him, in all impartial eyes, the glory of having guided the nation in safety over the kindling mine of revolution. The contest between his order and the people, of which he had once spoken, had actually arrived, and he sacrificed the independence of the peers to the will of the nation. That no other course was open to a man charged with so fearful a responsibility, is a sufficient answer to the charge of inconsistency. The moral courage requisite to so stern a duty was of higher account than a martyrdom purchased by civil war.

The acts of the first reformed parliament are already told (see BRITAIN). The emancipation of the slaves, the abolition of the East India Company's monopoly, the reform of the Irish Church, and of the poor-laws, were the chief of the legislative victories won under the rule of Earl Grey. His foreign policy, in the able hands of Lord Palmerston, was at once bold and pacific, temperate but just. Personal changes and differences finally shook the cabinet, and in November 1834 Earl Grey resigned. The remaining years of his life were spent in retirement. For some time he appeared occasionally in the House of Lords, frankly supporting the administration of Lord Melbourne. He died at his seat, in Northumberland, on the 17th July 1845, in the eighty-second year of his age. A political career so long useful and unblemished had seldom been exemplified. Faithful, in the midst of so much inconsistency and cowardice, to the principles for which he had braved obloquy in his youth, and resisted the fascinations of power, he attained at length, in the decline of life but not of vigour, the goal of all his strivings, the grand results, of which he had all but despaired. In the latter part of his political life he stood alone—an *ultimus Romanorum;* and, after his death, his characteristic part as a statesman was no longer possible to a successor, had any been fit to assume it. Let his defects have been ever so many, and they were few, the high example of his uncorrupted honour and constancy in the pursuit of great ends is a κτημα ες αει to the nation which reaps their fruits.

GREY, *Lady Jane*, a scion of the blood-royal of England, remarkable for her many virtues and accomplishments no less than her misfortunes, was born in 1537, at Broadgate, in Leicestershire. She was the great-granddaughter of Henry VII. of England. Mary, second daughter of that king, after being left a widow by Louis XII. of France, married Charles Brandon, Duke of Suffolk, by whom she had a daughter, who ultimately married Henry Grey, Marquis of Dorset. The offspring of this union was three daughters, the eldest of whom was Lady Jane Grey. From an early period she was distinguished for her talents; it is known for certain that while still very young she had thoroughly mastered Latin, Greek, French, and Italian, and was conversant with at least three of the Oriental tongues, Hebrew, Chaldee, and Arabic. In Ascham's *Schoolmaster* is given a touching account of the difficulties and hardships under which she pursued her studies, and the causelessly cruel treatment she experienced from her parents. In 1553, her father and the Duke of Northumberland, having risen to power after the downfall of Somerset, resolved to transfer into their own families the right of succession to the throne. A marriage was accordingly brought about between Lady Jane Grey and Lord Guilford Dudley, the Duke of Northumberland's fourth son; and the weakly Edward VI., when he found his end approaching, was easily persuaded to pass over his own sisters, Mary and Elizabeth, and nominate Lady Jane Grey and her husband as his successors to the English throne. Some days elapsed after the king's death before Lady Jane was told that she was queen of England; and when she came to know the fact, she could only with the greatest difficulty be persuaded to avail herself of it. After a reign of ten days, she quietly resigned the throne in favour of Mary. Her husband and she were thrown into the Tower; and though it was not originally intended to put them to death, yet, in consequence of Wyat's insurrection, they were executed together, Feb. 12, 1554. Lady Jane displayed on the scaffold the same pious resignation and calm self-possession that had distinguished her throughout life. (Ascham's *Schoolmaster*; *Biog. Brit.*; Burnet's *Hist. Ref.*)

GREYHOUND. See Hound, and Mammalia.

GREYWACKE, or Grauwacke, a rock formation, composed of quartz, flinty slate, clay slate, and felspar, in pieces varying in size, and cemented together by a clay-slate basis. See Mineralogy.

GRIESBACH, Johann Jacob, an eminent German biblical critic, was born at Butzbach, in Hesse-Darmstadt, Jan. 4, 1745. He was educated at Frankfort-on-the-Maine, and completed his studies at the universities of Tübingen, Halle, and Leipzig. He distinguished himself especially in all theological and biblical inquiries, and was the favourite pupil both of Semler and Ernesti. At the early age of twenty-four he had determined to devote himself to the scientific study of the doctrines and text of the New Testament. To carry out his plan, he began a literary tour through Germany, Holland, and England, making friends for himself among the leading literati of all these countries, and amassing large stores of valuable materials for his great work. In 1770 he returned to Frankfort to arrange and digest these; but in the following year was made theological lecturer, and in 1773, extraordinary professor of theology at Halle. In this office he distinguished himself so much that he was offered a professorship at Jena, which he accepted. In 1780 he became rector of the university, and was promoted to various other responsible offices. The Duke of Saxe-Weimar nominated him his ecclesiastical councillor, and a member of his states; and he had been already made prelate and deputy of the district of Weimar. About ten years before this, he had married a sister of the famous Schütz, with whom he seems to have lived happily till his death, March 24, 1812. Griesbach's first edition of his text of the New Testament was published at Halle in 1774, in the form of a hand-book for the students then attending his lectures. The first volume of the second edition was published in 1796, and the second in 1807. A font of types was cast expressly for this edition by the famous type-founder Göschen; and as the expense of the paper was borne by the Duke of Grafton, chancellor of the university of Cambridge, the grateful author published his book simultaneously in London and Halle. The book has been since twice reprinted in London, once in 1809, and again in 1818.

Griesbach's recension of the text of the New Testament is based on a comparison of the three great classes into which he divides the various Greek MSS. These sets of MSS. are the Alexandrine, the Western, and the Byzantine or Asiatic, which latter is the basis of the Greek Vulgate. Of these, the first is by far the best, as Griesbach considers undeniable, from the coincidence between the Scripture quotations in the extant works of Origen and the text of the celebrated Alexandrian MS. of the New Testament. The Byzantine, in opposition to Matthiæ and Scholz, he considers far from reliable. But his whole system has been attacked repeatedly in Germany and England, in the latter country more especially by Dr Nolan in his *Enquiry into the integrity of the Greek Vulgate, or received Text of the New Testament*, and by Archbishop Lawrence in his *Remarks upon the Systematical Classification of MSS. adopted by Dr Griesbach.*

Griesbach's chief works, in addition to those already mentioned, are—*Dissertatio de fide historicâ, ex ipsâ rerum quæ narrantur, natura judicandâ*, 4to, 1764; *Diss. hist. theol. locos theologicos ex Leone M. Pontifice Romano Sistens*, Halle, 4to, 1768; *Dissertatio de Codicibus quatuor Evangeliorum Origenianis*, 4to, 1771; *Dissertatio curarum in historiam textûs Græci Epistolarum Paulinarum specimen*, Jena, 1777; *Programma de fontibus unde Evangelistæ suas de resurrectione Domini narrationes hauserint*, 1784; *Progr. de imaginibus Judaicis quibus auctor Epistolæ ad Hebræos in describenda Messiæ provincia usus est*, 1791–92; *Symbolæ criticæ ad supplendas et corrigendas varias N. T. lectiones; Accedit multorum N. T. codicum Græcorum descriptio et examen*, Halle, 1785–93; *Commentar. critic. in textum Græcum N. T.*; Griesbach's *Opuscula Academica* were published at Jena in 1824.

GRIFFIN, or Gryphon (*gryphus*, *γρύψ*), in the natural history of the ancients, the name of an imaginary bird of prey, of the eagle species, represented with four legs, wings, and a beak; the upper part resembling an eagle, and the lower a lion. This animal, which was supposed to watch over gold mines and hidden treasures, was consecrated to the sun; and the ancient painters represented the chariot of the sun as drawn by griffins. According to Spanheim, those of Jupiter and Nemesis were similarly provided. The griffin of Scripture is that species of the eagle called in Latin *ossifraga*, or osprey. The griffin is frequently seen on ancient medals, and is still borne in escutcheons. Guillim blazons it rampant, alleging that any very fierce animal may be so blazoned as well as the lion; but Sylvester, Morgan, and others use the term *segreiant* instead of rampant. The griffin was also an architectural ornament among the Greeks, and was copied from them, with other architectural embellishments, by the Romans.

GRIMALDI, one of the four ancient families of "high nobility" of Genoa. The lordship of Monaco, afterwards elevated to the rank of a principality, belonged to the Grimaldi from A.D. 980 for more than 600 years. With the Fieschi they always acted an important part in the history of Genoa, especially in the disputes between the Ghibelines and the Guelphs, to which latter family both parties belonged. The influence of the Grimaldi was much increased by their large estates in France and Italy. Of this family there were several eminent men, of whom the principal are: 1. Ranieri Grimaldi, the first Genoese who conducted the naval forces of the republic beyond the straits of Gibraltar. He sailed to Zealand, in the service of Philip (the Fair) of France, in 1304, with sixteen Genoese galleys and twenty French ships under his command; and there he defeated and made prisoner the Count Guy of Flanders, who commanded the enemy's fleet of eighty sail.—2. Antonio Grimaldi, likewise was distinguished in the naval service of his country in the early part of the fourteenth century. His victories over the Catalonians and Aragonese, who had committed aggressions on the Genoese, gave the latter a decided maritime ascendency for a long time; but at length, in 1353, the Catalonians, assisted by the Venetians, under the command of Nicholas Pisani, gave him battle, and nearly destroyed his whole fleet.—3. Giovanni Grimaldi is celebrated for the victory he gained over the Venetian admiral Trevesani, on the Po, in 1431, when, in sight of Carmagnola's army, he succeeded in taking twenty-eight galleys and a great number of transports, with immense spoils.—4. Domenico Grimaldi, cardinal, archbishop, and vice-legate of Avignon, was famous as a naval commander, and eminent as a zealous extirpator of heresy from the Romish Church. Though a bishop at the time, he distinguished himself by his skill and courage at the battle of Lepanto in 1571.—5. Geronimo Grimaldi, born in 1597, was sent by Urban VIII. as nuncio to Germany and France, and the services he rendered the Roman hierarchy were rewarded by a cardinal's hat in 1643. His whole career was highly honourable. He was bishop of Aix, and strenuously endeavoured to reform the manners of the clergy in the diocese by establishing an ecclesiastical seminary. He also founded an hospital for the poor, and annually distributed 100,000 livres in alms alone. He died at the advanced age of eighty-nine, in the year 1685.

GRIMM, Friedrich Melchior, Baron, born at Ratisbon in 1723, is a remarkable instance of the power of letters in the eighteenth century. He was born of poor parents, who, however, gave him an education far beyond their station. On completing his studies, he tried his fortune as a dramatic writer, and, failing utterly, went to Paris as tutor to the young Count Schönberg, whose father was Polish minister at the court of Versailles. He there became reader to the Prince of Saxe-Gotha, and attached himself to the Encyclopedists, who then numbered in their ranks nearly all the intellect of Paris. In the contest as to the respective merits of French and Italian music, which at this time divided the French capital, Grimm sided with the partizans of the latter, and published on the subject a very witty little pamphlet, entitled *Le petit Prophète de Böhmischbroda*, which covered the champions of the national music with ridicule, while Rousseau drove them out of the field altogether by his *Lettre sur la Musique Française.* Their common fondness for music was the origin of a sincere friendship between Grimm and Rousseau. Grimm's reputation as a man of wit and talent now threw open to him the best *salons* in Paris. His inimitable social tact, his fine conversational powers, and the perfect elegance of his manners and person (on which last he bestowed infinite pains), all strengthened the impression which he had made on his first appearance as an author. His success was still further ensured by his powers of fascinating the fair sex, with several of whom simultaneously he contrived to pass as the perfect model of a passionate and disinterested lover. After the death of the Comte de Friesen (nephew of Marshal Saxe), to whom Grimm owed much, and whose secretary he had been, he attached himself to the Duke of Orleans, and began writing, for the benefit of some of the German princes, those literary bulletins, in which, with great ability, he analyzed the current literature of France. In 1776 he became the Duke of Saxe-Gotha's minister at the French court. When the Revolution broke out he retired to Gotha. In 1795, Catherine II. of Russia appointed him her minister at Hamburg, and her successor Paul confirmed him in this office. A sudden illness deprived him of the sight of an eye, and he once more returned to Gotha, where he died in 1807, at the advanced age of eighty-four.

Grimm's only title to remembrance by posterity is his *Correspondence Litteraire, Critique et Philosophique*, of which there have been several editions, the best being that in 15 vols., Paris, 1829. This work is an invaluable guide to all who desire to know the secret, literary, and social, and even political history of France during the middle and towards the close of the eighteenth century. But it must be remembered that its author was till his death—what he had been all his days—an adventurer, without fixed principles, a professed atheist, and, on the score of *morale*, infinitely inferior to the Diderots and D'Alemberts, who respected, and even feared him. Of these men Rousseau alone seems to have thoroughly understood the intense selfishness, egotism, and spirit of intrigue that constituted the real basis of Grimm's character. To the latter quality he owed mainly his success in life; and that he possessed it in no common degree may be easily imagined from the skill with which he finally worked his way to the top of the social ladder.

GRIMMA, a town of Saxony, circle of Leipzig, on the Mulde, 16 miles S.E. of Leipzig. In the middle ages Grimma was an important commercial town. It has a bridge over the river; an old castle; manufactures of cotton, linen, and woollen stuffs; mathematical, surgical, and musical instruments; and some trade. Pop. (1849) 5384.

GRIMSBY, Great, a municipal and parliamentary borough and seaport-town of England, county of Lincoln, on the S. side of the estuary of the Humber, near its mouth, and 15 miles S.E. of Hull. In the reign of Edward III. it was a port of such importance as to furnish that monarch with 11 ships and 170 mariners for the siege of Calais; but the gradual blocking up of the harbour by the accumulation of mud and sand led to the decay of the port, until the construction of the new harbour in the beginning of the present century. This soon became inadequate for the increasing commerce; and, in 1846, a new harbour was commenced, and the foundation-stone was laid by Prince Albert 17th April 1849. The new works occupy a space of 135 acres, gained from the sea, and comprise a wet dock of upwards of 20 acres, with two entrance-locks, having in front a tidal basin of 13 acres. The latter is formed by two timber piers, which are together about 2000 feet in length, and is provided with landing-slips. The chambers of the two entrance-locks connecting the tidal basin and the dock are respectively 45 feet in width by 200 in length, and 70 in width by 300 in length. At the dock entrances the average depth of water is about 9 feet at ebb and 26 feet at high tides, the latter being the permanent depth in the dock itself. There are extensive warehouses and sheds for the storing of merchandise, and lines of railway extend along each side of the dock. The dock was opened on 23d March 1852. The Manchester, Sheffield, and Lincolnshire, and the East Lincolnshire lines of railway terminate here. The vessels registered as belonging to the port on 31st December 1853 were,—under 50 tons, 74 sailing-vessels, tonnage 2151, and 4 steamers, tonnage 71; above 50 tons, 14 sailing-vessels, tonnage 1251, and 2 steamers, tonnage 1030. The vessels that entered and cleared at the port during that year were,—Coasting trade, sailing-vessels, inwards 251, tonnage 17,143; outwards 176, tonnage 14,656; steamers, inwards 4, tonnage 1563; outwards 1, tonnage 346;—Colonial and foreign trade,—sailing-vessels, inwards 420, tonnage 82,397, outwards 243, tonnage 51,039; steam-vessels, inwards 88, tonnage 33,760, outwards 95, tonnage 36,311. The amount of customs duty received at the port during 1852 was L.29,101. The parish church of Grimsby is a large cruciform structure, with a tower and steeple rising from the centre. There are a free grammar and other schools, a mechanics' institute, &c. Grimsby is governed by a mayor, four aldermen, and twelve councillors, and returns one member to parliament. Pop. (1851) of parliamentary borough, 12,263; of municipal do., 8860.

GRINDELWALD, a village of Switzerland, in one of the most picturesque valleys of the Canton of Berne. It is 3250 feet above the sea, and is surrounded by the lofty Wetterhorn, Schreckhorn, and Grindelwald Mountains. Near it are the two glaciers of Upper and Lower Grindelwald.

GRINDSTONE, a mass of sandstone cut into a flat circular form, and mounted on a spindle, which is commonly made to revolve by means of a winch. It is used for grinding metal or sharpening tools. The finer grindstones, such as those called polishing stones by the cutlers, are obtained from different rocks in Derbyshire, Staffordshire, and Warwickshire. Stones of the common kind are exported from Newcastle.

GRINSTEAD, East, a market-town of England, county of Sussex, 28 miles S. of London. It is pleasantly situated on an eminence, and the tower of its parish church forms a conspicuous object for a great distance around. The church and town-hall are both handsome edifices. At the east end of the town is Sackville College, a quadrangular stone building, erected in 1616. It was founded by Robert, Earl of Dorset, for the support of twenty-four aged unmarried persons of both sexes, but in consequence of a deficiency of income the number has been reduced to twelve. Each of these has a comfortable room, and L.8 a-year in money. Market-day Thursday. Previous to the Reform Act, by which it was disfranchised, E. Grinstead returned two members to parliament. Pop. of parish (1851) 3820.

GRISONS (Ger. *Graubünden*), the largest and most eastern of the cantons of Switzerland, is bounded on the N.E., E., and S.E., by Liechtenstein and the Austrian dominions, and on the other sides by the cantons of St Gall, Glarus, Uri, and Ticino. It lies between N. Lat. 46. 15. and 47. 4., and E. Long. 8. 40. and 10. 29.; is 80 miles in length from E.N.E. to W.S.W., and 45 in breadth, and has an area of 2963 square miles. Lofty ranges of mountains constitute its boundaries on almost every point, and occupy a great part of the interior; indeed, the whole canton may be said to be mountainous. The main chain of the Rhaetian Alps crosses the canton from W. to E., at first separating it from Ticino and Italy, and afterwards dividing the waters of the Rhine from those that flow into the Inn. A great portion of this chain is above the limit of perpetual snow; and some of the summits, as those of the Muschelhorn, the Piz Val Rhin, and Monte Maloya, considerably exceed the height of 10,000 feet above the sea. It is crossed by the passes of the Splügen, Bernardin, Albula, and Scaletta. Another mountain range, an offset of the Lepontine Alps, and little inferior in height to the former, extends in a N.E. direction from the St Gothard, and forms the western boundary of the canton, dividing the waters of the Rhine from those of the Reuss and Linth. A third chain bounds the Engadine on the S.E., and a fourth, called the Rhaetihon, forms the boundary between the Grisons and the Vorarlberg. The valleys are numerous and strikingly beautiful. There are five greater valleys, known as the Hither Rhine, the Farther Rhine, the Engadine, the Albula, and the Brettegau; and nearly 150 smaller valleys are connected with these. There are no fewer than 240 glaciers and 56 waterfalls within the canton. The Rhine and the Inn both have their sources in the Grisons, as have also several tributaries of the Upper Adige, the Po, and the Adda. The scenery is peculiarly grand and magnificent. The character of the country unfits it for agriculture, and consequently its chief wealth consists in cattle, which, with timber, constitute its principal exports. Sheep, goats, and hogs are also numerous. Iron, lead, and zinc are among the mineral products, but few mines are worked. The manufactures are not important, and are chiefly for domestic use. The climate is very various. In the upper valleys the snow lies for seven months in the year, while in some of the others the temperature is sufficiently mild to admit of the cultivation of the vine. The corn produced does not by half supply the wants of the inhabitants. Hemp and flax are largely cultivated. The principal branch of commerce is the transit trade with Italy, across the Alps. The old division of the canton into three leagues is still adhered to; the Gray League (*Graue Bund*), the League of God's House (*Gottes-haus Bund*), and the League of Ten Jurisdictions (*Zehngerichte Bund*). Each of these comprise several jurisdictions (in all twenty-six), and these in their turn contain a number of communes, which may almost be said to be so many little republics, as each exercises within itself rights almost independent. The legislative power is vested in the great council, as also the election to public offices, and the settling of disputes among the communes; but the people have a *veto* in the passing of new laws, and in the concluding of treaties. It is composed of sixty-five members chosen annually, in the different jurisdictions, by universal suffrage of the male population above seventeen years of age. It nominates a commission of nine members, charged with the preparation and preliminary discussion of subjects coming before it; and also a small council of three members, one for each league, intrusted with the executive. Pop. (1850) 89,895, of whom 38,039 were Roman Catholics, and 51,855 Protestants. About 50,000 speak Romansch, 30,000 German, and 9000 Italian.

GRIT, or GRITSTONE, a name given to several kinds of sandstone used in building, as well as for millstones or grindstones, and sometimes for filtrating water. In geology the term is applied chiefly to the *calcareous grit*, a part of the middle oolite formation; and to the *millstone grit*, a rock which contains embedded quartz pebbles.

GROAT, an old English silver coin, equal to fourpence. Other nations, as the Dutch, Poles, Saxons, Bohemians, and French, have likewise their groats, groots, groschen, gros, and the like. In England in the Saxon times, no silver coin larger than a penny was struck, nor after the Conquest till the reign of Edward III., who about the year 1351 coined grosses or great pieces, which went for fourpence each; and so the matter stood till the reign of Henry VIII., who in 1504 first coined shillings.

GROATS, oats deprived of the husks.

GROCYN, WILLIAM, a distinguished classical scholar, was born at Bristol in 1442, and educated at Winchester School, and New College, Oxford. He was the friend of Dean Colet the tutor of Erasmus, and the godfather of Lilly the grammarian. A Latin epistle of his to Aldus Manutius is prefixed to Linacre's translation of *Proclus de Sphæra.* It was Grocyn who first publicly taught Greek in Exeter College, Oxford, and introduced a better pronunciation of that language than had hitherto been known in England. By the introduction of this language alarming many as a most dangerous innovation, the university divided itself into two factions, distinguished as "Greeks and Trojans," who bore such decided hostility to each other that they proceeded to open hostilities. Thus was Grocyn situated when Erasmus came to Oxford and studied Greek under his tuition. After distinguishing himself as one of the most learned and able men of his day, Grocyn died at Maidstone in 1519. His will is printed in the appendix to Knight's *Life of Erasmus.*

GRODNO, a government in the middle and western portion of European Russia, lying between N. Lat. 51. 30. and 54. 20., E. Long. 23. 7. and 26. 42., and bounded on the N. by the government of Vilna, E. by Minsk, S. by Volhynia, and W. by the kingdom of Poland. Its greatest length is about 173 miles and its greatest breadth about 120. Area 14,700 square miles. The surface is an extended sandy plain, broken only by a few chalk hills. A large portion of it is covered with forests, particularly in the N., while in the S. are extensive marshes. The principal rivers are the Niemen, Bug, Narew, and Priepec. The climate is moist and foggy. Rye is the principal grain cultivated, of which about 2,348,000 English quarters are produced annually, and about one-third of this quantity is exported. Few other kinds of grain or vegetables are grown for food; but considerable quantities of flax, hemp, and hops are raised. The pasture lands are extensive, and the rearing of cattle obtains a considerable amount of attention. The sheep have been much improved by crossing, and wool constitutes a principal article of export. The mineral products comprise iron, chalk, nitre, and building stone. The manufactures are inconsiderable, and chiefly for domestic use; the principal are woollen cloths and leather. In the N. the inhabitants are mostly Lithuanians, elsewhere the Rusniaks prevail. It is divided into eight circles. The principal towns are Grodno, Novogrodek, Slonim, and Brzesc-Litovski. Pop. (1849) 905,666.

GRODNO, the capital of the foregoing government, is situated at the foot of a hill on the right bank of the Niemen, 90 miles S.S.W. of Vilna. The town is irregularly built on a large uninclosed space, and the houses are mostly of wood. The streets, with the exception of two or three, are unpaved and extremely dirty. It has a spacious and handsome modern palace, built by Augustus III. of Poland, and a more ancient one now uninhabitable. There are nine Roman Catholic churches, two Greek churches, a Lutheran church, and two synagogues; also a gymnasium, a riding school, and an academy of medicine, founded by Stanislaus Augustus, in connection with which are a library, museum of natural history, and a botanic garden. The manufactures are inconsiderable. Pop. (1849) 16,527.

GROIN, that part of the abdomen next the thigh.

Groin, in *Architecture*, the angular curve formed by the intersection of simple vaults crossing each other at any angle, and leading to a common centre or apex. See plates to Architecture.

GRÖNINGEN, a province of Holland, forming the N.E. extremity of that kingdom, and bounded on the N. by the German Ocean, E. by the estuary of the Ems, the Dollart, and Hanover, S. by the province of Dantzig, and W. by that of Friesland. Its greatest length from S.E. to N.W. is 50 miles, and its extreme breadth in the northern part 34 miles. Area, 883 square miles. The surface is level and everywhere intersected by canals and ditches, whilst it is protected by continuous dykes against the inundations of the sea. The soil is generally heavy and marshy; and in several parts, especially in the S.E., are extensive swamps. The principal rivers are the Hunse and the Aa. The climate is humid and unhealthy. Along the shore there extends a tract of land from 18 to 20 miles in breadth, which, by being well drained and embanked, bears excellent crops of oats and some barley. The land farther from the shore is generally sandy heath, affording much turf, and yielding with care a supply of potatoes. The pastures constitute the chief wealth of this province, and support a great number of excellent cattle. The butter and cheese are, however, inferior to those of the provinces of Holland and Friesland. The manufactures are few and insignificant. The only town of importance is the capital. The province is divided into three arrondissements—Gröningen, Winschoten, and Appingadam. Pop. (1854) 199,563.

Gröningen, the capital of the above province, and the most important town in the northern part of Holland, is situated on the Hunse, 92 miles N.E. of Amsterdam. It is neat, clean, and regularly built, and is surrounded by walls and ditches. It has twelve churches, the finest of which is St Martin's, a handsome Gothic edifice, surmounted by a lofty spire. The town-hall is an elegant modern structure, in the Bree-market, one of the grandest squares in the kingdom. The university, founded in 1614, has an excellent museum of natural history and a botanic garden, and is attended by about 400 students. Gröningen has an academy of painting, sculpture, and architecture; schools for the blind and the deaf and dumb; societies of natural history, chemistry, and literature; a public library, &c. It has an active trade in cheese, butter, cattle, corn, and other agricultural products; and ship-building is carried on. There are paper-mills, and some factories of woollen and silk stuffs, but, generally speaking, the manufactures are inconsiderable. Pop. (1850) 33,695.

GRONOVIUS, the Latinized form of Gronov, Johann Friedrich, a learned scholar and critic, was born at Hamburg on the 10th of September 1611. He went through his early studies with great distinction at Bremen, after which he studied law at Altdorf under the learned professors who had conferred celebrity on that school. To extend his knowledge by travel, and to converse with the learned and explore the libraries, he visited the principal cities of Holland, England, and France. In 1658 he succeeded Daniel Heinsius, the celebrated professor of belles-lettres in the university of Leyden; and in that city he died on the 28th of December 1671. Gronovius was a man of equal learning and modesty; and, as he was naturally disinclined to controversy, he avoided those literary disputes by which so many then sought to obtain distinction. For a correct list of his numerous works, we refer to the *Biblioth. Erudit. Præcoc.* of Klefeker, and to the *Dictionnaire* of Chauffepié, and shall only mention the following:—

Diatribe in Statii poetæ Sylvas, Hague, 1637, in 8vo; *De Sesterciis sive subsesivorum Pecuniæ veteris Græcæ et Romanæ libri iv.*, Deventer, 1643, in 4to; *Observationum libri iv.*, Deventer, 1662, in 12mo; *Laudatio funebris Joannis Golii*, Leyden, 1668, in 8vo; *De Musæo Alexandrino Exercitationes Academicæ*, inserted in the eighth volume of the *Thesaurus Antiquitatum Græcarum*; *Lectiones Plautinæ, quibus non tantum fabulæ Plautinæ et Terentianæ, verum etiam Cæsar, Cicero, Livius illustrantur*, Amsterdam, 1740, in 8vo; *Notes on the Treatise of Grotius De Jure Belli et Pacis.* Gronovius also revised the text, and published editions with notes, of Titus Livius, Statius, Pliny the Elder, Justin, Tacitus, the Senecas, Aulus Gellius, Phædrus, and Paulinus, almost all of which form part of the *Variorum* collection.

(J. B—E.)

Gronovius, *Jacobus*, son of the preceding, and one of the most laborious philologers of the seventeenth century, was born at Deventer (Holland) on the 20th of October 1645. At an early age he had read all the masterpieces of antiquity. In the course of his travels he visited England, where he occupied himself several months in collating the manuscripts in the libraries of Oxford and Cambridge. He then returned to Leyden, and there published, in the year 1670, an edition of Polybius, with notes, amongst which he inserted those that Casaubon had on his deathbed bequeathed to him. This first editorial effort did him much honour, and well merited the offer, which was in consequence made him, of a chair in the academy of Deventer. But entertaining the intention of continuing his travels, he declined the proffered situation, and almost immediately set out for Paris, where he met with a most distinguished reception. The death of his father obliged him to return a second time to Leyden; but as soon as he had arranged his affairs, he again set out along with M. Paats, ambassador of the States-general, to Spain; and having travelled through that country, he embarked for Italy. The Grand Duke of Tuscany retained him in his states by appointing him professor in the university of Pisa; and Gronovius profited by the facility he had of visiting Florence, to form a connection with Magliabecchi, who placed at his disposal all the treasures of the Medicean library. At the end of two years he prevailed on the grand duke to accept his resignation; visited Venice and Padua; and traversed Germany on his way to Deventer, where it was his intention to settle. But scarcely had he arrived in that city when the curators of the university of Leyden tendered him a chair, and pressed their offer so urgently that he was induced to accept it; and he taught at Leyden till his death in 1716. If he inherited the erudition of his father, he had neither his gentleness nor his moderation. Never was there a man fonder of disputation, or more unjust towards the adversaries whom, for the most part, he raised up against himself by his asperity and haughtiness. It would be tedious, if not disgusting, to enter into details respecting the quarrels he had to maintain with Fabretti on the sense of some passages in Livy; with Feller and Perizonius as to the manner of Judas's death; with Vossius on Pomponius Mela; with Bentley and John Leclerc on the corrections of Menander; with Kuster on Suidas, &c. The scurrility he indulged in these discussions, which did not always terminate to his advantage, and his exorbitant vanity, caused him to be compared to Scioppius, and procured for him the unenviable distinction of a place in the work of Mencken on the Empiricism of the Learned. In the *Memoirs of Nicéron* will be found a notice of his life, followed by a catalogue of his works, forty-six in number.

The most celebrated, as well as the most important of these, is the *Thesaurus Antiquitatum Græcarum*, Leyden, 1697 and the following years, in 13 vols. folio. For this invaluable collection he adopted the plan traced out by Grævius in the *Thesaurus Antiquitatum Romanarum*, Utrecht, 1694, in 12 vols. folio. Gronovius published new editions of several authors commented on by his father, such as Seneca, Aulus Gellius, Phædrus, and others; and he also edited Macrobius, Polybius, Tacitus, Pomponius Mela, Cicero, Ammianus Marcellinus, Quintus Curtius, Suetonius, Arrian, Minutius Felix, Herodotus, Cebes, and some ancient geographers; the poem of Manetho on the stars; the *Dactylotheca* of Gorlæus; the *Lexicon* of Harpocration, &c., the greater part of which, enriched with correction and notes, form part of the *Variorum* collection, though, in general, not held in much estimation. The other productions of Gronovius consist of Theses, Discourses, and Diatribes, of which a list will be found in the *Memoirs of Nicéron*, and also in the *Biblioth. Erudit. Præcocium* of Klefeker. (J. B—E.)

GROOM (Flemish, *grom*, a boy), a servant; more particularly one who takes care of horses in the stable, &c.

Groom is also the title of several superior officers of the royal household; as groom of the chamber, groom of the stole or robes, &c. See Household, *Royal*.

GROOTE Eylandt (*Great Island*), the largest island in the Gulf of Carpentaria, North Australia; in S. Lat. 14., E. Long. 136. 40. It is of an irregular form, and is 45 miles in length from N. to S., with an average breadth of 30 miles. It is generally barren and unproductive on the coast; but towards the interior is covered with wood.

GROSE, Francis, a celebrated English antiquary, was of Swiss extraction, but born at Greenford in Middlesex, about the year 1730 or 1731. The bias of his mind showed itself early; and his father indulging it, procured him the office of Richmond Herald in the Herald's College. In 1763 he exchanged this position for that of adjutant and paymaster of the Hampshire militia, where, as he himself humorously observed, the only account-books he kept were his right and left pockets, into the one of which he received, and from the other of which he paid. This carelessness exposed him to serious losses; and after a vain attempt to repair them by accepting a captaincy in the Surrey militia, he began to turn to account his excellent education and his powers as a draughtsman. In 1773–76 he published his *Views of Antiquities in England and Wales*, a work which brought him money as well as fame. In the following year he added two more volumes to this work; and in 1789 he set out on an antiquarian tour through Scotland. In the course of this journey he visited Burns, who composed in his honour the famous song beginning "Ken ye aught o' Captain Grose," and that other, still more famous, "Hear, land o' cakes and brither Scots." In 1790 he began to publish the results of what Burns called "his peregrinations through Scotland;" but he had not finished the work when he bethought himself of going over to Ireland and doing for that country what he had already done for Great Britain. Shortly after his arrival in Dublin, however, he was seized at table with an apopletic fit, and died in a moment.

Grose was a sort of antiquarian Falstaff; at least he possessed in a striking degree the knight's physical peculiarities; but he was a man of true honour, a valuable friend, and an inimitable boon-companion. Though his professional merits were far from contemptible, he showed to greatest advantage as a social being; his humour, his varied knowledge, and his good nature, were all eminently calculated to make him a favourite in society. As Burns says of him—

> "But wad ye see him in his glee,
> For meikle glee and fun has he,
> Then set him down, and twa or three
> Guid fellows wi' him,
> And port, O port! shine thou a wee,
> And then ye'll see him."

Subjoined is a list of Grose's works:—

The Antiquities of England and Wales, in 8 vols. 4to and 8vo; *The Antiquities of Scotland*, in 2 vols. 4to and 8vo; *The Antiquities of Ireland*, in 2 vols. 4to and 8vo, a posthumous work edited by Mr Ledwich, 1794; *A Treatise on Ancient Armour and Weapons*, 1785, in 4to; *A Classical Dictionary of the Vulgar Tongue*, 1785, in 8vo; *Military Antiquities, being a History of the English Army from the Conquest to the Present Time*, 1786, 1788, in 2 vols. 4to; *The History of Dover Castle*, by the Rev. William Darell, 1786, in 4to; *A Provincial Glossary, with a Collection of Local Proverbs and Popular Superstitions*, 1788, in 8vo; *Rules for Drawing Caricatures*, 1788, in 8vo; *Supplement to the Treatise on Ancient Armour and Weapons*, 1789, in 4to; *A Guide to Health, Beauty, Honour, and Riches, being a collection of humorous advertisements, pointing out the means to obtain these blessings*, with a suitable introductory preface, 8vo; *The Olio*, a collection of essays, jests, and small pieces of poetry, highly characteristic of Grose, though certainly not all by him, 1793, in 8vo.

GROSS, the number of twelve dozen.

Gross Weight, in commerce, the weight of merchandise and goods with the dust and dross, as also of the bag, cask, chest, &c., in which they are contained; and out of this gross weight allowance is to be made for tare and tret.

Gross, or *Grossus*, in ancient English law. A *villein in gross, villanus in grosso*, was one who did not belong to the land, but immediately to the person of the lord, and was transferable, like personal goods and chattels, from one owner to another.

GROSSASPERN. See Aspern.

GROSSENHAIN, a town of Saxony, capital of a cognominal bailiwick, in the circle of Dresden, stands in a fertile valley on the Röder, an affluent of the Elbe, 20 miles N.W. of Dresden. It has manufactures of woollen and cotton stuffs, and dye-works; and in 1849 contained 6943 inhabitants.

GROSSWARDEIN (Hung. *Nagy-Varad*), a city of Hungary, capital of the county of Bihar, on the left bank of the Körös, 140 miles E.S.E. of Buda. It is strongly fortified, and is the seat of a bishop, and of the several civil and military boards of the county. Besides the town proper it comprises eight suburbs, or rather distinct villages. The chief public buildings are the cathedral and some of the churches. It has several monasteries and nunneries, an ecclesiastical seminary, gymnasium, national school, and an orphan and other hospitals. It carries on a considerable trade in the products of the vicinity. In the neighbourhood are some hot mineral springs and valuable marble quarries. Pop. (1851) 21,221.

GROTESQUE, in its usual acceptation, is applied to anything distorted in figure; hence unnatural, wildly formed. Dryden says—"There is yet a lower sort of poetry and painting which is out of nature; for a farce is that in poetry which *grotesque* is in a picture: the persons and actions of a farce are all unnatural, and the manners false—that is, inconsisting with the characters of mankind; *grotesque* painting is the just resemblance of this."

In architecture, *grotesque* is applied to the light and fanciful ornaments used by the ancients in the decorations of the walls and some of the subordinate parts of their buildings. The term was thus applied from their having been long buried: the Italians call any subterranean apartment by the name of *grotta*, whence *grotesque*. *Arabesque* is also applied to the same kind of ornament which was much in use about the time of the Renaissance.

GROTIUS, Hugo, a celebrated Dutch scholar, jurist, historian, and miscellaneous writer, was born at Delft, April 10, 1583. His father, Jan Grotius or Groot, was a lawyer in that city. He was so much esteemed for his legal and general learning, that he was four times chosen burgomaster, and was made one of the three curators of the university of Leyden. He took great pains with the education of his son, who at the age of eight wrote good Latin verses, and at twelve is said to have converted his mother from the religion of Rome to that of the Reformed Church. After an elementary course at the Hague, under the famous Uytenbogoard, young Grotius was sent to Leyden, where his studies were superintended and directed by Joseph Scaliger. In 1597, when only fourteen, he defended, with much applause, public theses in mathematics, philosophy, and jurisprudence. Next year he accompanied Count Justin of Nassau and the grand-pensionary Olden Barneveldt on an embassy to the court of France. In that country he resided for nearly twelve months; and during this period he took the degree of LL.D. at the university of Orleans, though he had not then attained the age of seventeen. On returning to his native country, he was called to the bar, and pleaded his first cause at Delft in 1599. This year also witnessed his first published work, which was an edition of the Satyricon of Martianus Capella, with notes and commentaries. The work was undertaken at the instance of Scaliger, and was dedicated to the Prince of Condé. His reputation as a classical critic was increased by his edition of the *Syntagma Arateorum*, published in the following year. As this work relates to astronomy, it afforded him an opportunity of displaying his science as well as erudition. His brief notes on Lucan, accompanying an edition of the text, made their appearance in 1603. Some of his Latin verses had been printed so early as the year 1598, and others followed in 1599 and 1600. *Adamus Exul, tragœdia*, was published in 1601; but this tragedy he afterwards considered as too juvenile to be admitted into the general collection of his poems. His *Christus Patiens, tragœdia*, was printed in 1608, and was received with great applause. It was translated into English by George Sandys, and, at a more recent period, into German by D. W. Triller. With the former version he appears to have been much pleased. His third drama, *Sophompaneas, tragœdia*, was not published till 1617. It relates to the history of Joseph, whom he thus describes by an Egyptian name. Of this tragedy a Dutch version was undertaken by the celebrated poet Vondel. His *Prosopopeia* of Ostend was still more enthusiastically received, and was immediately translated into French by three different persons, and into Greek by Casaubon.

His first appearance at the bar produced a very favourable impression, and he soon rose to eminence. In 1607, that is, at the age of twenty-four, he was promoted to the important office of advocate-general of Holland and Zeeland. During the following year he married Maria van Reygersberg, a daughter of one of the first families in Zeeland. About this period he was occupied with a professional work, which appeared in 1609, under the title of *Mare Liberum, sive de Jure quod Batavis competit ad Indicana Commercia Dissertatio,* and involved its author in a violent controversy with Selden, Wellwood, and other English jurists. In 1610 he published a work *De Antiquitate Reipublicæ Batavæ;* and in the same year a Dutch translation of it, which was partly executed by his father. The book was afterwards translated into French. In 1613 Grotius was appointed pensionary, or syndic, of Rotterdam, and then fixed his residence in that city. In the course of the same year he was sent on a mission to the court of London, for the purpose of remonstrating against the arbitrary proceedings of the English, who claimed an exclusive right to the Greenland fisheries. His diplomatic exertions appear to have been attended with little or no success; but he was very graciously received by James VI., and had the satisfaction of forming a personal acquaintance with Isaac Casaubon.

Soon after this the famous Arminian controversy broke out, which ended so disastrously for Arminius and his partisans. Of these none had been more zealous than Grotius; and when the Stadtholder's influence had decided the day against him, he did not shrink from the punishment which he well knew would follow defeat. Barneveldt was beheaded; and Grotius, after an irregular and unfair trial, was condemned to perpetual imprisonment, and to have all his property confiscated. On the 6th of June 1619, in accordance with this cruel sentence, he was removed to the fortress of Loevestein, near the town of Gorcum in South Holland. His father was not allowed to visit him, and it was only with great difficulty that his wife obtained permission to share his cell. In literary pursuits he found at once the business and the pleasure of his life. He wrote some short annotations on the New Testament, and a work in Dutch verse on the truth of the Christian religion. For the use of his daughter Cornelia, he composed a metrical catechism in the same language. It was printed at the Hague in the year 1619, and he afterwards translated it into Latin verse. Another of his labours during his imprisonment was his introduction to the Dutch law, *Inleydinge tot de Hollandse Rechtsgelehrtheyt.* It was published in 1631, or perhaps earlier, and went through many editions, several of which contain the additions of Groenewegen, well known for his treatise *De Legibus abrogatis et inusitatis in Hollandia.* He translated Stobæus's fragments of the Greek poets, the Phœnissæ of Euripides, and the remains of Menander and Philemon. After he had been imprisoned for about twenty months, his wife devised a plan for his escape. He was in the habit of receiving books and clothes in a very large chest, which, for the first year, was examined regularly, and with great care by the officers. At last, however, they ceased their scrutiny; and Grotius' wife perceiving this, persuaded her husband to allow himself to be carried out in the chest. He consented, and after some hair-breadth escapes, found his way to Antwerp. After a short stay in that city he sought a more secure asylum in France. He reached Paris, April 13, 1621, and was warmly received by the literati of that city, and by the king himself, who gave him a pension of 3000 livres. He was at last joined by his wife, who had been detained in prison for about a fortnight after his escape, but had been released when it was found useless to detain her.

Being placed in a situation of comparative tranquillity, he now resumed his literary labours. Before the close of the year 1622, he published an *Apology* for himself and the party with which he acted. For this work sentence of death was pronounced against him in Holland, and the same penalty was denounced against all in whose possession it might be found. Grotius spent another year in Paris, editing and writing, and next year retired into the country to a villa near Senlis, which the kindness of the president De Mesmes had placed at his disposal. He here began the composition of his famous treatise *De Jure Belli et Pacis,* which was published in 1625. This work immediately made its author known all over Europe, and was translated into Swedish, English, and German, and twice into French. The treatise *De Veritate Religionis Christianæ* was published at Leyden in the year 1627, and the subsequent editions of this work have been very numerous. It has been translated into almost all the languages of Europe, and into various languages of Asia. An Arabic version was executed by the learned Dr Pococke.

In the meantime, his residence in France was not entirely free from inquietude and mortifications. His pension had never been paid with any degree of regularity; and he began at last to yearn for his own country. The death of Maurice of Orange, April 23, 1625, gave him hopes of returning in safety. He arrived at Rotterdam in the October of 1631; but his reception there, and in the other Dutch towns, was so extremely ungracious, that he was glad to escape from Holland with his life. He retired to Hamburg, where offers were made to him by the King of Denmark and several other princes. He accepted that of Oxenstiern, the chancellor of Sweden, who then governed that country in the minority of Christina. By him Grotius was appointed Swedish ambassador to the Court of France. He made his public entry into Paris, March 2, 1635. His mission was to try to secure the assistance of the French against the Imperialists; and though he had to contend with the statecraft, first of Richelieu, and afterwards of Mazarin, he upheld the honour and secured the interests of his adopted country with much address and effect. His diplomatic engagements, however, did not wholly interrupt his literary labours. During his stay in Paris he edited *Tacitus;* and, renewing his legal studies, published his *Florum Sparsio ad Jus Justinianeum*, Paris, 1642, 4to. Of this work, two different editions, both in duodecimo, were printed at Amsterdam in the course of the following year. It contains a series of annotations on the body of the civil law, and, as the title suggests, many of them are philological. At this busy era of his life he completed most of his theological works. The publication, in 1640, of his *Commentatio ad Loca quædam Novi Testamenti quæ de Antichristo agunt aut agere putantur*, exposed him to many severe animadversions from such men as Des-Marets, Du Moulin, Cocceius, and Slichtingius, some of whom accused him of being at heart a partizan of Papacy, others a follower of Socinus. This, however, did not prevent Grotius from publishing another volume of an equally liberal character, which bears the title of *Via ad Pacem Ecclesiasticam*, Amst., 1642, 8vo. His professed object is to conciliate the differences between the Protestants and the Papists. Although he was completely entangled in the cobwebs of Arminianism, the charge of Socinianism seems to be destitute of foundation. But with respect to the claim of the Romanists, it must be admitted to be somewhat more plausible. Grotius had found an asylum in a Catholic country: he may, in some degree, have been misled by his respect for antiquity, and attracted by the splendour of the Popish hierarchy. He expressed a great veneration for the Church of England. His *Via ad Pacem* was immediately attacked by several antagonists, the most formidable of whom was André Rivet, professor of divinity in the university of Leyden. Grotius defended himself in a work entitled *Votum pro Pace Ecclesiastica*, printed in 1642; and Rivet rejoined in the course of the following year. In 1645 Grotius published *Rivetiani Apologetici, pro Schismate contra Votum Pacis facti, Discussio;* and in 1646 Rivet endeavoured to assert the genuine peace of the church against suspicious mediators. Grotius was about this period engaged in a theological undertaking of much greater importance, namely, his annotations on the different books of the Old and New Testaments. His notes on the Old Testament and the Apocrypha were printed at Paris in 1644, in three volumes folio. His notes on the Gospels had been published in the same form three years earlier, but the concluding portions of this great work do not appear to have been printed before the year 1648. This is one of the works which have chiefly recommended his name to posterity; and writers of every denomination have agreed in ranking him among the ablest of biblical critics.

After having long discharged the functions of an ambassador, he at length solicited and obtained his recall. He had encountered many discouragements in the course of his negotiations; and the arrival of a Swedish agent, of whom he entertained a very unfavourable opinion, seems to have confirmed his wish to retire. Having embarked at Dieppe, the ambassador landed once more in his native country, and was received with due honour at Amsterdam. He proceeded by sea to Hamburg, where he arrived about the middle of May 1645. On reaching Stockholm, he was very graciously received by the queen, who made him ample promises, and was anxious to retain him in her service. The climate of Sweden, however, did not suit his health, and he determined to quit it. Christina loaded him with gifts; and, with these rewards of his faithful services, he sailed, August 12, for Lubeck. The vessel was speedily overtaken by a storm, and on the 17th was driven ashore near Danzig. Travelling in an open carriage, he arrived at Rostock on the 26th, in a very feeble and exhausted condition. Every effort was made to save his life, but in vain. He expired, August 28, 1645, in the sixty-third year of his age. His remains were conveyed to Delft, and were deposited in the tomb of his ancestors.

He had prepared for the press various works which he did not live to publish. Soon after his death one of these appeared under the following title—*De Imperio Summarum Potestatum circa Sacra*, Lutet. Paris, 1647, 8vo. This was soon followed by *Philosophorum Sententiæ de Fato, et de eo quod in nostra est potestate, collectæ partim et de Græco versæ*, Paris, 1648, 4to; Amst., 1648, 12mo. Next appeared *Historia Gotthorum, Vandalorum, et Langobardorum, partim versa, partim in ordinem digesta*, Amst., 1655, 8vo. His history of his native country was published not long afterwards—*Annales et Historiæ de Rebus Belgicis*, Amst., 1656, fol.; Amst., 1658, 12mo. This very title at once suggests Tacitus as the writer's model, and his style is evidently formed on that of the ancient historian. Another posthumous publication was his tract *De Eucharistia*, which was fiercely attacked by Salmasius, under the assumed name of Simplicius Verinus. A very ample and interesting collection of his letters, consisting of nearly one thousand pages in double columns, was published by two of his grandsons: *Epistolæ quotquot reperiri potuerunt; in quibus præter hactenus editas, plurimæ theologici, juridici, philologici, historici, et politici argumenti occurrunt*, Amst., 1687, fol. The poetical version of the *Anthology*, on which he had bestowed much labour, was not published till a century and a half after his death. The manuscript at length came into the possession of De Bosch, a man of learning and taste, who published the work in a splendid form, with copious illustrations of his own, under the title of *Anthologia Græca, cum versione Latina Hugonis Grotii, edita ab Hieronymo de Bosch*, Ultrajecti, 1795–8, 3 tom. 4to.

Gulielmus Grotius, or Willem de Groot, the brother of Hugo, deserves a brief notice. Being bred to the legal profession, he became eminent at the bar, and was appointed advocate to the East India Company. He was a man of erudition, and the author of several works. One of these is an *Enchiridion de Principiis Juris Naturalis*, in which he illustrates the principles of a science that was so deeply indebted to another member of the same family. Another of his works, which was published after his death, and which is still held in great estimation by civilians, bears the title of *Vitæ Jurisconsultorum quorum in Pandectis extant Nomina*, Lugd. Bat., 1690, 4to. He appears to have been a most affectionate brother, and to have sympathized very deeply in the fortunes of a kinsman whose moral and intellectual endowments reflected so much lustre on the family to which he belonged.

GROTTAMARE, a town of the Papal States, delegation and 14 miles S.S.E. of Fermo, on the Adriatic. It has large manufactories of liquorice and cream of tartar, and sugar refineries. Pop. 4050.

GROTTO, properly Grotta, a cave, natural or artificial, in the face of a rock or a mountain.

Among the more remarkable artificial works of this kind may be mentioned the famous *Grotta di Pausilippo*, which is a straight passage cut through the rock from Naples to Puzzuoli, about 1000 paces in length, 80 or 90 feet high, from 24 to 30 feet wide, and forming the main road for the daily traffic of a very populous district. See Pausilippo. But the most remarkable examples of artificial caverns in the world are to be found in the ancient Petra, which may be called a city of caves or grottoes. See Petra.

Of natural grottoes, it will only be necessary here to name a few of the most remarkable in their several ways, in order to facilitate reference to those parts of the work where they are more particularly described. Among these are the celebrated caverns of Illyria, in the Julian Alps—mountains of calcareous formation, and abounding in caves; while they present, particularly in the eastern part, the natural phenomena of subterranean rivers, lakes, cascades, and other curiosities, such as are unknown in any other part of Europe. The most magnificent of these is described under ADELSBERG, which see. Under separate heads, or those of the countries where they occur, will be found, together with many others of note, descriptions of the following famous caves:—Baumans Höhle, a series of ossiferous caverns in Germany (see BAUMANS HÖHLE); the ossiferous cave of Kirkdale in Yorkshire (see KIRKDALE); the Mammoth Cave of Kentucky, said to be 8 or 10 miles in length (see KENTUCKY); the Epsom Salt Cave, 2 miles long (see INDIANA); the famed cavern of Antiparos, an island in the Grecian Archipelago (see ANTIPAROS). The caves and excavations of the Peak district in Derbyshire are very celebrated. An account of these is to be found in the illustrated work entitled *Peak Scenery*, by E. Rhodes.

The *Grotta del Cane* (*i.e.*, dog's cavern) is a small cave near Puzzuoli, about 7 miles S.W. of Naples, remarkable for the noxious quality of its air. This is caused by the carbonic acid which issues from crevices in the floor of the cave, and which fills the lower part to the level of the entrance, when it flows out by its superior gravity. Hence a man may enter the cave with impunity; while a small animal, such as a dog, is speedily destroyed by the noxious gas it must necessarily respire. See CAVE, vol. vi., p. 350.

GROUP, in *Painting* and *Sculpture*, an assemblage of two or more figures of men, beasts, or other things, which have some apparent relation to each other

GROUSE, a heath-cock. See index to ORNITHOLOGY.

GROUT, among builders, mortar rendered fluid by the addition of water: also a mixture of plaster and fine stuff, putty, or coarse stuff, used in finishing ceilings, for mouldings, and sometimes for setting walls.

GROVE, a small wood or cluster of trees. Among the ancients groves were held in great veneration. The *proseuchæ*, and high places of the Jews, whither they resorted for the purposes of devotion, were probably situated in groves (see Joshua xxiv. 26). The *proseuchæ* in Alexandria, mentioned by Philo, had groves about them; for he complains that the Alexandrians, in a tumult against the Jews, cut down the trees of their *proseuchæ*. There were groves near many of the Roman temples, which were consecrated to some god, and, as Cicero alleges, called *luci* by antiphrasis, *a non lucendo*, as being shady and dark.

GROWTH, the gradual increase which takes place in animal or vegetable bodies by the addition of matter through ducts and secretory vessels.

Among the numerous instances recorded of an extraordinary degree of early development in the human frame, not the least remarkable is that of a boy who was exhibited before the Academy of Sciences at Paris in the year 1729. This boy, though then only seven years of age, measured four feet eight inches and four lines in height. It was stated that at two years of age he began to exhibit signs of pubescence, which soon afterwards were completely developed. At the age of four he was able to toss the common bundles of hay in stables into the horses' racks; and at six he could raise as much as a sturdy fellow of twenty. But though he thus increased in bodily strength, his understanding was not greater than is usual with children of his age, and their playthings were also his favourite amusements. A similar instance of precocious virility was exhibited to the great meeting of *naturforschers* (natural philosophers) at Hamburg in 1830; and another more recently to the British Association. It has been generally observed that such abnormal precocity is indicative of premature decay, and that few of these individuals ever attain the ordinary term of manhood.

For the physiological consideration of the subject of growth in plants and animals, see BOTANY, vol. v., p. 99–103, and PHYSIOLOGY.

GRUB, a small worm; a name more particularly applied to the hexapod worms produced from the eggs of beetles, and which are eventually transformed into winged insects.

GRUBENHAGEN, a principality in the kingdom of Hanover, comprised in the *Landrostei* or province of Hildesheim. It consists of two unequal parts separated by the Harz Mountains, the larger being S.W. of that range. Area about 310 square miles. The Harz Forest covers the greater part of the principality, some of the hills of which are 2700 feet in height, and are clothed to their summits with pines. The principal pursuit of the inhabitants is mining. Its mineral wealth is considerable, comprising gold, silver, copper, lead, iron, zinc, vitriol, and sulphur. The climate is cold, moist, and gloomy. Pop. 87,280.

GRUNBERG, a town of Prussian Silesia, capital of a cognominal circle in the government of Liegnitz, and 36 miles N.N.W. of Glogau. It is surrounded by walls, and has flourishing manufactures of woollen cloths, printed cottons, and leather. The vine is extensively cultivated in the vicinity. Pop. (1849) including suburbs, 10,587. There is another town of this name in Hesse-Darmstadt, province of Upper Hesse, 14 miles E. of Giessen. Pop. about 2500.

GRUS (Lat. a *crane*), a constellation of the southern hemisphere.

GRUTER, JAN, a distinguished scholar and critic, was born at Antwerp in 1560. His father was a Fleming, but his mother, whose name was Tishem, was an Englishwoman, and able, from her own knowledge of the classics, to instruct her son in them. Being obliged to fly Holland for siding with the Reformed faith, Gruter's family came to England, and the young Gruter, after studying for some years at Cambridge, returned to his native land, and graduated at Leyden. After this he seems to have taught successively at Rostock, Wittemberg, and Heidelberg, in which last city he resided till his death in 1627, despite of tempting offers of professorships in France, Denmark, and Italy. It is not known what chair he held in Heidelberg, but he was also conservator of the university library. His knowledge of bibliography enabled him to amass a large private library, which, however, he lost in the memorable siege of Heidelberg in 1622.

Gruter at one time enjoyed a vast reputation for learning, and there is no doubt that he was as good a scholar as a man of solid faculties and unwearied industry can alone be. But though his erudition was great, his mental power, beyond the mere faculty of acquisition, seems to have been small; and, accordingly, we do not find that he has made any valuable contribution to any department of scholarship. Besides editions of some of the Latin classics which involved him in highly indecent controversies with Pareus and others of his contemporaries, Gruter compiled a most valuable work, published at Heidelberg in 1601, under the title of *Inscriptiones antiquæ totius orbis Romani*. Gruter is said to have written a book every month, but the entire list of his works preserved in Nicéron only comprises thirty-two. These, as has been already mentioned, are chiefly the later Latin classics, and possess but little critical value.

GRUYÈRE (German *Greyerz*), a town of Switzerland, canton of Freiburg, 15 miles S. of the town of that name, on a hill, the summit of which is crowned by one of the best preserved feudal castles in Switzerland. Its population does not amount to 400, but the district is noted for producing the celebrated cheese to which it gives name.

GRY, a measure containing one-tenth of a line. A line is one-tenth of a digit, and a digit one-tenth of a foot, and a philosophical foot one-third of a pendulum whose vibrations, in the latitude of forty-five degrees, are each equal to one second of time, or one-sixtieth of a minute.

GUADALAJARA, a province of Spain, in New Castile, bounded on the N. by the provinces of Segovia, Soria, and Saragossa, S. by Cuenca, E. by Saragossa and Teruel, and W. by Madrid. In Atienza in the north of this province are some of the loftiest summits in the Peninsula, having their culminating point in the Peña de la Bodera. The soil varies considerably, but is generally of good quality. Pasture occupies the larger portion of the surface in the higher tracts. The districts of Tamajon are admirably adapted for cereals. Alcarría, however, matures all kinds of crops common to the latitude. Iron and lead are the only minerals; the former is very abundant, and has been worked from the remotest periods; the latter occurs but in small quantities. The principal productions are wheat, barley, oil, wine, silk, saffron, and flax; but the chief wealth of the province consists in sheep and wool. Manufactures and trade have been gradually declining for many years. For administration the province is divided into nine districts, of which Guadalajara is the capital. The estimated population of this province is (1856) upwards of 200,000; and the area is 1951 English square miles.

GUADALAJARA, a city of Spain, capital of the province of the same name, in New Castile, is situated on the eastern bank of the Henares, 38 miles N.E. of Madrid, and is 2330 feet above sea-level, in N. Lat. 40. 33. It is ill built, has five parish churches, seven conventual churches besides several chapels, four convents, an Ionic sessions and town-house, built in 1585; a handsome theatre, lying-in, civil, and military hospitals; barracks; the palace of the Duque del Infantado; a Latin, normal, and various other schools. An extensive Roman aqueduct supplies six public fountains; and there are four public promenades. The principal manufactures are wine, oil, soap, earthenware, and woollens. The cloth manufactory which was formerly carried on in behalf of the government, is now in private hands. The trade of the city consists chiefly in grain, flax, fruits, clothes, and silk.

Guadalajara is the chief town of the *Arriaca* of the Romans, and was taken by the invading Moors (A.D. 714), who bestowed on it the name of "Guidalhichara," or "Guadalaruaca," of which its present name is a corruption. Pop. about 7500.

GUADALAJARA, a state and town of Mexico. See MEXICO.

GUADALCANAL, a town of Spain, province of Andalucia, 50 miles N. of Sevilla, and 70 S.E. of Badajoz, near the Vanalija. Its principal manufactures are soap, leather, hats, oil, wine, and brandy; and its trade consists chiefly in grain, fruits, wine, and cattle.

GUADALETE, a river of Andalucia, in Spain. It rises in the Sierra del Peñol, or San Cristoval, province of Cadiz, flows W.S.W. near the town of Bornos, and past Arcos, and falls into the Atlantic near Matagorda, 3 miles E. of Cadiz, after a course of 95 miles.

GUADALOUPE, or GUADELOUPE, one of the Leeward group of islands in the West Indies, and one of the most important colonies of France, and situated in N. Lat. 16. 20., W. Long. 62. It consists properly of two islands separated from each other by a narrow channel, about 5 miles in length, by from 30 to 100 yards wide, and with depth sufficient for vessels of 60 tons. This channel, called *La Rivière Salée*, or Salt River, runs nearly N. and S., and has a large bay at each end, that on the N. being called the *Grand Cul-de-Sac*, that on the S. the *Petit Cul-de-Sac*. The western or larger island, called Guadaloupe proper, or *Basse Terre*, is 27 miles in length, by 15 in breadth; the eastern, or *Grande Terre* is nearly 30 miles long, by from 10 to 12 broad. Guadaloupe proper is of volcanic formation, and is traversed from N. to S. by a ridge of hills having a medium height of 2296 feet. Its principal peaks are *La Souffrière*, an active volcano 5108 feet high, and *Grosse-Montagne*, *Deux-Mamelles*, and *Piton de Bouillante*, extinct volcanoes. It is copiously watered by numerous small streams, two of which, the *Goyave* and the *Lezarde*, are navigable for small craft. The soil is fertile, and the surface is agreeably diversified by hill and dale, wood and garden. The products, natural and cultivated, are those of the West Indies generally. The principal town, *Basse Terre*, stands on the S.W. coast. It is the residence of the governor, and has some fine public buildings, fountains, and gardens, and about 6000 inhabitants. *Grande Terre*, unlike Guadaloupe proper, is marshy, sterile, and flat, nowhere rising more than 115 feet above the sea. Its chief town, *St Louis* or *Point à-Pitre*, the former capital of the island, is at the S. entrance to the Salt River, and has an excellent harbour. It formerly contained about 15,000 inhabitants, but was almost entirely destroyed by an earthquake on 8th February 1843, on which occasion 4000 of its inhabitants perished. The climate is humid, and hurricanes and earthquakes are frequent. The rainy season lasts from the middle of July to the middle of October. The chief exports are sugar, molasses, rum, cotton, coffee, dye-woods, and copper. The sugar crop amounts to about 60,000 hogsheads annually. A considerable quantity of fish is taken in the neighbouring seas. The government consists of a governor, with a privy council of six, and a colonial council of thirty members. The government of Guadaloupe comprises, besides that island, those of *Marie-Galante*, *Desirade*, *Les Saintes*, and the northern portion of *St Martin*. *Marie-Galante* lies 14 miles S.S.E. of Guadaloupe, and is about 12 miles in length, by 8 in breadth. It is traversed from N. to S. by a range of hills running parallel to the E. coast, where it presents a front of high and precipitous rocks. The W. and N. sides of the island are level; and parallel with the former is a narrow lagoon, 7 or 8 miles in length, separated from the sea by a low narrow tract of land. The island abounds in woods, particularly the wild cinnamon tree. Its principal town, *Grandbourg* or *Basse Terre*, stands near the S.W. point. *Desirade*, or *Deseada*, lies about 4 miles E. from the S.E. extremity of *Grande Terre*, and is about 8 miles long by 3 wide. It rises from the sea with a steep ascent, and then extends in a table-land, which consists of limestone rocks, in which many caverns occur, but it is without water. The soil in some places is of a deep black mould, and fertile; in others it is sandy and unproductive. The only anchorage is at the *Anse-Galet*, on the E. side of the island. *Les Saintes* are a group of rocky islets 6 or 7 miles S. of Guadaloupe, and consist of lofty and steep peaks, some of which are united by flat ground and ridges of inferior elevation. The two largest are called *Terre d'en Haut* and *Terre d'en Bas*. *St Martin* is a small island immediately S. of the British island of Anguilla, in N. Lat. 18. 5., and W. Long. 63. 6. Its form is nearly that of an equilateral triangle, each side being about 7 miles in length, and comprising an area of about 33 square miles. It is deeply indented with bays and lagoons, some of which afford good anchorage. The surface is generally hilly, the highest point being 1361 feet above the sea. It was colonized by the French and Dutch in 1638, but these were expelled by the Spaniards, who themselves abandoned the island in 1750, and the original settlers resumed possession. The southern portion of the island belonged to the Dutch. Guadaloupe was discovered by Columbus in 1493. In 1635 the French established a settlement upon the island, and retained possession of it till 1759, when it was taken by the English. It was subsequently, on several occasions, taken and retaken by these nations, and was finally ceded to France in 1814. Pop. (1854) 132,810. Slavery was abolished here by a decree of the French Republic in 1848, at which time about 100,000 persons were emancipated.

GUADALQUIVIR, a river of Spain, province of Andalucia, the fifth in point of length, and the sixth in the number and importance of its tributaries in the peninsula. It rises in the Sierras de Alcaráz, Segura and Cazorla, and falls into the ocean by Sanlucar de Barrameda, after a course of 412 miles. It flows first in a northerly direction, then W., then S.W., and ultimately towards the S., draining a basin of 25,680 square miles. In its course it passes through and drains the four provinces of Jaen, Córdoba, Sevilla, and Cadiz. Its source-spring is 4 miles W. of the town of Quesada, Sierra de Cazorla, province of Jaen.

GUADALUPE, a town of Spain, New Castile, 100 miles S.W. of Toledo. It is situated on the southern slope of Monte Altamira. The monastery of Jeronimo, which is in the centre of the town, was formerly the Loretto of Central Spain, and still contains many valuable works of art. Pop. 4000.

GUADI is the Spanish pronunciation of the Moorish *Wadi*, "a stream with its valley." It occurs in the names of numerous rivers of Spain.

GUADIX, a royal and episcopal city of Spain, province of Granada, and chief town of the department of the same name. It stands on the northern slope of the Sierra Nevada, and above the left bank of the River Guadix. It is said to have been the first Bishop's see erected in Spain; and is surrounded by ancient walls, and contains a fine cathedral, partly in the Corinthian style. The ruins of an ancient castle stand on a fine site, commanding the town. The principal manufactures are saltpetre, earthenwares, hempen goods, hats, silk fabrics, sail-cloth, and cutlery; and the trade is chiefly in silk, wool, cotton, flax, corn, liqueurs, and various other articles. The Moors made a valiant defence here and maintained their position till 1589. Pop. nearly 12,000.

GUAIACUM, a resinous substance, of a greenish-brown colour, an aromatic smell, and a bitterish acrid taste. It is the produce of *Guaiacum officinale*, a tree that grows in the warmer parts of America, especially St Domingo, and which is popularly known as *Lignum-vitæ*. This resin is used chiefly in pharmacy, but is an unimportant medicine.

GUAM, or Guahon, one of the Ladrone Islands. It is a large island, about 120 miles in circuit, high and shelving on each side, and fenced with steep rocks, against which the surf perpetually beats. There is a bay on the west side, in which there are several small harbours. The climate is mild and salubrious, and the soil yields a great profusion of vegetables and fruits, particularly guavas, bananas, cocos, oranges, and limes. The population is uncertain. The island was discovered by Magellan in 1521, and at that time the inhabitants—a wild and savage race—were numerous. Long. 143. 15., Lat. 13. 10.

GUAMANGA, or Huamanga, a city of Peru, capital of the department of Ayacucho, on an affluent of the Apurimac, 140 miles W.N.W. of Cuzco. It was founded by Pizarro on the site of an Indian village of the same name, for the convenience of trade between Cuzco and Lima. It has a fine cathedral, several other churches, monasteries, nunneries, and a university. Pop. about 20,000.

GUANAJUATO, a state and city of Mexico. See Mexico.

GUANCAVELICA, or Huancabelica, a town of Peru, capital of a cognominal department, in a ravine of the Andes, 11,000 feet above the sea, and 80 miles W.N.W. of Guamanga. The district is bleak and cold, but is famous for its mines of gold, silver, and particularly mercury. Pop. about 6000.

GUANO, the solid excrement of carnivorous sea-birds, which is found in immense quantity on the coasts of South America, and in other tropical countries, as South Africa. The analysis of this very powerful manure, its varieties, adulterations, market prices, agricultural application, &c., are fully detailed under Agricultural Chemistry, vol. ii., p. 408–11; see also Agriculture, vol. ii., p. 299.

Guano, or *Huano*, is the Peruvian term for manure. This substance, though brought to Europe for the first time in 1840, has been employed in agriculture by the Peruvians from the age of the Incas downwards. The chief sources of supply at present are the Chinca islands, off the coast of Lower Peru, and the Lobos islands, opposite to Lambayeque in Upper Peru. Chinca, the chief of the group bearing that name, has been estimated to contain the enormous quantity of seventeen millions of tons; and that of the remainder of the group is given at twenty to twenty-five millions. The supply on the Lobos islands, though not so extensive, is yet very large. There are also other islands and places on the coast that afford considerable supplies of guano; so that upon the whole, for all practical purposes, the supply may be considered as inexhaustible.

So ignorant were the governments of Peru and Bolivia of the value of this article, that they sold to private parties the sole right to ship guano for the term of nine years for the trifling sum of $40,000; but soon perceiving the ruinous nature of the contract, the Peruvian government cancelled it two years afterwards (in 1841), on the ground of enormous public lesion, and ignorance of the value of the privilege conceded. This had the effect of opening up the trade for a time; but the monopoly system was revived in the course of a year or two by the Peruvian government, whose agents (Messrs Gibbs & Sons, of London) are now the sole importers in this country, though of late much has been sent direct from Peru to Spain. The exorbitant price demanded for this manure has occasioned much complaint; and it is to be hoped that some measures may be devised for reducing the price to a fair commercial rate. (M'Culloch's *Commercial Dictionary*.)

The total quantity of guano imported in 1854 amounted to 235,111 tons: against 123,166 tons in 1853; 129,889 tons in 1852; 243,014 tons in 1851; and 116,925 tons in 1850. Of the above 235,111 tons, 221,747 tons came from Peru; 3187 from British South Africa; 1502 from the United States; 4249 from Chili.

GUARANIS, an aboriginal people of South America. See South America, vol ii., p. 691.

GUARANTEE, in law, an obligation undertaken by one party that another shall pay or perform that for which he is or may become liable to a third party. In mercantile transactions in Scotland it may be constituted in any way by which the consent of the guarantee obligant is truly and freely given; but it can only be proved by his oath or writing. The evidence of witnesses is inadmissible, unless the obligation was undertaken as an integral part of a transaction relative to moveables, provable by witnesses, or that something followed on the faith of it, with the knowledge of the guarantee obligant, by which the rights of parties were materially affected. In England it is enacted by statute, that "No action shall be brought whereby to charge the defendant upon any special promise to answer for the debt, &c., of another person, unless the agreement on which such action shall be brought, or some memorandum or note thereof, shall be in writing, and signed by the party to be charged therewith, or some other person thereunto by him lawfully authorized." The construction of all such obligations is never extended beyond their obvious meaning, and they are only understood to apply to future, unless they expressly include past transactions. All their conditions and limitations must be carefully regarded, otherwise they become void. If so expressed or intended, however, such obligations may be of the most unqualified character; they may be unlimited in amount, and indefinite as to time. When the guarantee obligant is compelled to pay, he has an action of relief against the principal debtor; but that party, being primarily liable, must first be sued by the creditor; and whatever he does towards the extinction of the claim of the creditor, or whatever the creditor recovers from him or his estate, goes so far to relieve the guarantee obligant, who can also plead against the creditor any defence which could be competently pleaded by the principal debtor. Where more persons than one are bound together in a guarantee obligation, any of them seeking relief from the others of a share of his loss must communicate to them a share of any security which he may hold over the estate of the principal debtor, or of any abatement he may have obtained from the creditor. A guarantee obligation may be extinguished by the extreme neglect of the creditor; as, for example, by his failing to take advantage of a security in his power, omitting to negotiate a bill, inadvertently giving up funds of the principal debtor over which he had a right of lien or retention, or renouncing any security over his estate. In like manner, if he compound with, or discharge the principal debtor, without the concurrence of the guarantee obligant, the guaranty is at an end; excepting under a commission of bankruptcy in England, or a sequestration in Scotland, where the creditor may, by acquiescence, allow the principal debtor to be discharged, and may accept a composition, without discharging the guarantee, provided the guarantee obligant has previously been duly warned and called on to satisfy the debt. (M. L.)

GUARD, in military affairs, a body of men appointed to watch a position, and withstand an attack, if attempted.

GUARDS, The, a general name for the regiments of Household Troops.

Horse Guards, in England, were originally gentlemen chosen for their bravery to be intrusted with the guard of the king's person. They were divided into four troops. The first was raised in the year 1660, and the command given to Lord Gerard; the second in 1661, and the command given to Sir Philip Howard; the third in 1693, and the command given to Earl Feversham; the fourth in 1702, and the command given to Earl Newburgh. Each troop had one colonel, two lieutenant-colonels, one cornet and major, one guidon and major, four exempts and captains, four brigadiers and lieutenants, one adjutant, four subbrigadiers and cornets, and sixty private men. The four troops were afterwards turned into two regiments of Life Guards.

The *Horse Grenadier Guards* were divided into two troops. The first troop was raised in 1693, and the command given to Lieutenant-General Cholmondeley; the second in 1702, and the command given to Lord Forbes. Each troop had a colonel, a lieutenant-colonel, a guidon or major, three exempts and captains, three lieutenants, one adjutant, three cornets, and sixty private men.

The *Yeomen of the Guard* were first raised at the coronation of Henry VII., Oct. 30, 1485. They are a superior kind of Foot Guards to the royal person, and are generally called by the nickname of *Beef-Eaters*. (See Appellation.) They were originally fifty in number, and of larger stature than ordinary, each being required to be over six feet in height. This band was afterwards increased to a hundred, and seventy supernumeraries; and when one of the hundred died, his place was supplied out of the seventy. Their first captain was the Earl of Oxford, in 1486.

The *Foot Guards* are regiments of foot appointed to guard the royal person and palace. They were raised in 1660, when the command of the first regiment was given to Thomas Lord Wentworth; that of the second to General Monk, then Duke of Albemarle; and that of the third to the Earl of Linlithgow. The second regiment is always called the Coldstream Guards, from a town in Berwickshire, where it was first embodied. This regiment is older than the first, having been raised sooner; and, from being commanded by General Monk, was called Monk's regiment, in compliment to whom it was made one of the three royal regiments by Charles II.

Scotch Guards, a celebrated band which formed the first company of the ancient *Gardes du Corps* of France. In the ancient intercourse between the two countries, the natives of Scotland had often distinguished themselves in the service of France. On this foundation the company of Scotch Guards, and the company of Scotch Gendarmes, were instituted; both of them owed their institution to Charles VII. of France, by whom the first standing army in Europe was formed, in the year 1454.

The ancient rights and privileges of the Scottish Life Guards were most honourable. The author of the Ancient Alliance between France and Britain says, "On high holidays, at the ceremony of the royal touch, the erection of knights of the king's order, the reception of extraordinary ambassadors, and the public entries of cities, there must be six of their number next to the king's person, three on each side; and the body of the king must be carried by these only, wheresoever ceremony requires. They have the keeping of the keys of the king's lodging at night, the keeping of the choir of the chapel, the keeping the boats where the king passes the rivers; and they have the honour of bearing the white silk fringe in their arms, which in France is the *coronne couleur*. The keys of all the cities where the king makes his entry are given to their captain in waiting or out of waiting. He has the privilege, in waiting or out of waiting, at ceremonies—such as coronations, marriages, and funerals of the kings, and at the baptism and marriage of their children—to take duty upon him. The coronation robe belongs to him; and this company, by the death or change of a captain, never changes its rank, as do the three others."

This company's first commander, who is recorded as a person of great valour and military accomplishments, was Robert Patillock, or Patullo, a native of Dundee; and the corps, ever ardent to distinguish itself, continued in great reputation until the year 1578. From that period the Scotch Guards were less attended to, and their privileges came to be invaded. In 1612 they presented a remonstrance to Louis XIII. on the injustice they had suffered, and placed before him the services they had rendered to the crown of France. Attempts were then made to re-establish them on their ancient foundation; but the negotiation for this purpose proved ineffectual. The troops of France became jealous of the honours paid to them; the death of Francis II., and the return of Mary to Scotland, at a time when they had much to hope for, were unfavourable to their pretensions; the change of religion in Scotland, and the accession of James VI. to the throne of England, altogether disunited the interests of France and Scotland. The Scotch Guards of France had therefore latterly no connection with Scotland except in name.

Guard-Boat, a boat appointed to row the rounds among ships of war laid up in a harbour or in ordinary, and to observe that their officers keep a good look-out, &c.

Guard-Ship, a vessel of war appointed to superintend maritime affairs in a harbour or river, and to see that the non-commissioned ships have their proper watchword duly kept, by sending guard-boats round them every night.

GUARDAMAR, a town of Spain, province of Valencia, near the right bank of the Segura, 2 miles from the sea, and 20 miles S.S.W. of Alicante. Pop. nearly 3500.

GUARDIA, the name of several places in Spain; of these the principal are—1. La Guardia, a town of New Castile, near the left bank of the Cedron, 30 miles E.S.E. of Toledo. Its manufacturing industry is confined to wine, oil, soap, saltpetre, linens, baize, and serge. The trade consists chiefly in agricultural produce, cattle, and hemp. Pop. nearly 4000.—2. A town in Andalucia, on a rock surmounted by an old fort, near the left bank of the Jaen. The chief manufactures are delft, linens, and shoes; and there is some trade in agricultural produce, and fruits. Pop. nearly 2500.

GUARDIAN, in *Law*, generally signifies one who has the charge of the person, education, and property of children, or of any one labouring under some incapacity for managing his own affairs.

A father is by nature the guardian of his children. On his death the office is devolved on those who may have been appointed by him, or if they decline to accept, the law appoints the nearest relatives on the father's side. The Roman law, in the event of no appointment by the father, generally committed the guardianship of both the minor and his estate to him who, by the death of the minor, would succeed to his inheritance; presuming that he would take the best care of the estate who had the nearest prospect of succeeding to it. But both the law of England and Scotland commit only the care of the estate to the heir-apparent; and, wisely considering that he may not be sufficiently careful of a life standing in the way of his own succession, intrust the custody of the pupil to the mother if alive, or, if dead, to the nearest relatives on the mother's side. Guardians may also be appointed by a stranger for the management of an estate left to the minor by such stranger, or by a judge before whom a suit may depend, in which a father may have an interest adverse to his child; and in all cases where, from any cause, a person cannot manage his own affairs, and his relatives are unwilling or disqualified to act for him, the law, in one form or another, provides a manager or guardian. In these last cases, security, and a strict account of his intromissions, are exacted from the guardian. The guardianship of a father over his minor daughter is at an end when she marries a person who has attained majority—the husband being the guardian of his wife.

Both in England and in Scotland, as by the Roman law, guardians are appointed for the protection of the persons and estates of idiots and lunatics. Guardians for children are distinguished as tutors and curators. The former act altogether in the place of the pupil, who is held incapable of giving consent; and the latter act along with the minor (that is a person past pupilarity, but still under majority), who is not held incapable, though immature. The powers of both of these guardians resemble those of a parent; and may be comprehended in the word administration, or management. They can neither sell their ward's estate, nor alter its succession.

In Scotland, the court, on evidence that a person of full age is of a weak and facile disposition and wasteful habits, will appoint, and such a person may even by his own voluntary act appoint, a guardian, called an interdictor, without whose consent (the public being previously warned in a prescribed form) he can do nothing towards the alienation of his heritable estate. This sort of guardianship can only be removed by the court on evidence, either that it was originally unnecessary, or that the party has become provident of his own affairs; or, when constituted voluntarily, by the consent or death of the interdictor. (M. L.)

Guardian of the Spiritualities, the person to whom the spiritual jurisdiction of a diocese is committed during the vacancy of the see. A guardian of the spiritualities may likewise be either such in law, as the archbishop is of any diocese within his province, or by delegation, as he whom the archbishop or vicar-general for the time appoints. Such guardian has power to hold courts, and grant licenses, dispensations, probates of wills, &c.

Guardian of the Temporalities, one appointed by the crown during such vacancy, to take care of the goods and profits, and to render an account thereof to the Exchequer.

GUARINI, Giovanni Battista, a celebrated Italian poet, was born at Ferrara, on the 10th of December 1537. He studied at the university of Padua, under the direction of his father Alexander, to whom he owed the greater part of his acquisitions in knowledge, and more particularly his taste for poetry. Guarini succeeded his father in the chair of humanity at Ferrara, though then scarcely twenty; but some lyrical compositions already published by him had inspired such hopes of future eminence as fully justified his promotion. Called to the court of the Duke of Ferrara, at that period the resort of men of the first talents in Italy, he there became acquainted with Tasso, who was seven years younger than himself, gained his friendship, and afterwards became his most zealous defender and ardent panegyrist. The duke having knighted Guarini, intrusted him with several important missions to the different courts of Europe; but, during fourteen years that he remained in the service of this prince, he never obtained the slightest recompense, and in the meanwhile had expended the greater part of his fortune. Guarini complained of this; the duke, conscious that his complaints were well founded, became irritated; recrimination ensued, and the poet retired in disgust from court. Some time afterwards, he passed into the service of Emanuel Philibert, Duke of Savoy, and next into that of Vincent, Duke of Mantua; but as, at both courts, he received much praise and no salary, he at length retired to his estate of Guarini, near Reggio. Having lost his wife, he formed a design of taking holy orders, and with this view repaired to Rome. But Guarini had too much ambition to persevere in such a scheme; and, accustomed as he had been to the gaieties of courts, he found himself but little disposed to relish the sweets of retirement. He accordingly returned to Ferrara, and thence proceeded to Florence, where the Grand Duke Ferdinand loaded him with presents and honours. His good fortune, however, was not of long duration. The grand duke, wishing to establish suitably a lady of Pisa to whom he had been attached, induced one of the sons of Guarini to marry her without the knowledge of his father, whose delicacy on the point of honour was well known to him. When the latter was made acquainted with the marriage of his son, his indignation knew no bounds; and, justly offended at the despotic proceeding of the grand duke, he quitted Tuscany without the ceremony of taking leave. But after passing some months with his protectress, the Duchess of Urbino, he became reconciled to the Duke of Ferrara; and in 1603 he was sent by that prince to Rome as ambassador to Pope Paul V. Guarini, however, was constantly the sport of fortune; for, besides the ingratitude of the great, of which he had had painful experience, his life was embittered by domestic misfortunes. He had lost in the flower of her age a wife whom he adored; and his three sons frequently stirred up domestic quarrels about the division of a fortune almost entirely exhausted. But the most severe blow he received was by the tragical death of his daughter Anna. On returning from one of his journeys, he went to visit his beloved child, and when he fondly expected to fold her in his arms, he found only a bloody corpse. She had just fallen a victim to the jealousy of a suspicious and violent husband. But all these misfortunes did not prevent Guarini from occupying himself with his works, the principal of which are, *Il Pastor Fido*, a pastoral tragi-comedy in five acts, and in verse, which passed through forty editions during the lifetime of the author, and by which his name has been rendered for ever famous; *Verrato Primo*, Ferrara, 1588; *Verrato Secondo*, Florence, 1595; *Il Segretario*, dialogo, Venice, 1594, 1600; *Idropica*, a comedy in five acts, and in prose, Rome, 1614. A very beautiful edition of the works of Guarini was published at Ferrara, in 1737, four vols. 4to, with superb engravings, and very beautiful vignettes. The second volume contains the lyrical compositions of the author, some of which are highly esteemed; the fourth is filled with annotations and apologies or defences of the *Pastor Fido*, by different authors. Guarini also left a treatise on public liberty, which reasons of state, however, prevented him from publishing. His death took place at Venice, whither he had latterly retired, on the 6th of October 1612, in the seventy-fifth year of his age. Guarini's claim to the character of a great poet must rest exclusively on his *Pastor*

Fido, which, with all its faults, contains innumerable redeeming beauties, and still maintains its place as an Italian classic. His style, though it wants the purity, sweetness, and elegance, which characterize that of Tasso, is full of rich and sparkling imagery; and his sentiments, if not always natural or just, are seldom deficient in force and vivacity. The greatest blemish of the *Pastor Fido* is its frequent indecency and exceptionable morality. It is no doubt true that Corisco repents towards the conclusion of the piece, and that there is an apparent conformity in this respect to the established rule; but this professed repentance comes only after having displayed a character equally vile and perfidious, and promulgated maxims of the most lax morality. Although the *Pastor Fido* had been represented in all the courts of Italy, and even before popes, yet it was afterwards put into the *Index* by reason of the licentiousness which pervades it, and particularly on account of the passage commencing *Se'l peccar è si dolce e il non peccar si necessario.* But, with all these defects, it is a work of undoubted genius, and will continue to maintain the reputation which it originally acquired for its author. An excellent translation of the *Pastor Fido* into English blank verse was published anonymously at Edinburgh in 1809. (J. B—E.)

GUASTALLA, a walled town of Northern Italy, duchy of Modena, capital of a small district of the same name, on the right bank of the Po, 16 miles N. of Reggio. It is the see of a bishop, and has a cathedral and several other churches, and a public library. Manufactures—chiefly silk fabrics and twist. The French defeated the Imperialists under its walls in 1734. Pop. 10,000. The district of Guastalla formerly belonged to Parma, but since the death of the ex-empress Maria Louisa it has been transferred to Modena.

GUATIMALA, or GUATEMALA, one of the republics of Central America, occupies most of the table-land of Guatimala, with the mountainous district between it and the Gulf of Honduras, besides a portion of the table-land of Yucatan. Its extreme latitudes are 13. 29. and 18. 12. N., and longitudes 88. 10. and 93. 22. W. It is bounded on the N. by the Mexican state of Yucatan, on the W. by Chiapa, on the S. by the Pacific Ocean, S.E. by the Republic of Salvador, E. by Honduras, and N.E. by the Gulf of Honduras, and the British Honduras, or Belize. The total area of Guatimala is about 49,000 square miles. It is divided into seventeen departments, and contained, according to the returns of 1852, a population of 972,000, distributed as follows:—

Departments.	Populations.	Departments.	Populations.
Guatimala	89,500	Totonicapán	84,700
Sacatepec	44,500	Gueguetenango	64,800
Chimaltenango	56,400	Quesaltenango	66,800
Sanmarco	89,100	Chiquimula	73,000
Suchiltepec	36,300	Vera Paz	6,200
Escuintla	15,300	Salamá	109,900
Amatitlan	33,000	Isabel	9,000
Santa Rosa	36,000		
Mita	72,300	Total	972,000
Solola	84,200		

The surface of Guatimala is wholly mountainous, the main chain of the continuation of the Andes traversing it from S.E. to N.W. at an inconsiderable distance from the Pacific shore, and branching off in various ramifications towards the Atlantic; forming many valleys, but inclosing few plains. Along the main chain occur numerous volcanoes, all near the Pacific. The culminating point of the surface is in N. Lat. 15. 30., between the towns of Totonicapán and Gueguetenango. The eastern border of the plateau descending to the Gulf of Honduras is cut by deep valleys, which extend to a great distance, and in some places advance to the very shores. The country lying to the W. and the N.W. of the Golfo Dulce is a low plain, while all between the plateau and the Bay of Honduras is a succession of ridges and valleys. In many places the shore is rocky, with rocky barriers lying off it.

Numerous streams drain this state. The most important are—the Lacantun, forming part of the Mexican boundary; the Motagua and the Polochic, which fall through the Dulce into the Bay of Honduras. The most important lakes are—the Dulce, advantageous for foreign trading vessels; the Amatitlan, 18 miles S.E. of Guatimala, is 9 miles by 3, of great depth, and is much resorted to as a bathing-place by the inhabitants of Guatimala, from February till April; near it there are several mineral and hot springs; the Atitlan, 80 miles N.W. of the city of Guatimala, is about 20 miles long by 9 broad, surrounded by lofty heights, including the volcano of Atitlan, and is remarkable for its very great depth, and being without outlet, though several small rivers enter it; the Paten, near the frontiers with Yucatan, and about 30 miles long, 9 broad.

The climate of the table-land is that of perennial spring, the thermometer scarcely varying throughout the year, and it resembles very much the climate of Valencia in Spain in almost every particular. In the northern part of the state, in what is called *Los Altos*, the highlands, the average is lower than any other part of the country. Snow sometimes falls in the vicinity of Quesaltenango, the capital of this department, but soon disappears, the thermometer seldom remaining at the freezing point for any considerable time. In the vicinity of the city of Guatimala, the range of the thermometer is from 55° to 80°, averaging about 72° of Fahr. Vera Paz, the north-eastern department of Guatimala, and embracing the coast below Yucatan to the Gulf of Dulce, is nearly ten degrees warmer. This coast from Belize downwards to Isabel and San Tome is hot and unhealthy. From May till October is the rainy season. Thunder prevails in June, and terrific storms from the S.W. sweep along the Pacific coast in August and September. Earthquakes are very frequent.

The soil is generally very fertile, producing excellent rice, and all the cereals in great variety and abundance. Agriculture, however, is in a very backward state from the want of enterprise and the ignorance of the people, as well as from the want of roads. As articles of commerce, the most important products are cochineal and indigo. Cotton, cacao, sugar, vanilla, tobacco, and coffee, are grown in considerable quantities. The table-land is almost destitute of trees and even bushes, except on the declivities of the hilly ranges which so extensively traverse it. Trees of very large size form extensive forests on the lower lands along the Pacific. These are a source of great natural wealth. Among the trees the most valuable are the cedar, mahogany, Brazil, Santa Maria, pimento, guaiacum, &c.; and abundance of medicinal plants are also found and turned to some account. The vegetation is luxurious and vigorous along the low tract by the Bay of Honduras. Sheep are reared in considerable numbers, especially over the northern districts, and their wool is used for native manufactures. The horse is small, hardy, and handsome; and mules are numerous, being the chief beasts of burden. Pigs and poultry are very abundant, and of excellent quality.

Salt is manufactured along the coast of the Pacific. Jasper, marble, and brimstone, are obtained in considerable quantity in the vicinity of some of the volcanoes. Lead is worked by the Indians in Totonicapán. The manufactures are mostly limited to those for domestic use. The cotton manufacture, once extensive, is now confined to the departments of Guatimala and Sacatepec. Coarse woollen cloth is now more manufactured, especially *gerga*, which is made into a peculiar black called *poncho*, in which much taste is displayed.

Besides cochineal already noticed, the most important exports are woods employed in cabinet work; sarsaparilla, vanilla, and other medicinal roots and plants; hides, sugar, coffee, and cotton, in small quantities. The imports consist chiefly of wines, fancy goods, earthenware, porcelain, cutlery, hardware, silk and linens, dry goods, and British cotton.

The inhabitants of Guatimala are a mixture of native Indians, Europeans, and Negroes. The natives of negro blood are principally along the N.E. coast, and in Amatitlan. With the exception of certain portions of the indigenous Indians, or northern portions of Guatimala, the people of this state are characterized by all the vices that degrade the inhabitants of Central America.

Guatimala received its name from the Mexican word *quauhtemali*, "a decayed wooden log," because the Mexican Indians who accompanied Alvarado found near the palace of the kings of Kachiquel an old worm-eaten tree, and gave this name to the capital. In the mouth of a Spaniard the pronunciation became *guatimala*. Others have derived the name from the Tzendale word *uhatezmalha*, "a water volcano," in allusion to the mountain on the skirts of which the city of Guatimala was built. Another still less probable etymology is that from *coctecmalan*, "milk-wood," a peculiar tree found only in the immediate vicinity of the original capital, where now stands the village of Tzacualpa. Still another is from the name of *Guitemal*, the first king of Guatimala, as Quiché was named from Namaquiche, and Nicaragua from the cacique of the same name.

The principal part of Guatimala was conquered in 1524 by Alvarado, who found above thirty different tribes in possession of the country, each governed by its own chief, and using distinct languages and customs. The Pipil Indians still speak the Aztec or Mexican language, and dwell on the Pacific shores. Besides this there are above twenty different dialects used in the republic; but many of these are so similar that one tribe with little difficulty understands another. According to a tradition related by the historian Juarros, the Toltec Indians, the most civilized and powerful of the tribes of Guatimala, came originally from Tula in Mexico. This emigration is said to have been undertaken by the direction of an oracle in consequence of the great increase of the population in the reign of Namaquiché (*i. e.*, "Quiché the Great"), the fifth king of the Toltecas. Namaquiché V. died during their wanderings, and was succeeded by his son Acjopil, from whom Kicab-Tanub, the contemporary of Montezuma II., was the fourteenth in succession who reigned in Utatlan, the capital of Quiché, which stood near the Lake Atitlan, and was so named in honour of Quiché the Great, who had died during their perilous and tedious wanderings southwards. None of the Spanish settlements were conquered with so little bloodshed as that of Guatimala; and this was mainly owing to the celebrated Dominican Las Casas, who accompanied the conquerors in their expedition into this territory. In 1524 Alvarado founded the city of Guatimala; and in 1542 a chancery and royal *audiencia* were established in this city, with authority over all the settlements and provinces from the southern boundary of Costa Rica to the northern limit of Chiapas. Hence this city became the residence of the governor and captain-general. Till his death in 1541 Alvarado had exercised authority over the Spanish settlements from their subjugation in 1524, during four years under Cortez, and subsequently by direct delegation from the Crown. In 1742 the bishopric of Guatimala, which was established in 1534, became metropolitan, and was invested with authority over the suffragan bishoprics of Nicaragua, Chiapas (and Comayagua in Honduras). At this time the kingdom of Guatimala consisted of the aggregate of the settlements and districts; and under the Spaniards it formed a captain-generalship independent of the other governments and viceroyalties of Spanish America. During the fifteenth and sixteenth centuries Guatimala was severely harassed by the Dutch and English privateers, and by the inroads of the Poyaise and Mosquito Indians, who freely permitted the English to settle along their coast, while they maintained an unrelenting struggle with the Spaniards. On the 21st September 1821 the country became an independent state, and united itself with the Republic of Mexico; but again, on 1st July 1823, it became a separate government, and eventually the confederation of the five states of Guatimala—Salvador, Honduras, Nicaragua, Costa Rica, with the territory of Mosquitia—was formed. In 1846, however, this confederation was dissolved; and Guatimala, as well as each of the rest, became independent. Of late, attempts have again been made to renew the confederation, but, owing to political jealousies, without any definite result. The country has long been kept in a state of constant agitation, industry has been neglected, civil wars have been rife, and every effort to improve the condition of the inhabitants has been frustrated. Under a united system of government this country would rise into one of incalculable importance and influence. It possesses all the elements of prosperity in the resources and advantages with which nature has so richly and profusely invested it.

According to the constitution of October 19, 1851, the executive is in the hands of a president, elected by a general assembly, composed of the legislative chamber, the Archbishop of Guatimala, the members of the supreme court of justice, and the members of the council of state. The legislative assembly consists of fifty-nine members; and the president is elected for four years, but is eligible to be re-elected. The council of state is composed of the ministry, eight councillors chosen by the legislative assembly, and of others appointed by the president. The revenue and expenditure are about L.50,000, and the debt now amounts to L.240,000.

The principal cities in this republic are New Guatimala, the capital; Old Guatimala, Totonicapau, Quesaltenango, Chiquimula, Salamá, Flores, &c.; and the chief ports are Isabel, or Golfo Dulce; San Tomé, on the Bay of Honduras; and Istapá, on the Pacific.

The antiquities of Central America have recently been partially investigated by travellers, and are beginning to yield some fruits. The most prolific of the states, as yet, is Guatimala, which is now (1856) being examined by a judicious and experienced antiquarian, the Abbé Brasseur de Bourbourg, who resides as *cura* at Rabinal in Vera Paz, one of the least known of the departments of Guatimala. He is there in direct relationship with the native Indians of that district, which has longest resisted the advances of European civilization, and in which the aborigines have probably retained most of their primitive traditions, customs, and religious ideas. Between Vera Paz, Yucatan, and Chiapas, there lies a wide tract of country, drained by the great river Usumasinta, and inhabited by the unconquered tribes of the Lacandones, Manches, Choles, &c., all belonging to the great Tzendal or Maya family, who built the now ruined temples of Yucatan, and reared Palenque and Copan. This region is full of extensive ruins and imposing monuments; and the Abbé Brasseur de Bourbourg is here earnestly prosecuting his researches under most favourable circumstances. His object is to reach the lake of Peten, or Itza, so well known from the early chronicles as the stronghold of the warlike Itzaecs. The islands of this lake are covered with ruins, of which imperfect accounts have been given to the public by Colonel Galindo. But so little is yet known of this country that it has not been ascertained by Europeans whether this large lake discharges itself north into the Gulf of Mexico, or east into the Bay of Honduras, or, indeed, if it have an outlet at all. The documents brought to light by the Abbé de Bourbourg must prove of great value in elucidating the aboriginal history of America. These consist of a copy of the *Kachiquel grammar del Padre Flores*, containing a comparison of the Kachiquel with the Quiché and Zutugil, "the three metropolitan languages," which are all dialects of a single stock; the original MS. of Ximenes, of which only a part is copied in that of Ordoñez; *The Ancient History of Quiché* in Spanish and Quiché; a MS. *History of Guatimala of Vera Paz*, in Spanish, with numerous details on the astronomy and religion of the natives. And beside these, a separate history of Vera Paz; another of San Salvador; and another of the rebellion of the Tzendals, with a magnificent copy of the *Tonalamatl*, or Calendar of the Indians of Quiché, as still secretly used by the Indians of Santa Catalina Ixtahuacan, have been obtained by this indefatigable Abbé. But the most precious of his acquisitions is a MS. in the Kachiquel language, written about 1550 A.D., by one of the princes of Sololá, near the Lake of Atitlan; this he is rendering into French and Spanish; and it is full of details of the immigration of the Indians into these countries, their early sufferings, the valorous conduct of their chiefs, of the four Tulas that existed, &c. The abbé has visited two ancient cities full of large ruins; they are called Zamaneb or Cakyug, and Tzak-Pokomá. These he discovered by means of a *bayle* or dramatic dance, recited to him by a native Indian, a descendant of the ancient chiefs of Vera Paz. The facts of this *bayle* agrees with Ximenes, and also with the Kachiquel MS. already mentioned.

The best writers on Guatimala are,—Bernal Diaz del Castillo, *Historia Verdadera de la Conquista de Mexico*, 1632; Herrera, *Historia General de los Hechos de los Castellanos en los Islas y Tierra*

Ferme del Mar Oceano, Madrid, 1601; Alcedo's *Geographical Dictionary of Spanish America*, by —— Thompson, London, 1810, but at Madrid, 1786–89; Haefkin, *Centraal Amerika;* Juarros, *Guatimala*, which garbles the facts preserved in the MS. of Ximenes; Humboldt's, Thompson's, Byam's, and Dunn's Travels; Baily's *Central America*, which is accompanied with a good map, and is the most recent and reliable source of information up to this time (1856).

GUATIMALA, *la Antigua*, a city of Central America, in the republican state of Guatimala, and about 27 miles W.S.W. from Guatimala la Nueva. It stands in a wide and fertile valley, at an elevation of 5820 feet above the sea-level. The place was abandoned after the earthquake of 1773, which partially destroyed it; but it now contains a population of nearly 20,000. There is collected here a considerable quantity of cochineal; and there are some insignificant manufactories. The city is regularly laid out, but a great part of it is still in ruins. Prior to the earthquake the population amounted to about 60,000.

GUATIMALA, *la Nueva*, the capital of the republic of Guatimala, in Central America.[1] Its situation is in N. Lat. 14. 36., and W. Long. 90. 30., at the extremity of a plain 22 miles in length by 7 in breadth, with a deep ravine on three sides, and elevated above the sea 4970 feet. The form of the town is quadrangular; and the streets are wide, straight, and clean. On account of the frequency of earthquakes the houses are only one story in height. The Plaza or Great Square measures about 150 yards on each side, and is surrounded on three sides by colonnades. Here are the principal buildings in the town—the cathedral, archbishop's palace, the old royal palace, the *College de Infantes*, and the various government offices. In the centre stands a large and elegant fountain. The town is well supplied with water brought by pipes from the mountains upwards of two leagues distant. Besides the cathedral, there are 26 other churches and chapels; and, besides the plaza, several other squares, each with a fountain in the centre. At the south side of the city there has recently been erected a fort mounting 20 guns. There are several private schools in Guatimala; and several printing establishments, whence two weekly newspapers are issued.

Thompson, in his *Official Visit to Guatimala*, states that "the mean heat" of the city of Guatimala "during the day, from the 1st of January to the 1st of July is 75° of Fahr., at night 63°. In the summer months the average may be taken at ten degrees higher." Fruits, vegetables, provisions, and all articles of ordinary consumption are abundant, at moderate prices, while many descriptions of British manufacture are as cheap as in Britain. The manufactures are muslins, gauze, cottons, earthenware, porcelain, jewellery, cigars, &c.

The inhabitants are courteous and hospitable to strangers, but live very much apart from each other, their only recreation being their incessant religious processions. The suburbs are occupied mostly by ladinos (mulattoes) and Indians. The buildings of this city were begun in 1776, three years after the fearful earthquake of 1773, which completely destroyed Old Guatimala, the former capital. The population is variously estimated from 35,000 to 50,000.

GUAVA, the fruit of the *Psidium pyriferum* and *P. pomiferum*, nat. ord. Myrtaceæ, the pulp of which is made into a jelly of a peculiarly delicious flavour. This sweetmeat is imported in considerable quantities from the West Indies.

GUAYAQUIL, the name of a department, province, city, river, and gulf, in the republic of Ecuador, South America. The department is bounded on the west by the Pacific, and on the other sides by Peru and the departments of Ecuador or Quito and Assuay. The great chain of the Andes forms its eastern boundary. The chief products are cacao, cotton, maize, tobacco, and various kinds of fruits. Area, 26,238 square miles. Pop. estimated at 132,000. It is divided into the provinces of Guayaquil and Manabi, the capitals of which are Guayaquil and Puerto Viejo. Guayaquil, the capital of the above department, and the chief commercial town of the republic, stands on the right bank of the river of the same name, which is here about 2 miles wide, in S. Lat. 2. 12., W. Long. 79. 39. It extends about 2 miles along the river, and is divided into an old and new town; the former stands higher up the river, and is entirely inhabited by the poorer classes. Guayaquil is very unhealthy, which may be sufficiently accounted for from its low, level site, without drainage, the marsh immediately behind it, and the effluvia arising, especially in hot weather, from the mud left exposed to the action of the sun by the receding tide. There is also a deficiency of fresh water, the river being brackish for a considerable distance above the town. None of the public buildings are remarkable for architectural beauty; and the houses are generally of only one story, and built of wood. Vessels of considerable burden can come up to the town, as the tide at full and change rises 24 feet. Foreign goods are imported in considerable quantities, and sent up the river in balzas to Babayhoyo or Caracol, whence they are carried on the backs of mules to the valleys of Ambato and Quito; and almost all the native products exported are sent from this port. It has a dry dock; and several vessels of a superior construction have been built here. Cacao is the principal article of export, and next to it are straw-hats, hides, timber, tobacco, bark, &c. The chief articles of import are British manufactured cottons and hardware, silks, wine, flour, &c. In 1851, 181 vessels, of 16,051 tons entered and cleared at the port; the cargoes in the former case were valued at L.274,700, in the latter at L.287,800. Guayaquil is subject to frequent and terrific earthquakes. Pop. about 28,000. The Guayaquil River is the principal in Western Ecuador. It is formed by the union of numerous streams from the Andes, and becomes navigable for commercial purposes at Babayhoyo or Caracol, 70 or 80 miles from its mouth—river boats ascending to one or other of these places according to the season. Below Guayaquil the channel is impeded by numerous rocks and small islands, while at its mouth is the larger island of Pana. Where the river falls into the Pacific it is known as the Gulf of Guayaquil, the extreme points of which are 70 miles apart.

GUAYMAS, a seaport-town of Mexico. See MEXICO.

GUAYRA, LA, the principal seaport-town of the republic of Venezuela, province of, and 11 miles N.N.W. of Caracas. It is in an unhealthy situation, and is closely surrounded by high mountains and rocks. The chain of mountains which separates it from the high valley of Caracas descends almost directly into the sea; and the houses of the town are backed by a wall of steep rocks, leaving scarcely 100 or 140 fathoms' breadth of flat ground between this wall and the sea. The town is poorly built, and contains no edifice worthy of notice. The port is unsheltered, but has good anchorage in from 6 to 30 fathoms, and is well defended by land batteries. Its chief exports are coffee, cocoa, indigo, and hides, with some cotton and sugar. Pop. about 8000.

GUBBIO, or EUGUBIO (the ancient *Iguvium*), a city of the Papal States, delegation of Urbino, and 27 miles S. of the town of that name. It is pleasantly situated at the foot of the Apennines, and is well built. Among its fine edifices are the ducal palace, cathedral, and several churches. Gubbio, however, derives its chief interest from the celebrated Eugubian tables which were found near this, in

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[1] A city of this name was founded by Don Pedro de Alvarado in 1524, about 27 miles W. of the present city, near the town of Guatimala la Antigua, and was destroyed in 1541 by enormous masses of water bursting forth from the neighbouring volcano which was henceforth called Volcano de Agua.

1444, among the ruins of an ancient temple, and are now preserved at Gubbio. (See Eugubian Tables.) Pop. 8000.

GUBEN, a walled town of Prussia, capital of a cognominal circle in the government of Frankfurt, and province of Brandenburg, on the Neisse, which is here navigable, and on the Berlin-Breslau railway, 27 miles S.S.E. of Frankfurt. It is the seat of the courts of justice for the circle, and of a board of horticulture; and has a gymnasium, a public library, and manufactures of woollen cloth, linen, hosiery, leather, &c. It carries on a considerable trade in cattle, wool, and agricultural produce. Pop. (1849) 11,448.

GUDGEON, in *Mechanics*, the pin inserted in the end a horizontal shaft for its support, and on which it turns.

Gudgeon, a species of cyprinus. See Ichthyology.

GUEBRES, Guebers, Gaurs, or Gavres (*i.e.*, "giaour," or infidel), terms used in the East to designate the Fire-worshippers, a very ancient religious sect in Persia, who derive their origin from the immediate followers of Zoroaster. In India, where a colony of this sect has long been established along the western coast, they are called *Parsees*, a name indicative of their origin. Many of these have acquired great wealth and distinction, particularly at Bombay. The characteristic feature in this religion is the worship of fire, which the *Behendie* (*i. e.*, "followers of the true faith"), as they designate themselves, profess to regard as symbolical of the Supreme Power, which, as imaged in the sun, quickens, vivifies, and blesses all things; or, in other words, as the emblem of Deity. Their sacred books are termed the Zend-Avesta, the authorship of which is ascribed to Zoroaster, though it is unquestionably a spurious production. For an exposition of the leading tenets of this sect, see Zend.

The Fire-worshippers of Persia at the present day are nearly confined to the city of Yezd, and some towns in Kerman. They are a mild and inoffensive race, industrious, and temperate. They drink wine, eat all kinds of meat, and eschew polygamy, which is specially prohibited by their religion, except in cases of hopeless sterility, when a second wife is admissible. They have a singular mode of disposing of their dead, by exposing the bodies upon the towers of their temples, to be devoured by birds; and, from observation of the part first preyed upon, they draw inferences as to the fate of the deceased.

GUELDERLAND, or Gelderland, a province of Holland, lying between N. Lat. 51. 45. and 52. 32., and E. Long. 4. 57. and 6. 47.; and bounded on the N.W. by the Zuider-Zee, N.E. by the province of Overyssel, E. by the Rhenish provinces of Prussia, S. by Limburg and North Brabant, and W. by South Holland and Utrecht. It is 88 miles in length from E. to W., and its greatest breadth is 54 miles. Area, 1962 square miles. The surface is generally level, but not so flat as in most of the other provinces of Holland, and some parts of it might even be said to be hilly. The soil in the cultivated parts is good, but a considerable portion of it is either sandy down or covered with heath. The principal crops are wheat, rye, potatoes, hops, and tobacco. The pasturage is excellent, and orchards are very numerous. The principal rivers are the Rhine, the Waal, the Yssel, the Leck, and the Maas, besides which there are several smaller rivers and canals. It is traversed by the railway from Amsterdam to Arnheim. The inhabitants are chiefly employed in agriculture, but some manufactures are also extensively carried on, as of leather, paper, and linen. The province is divided into four arrondissements—Arnheim, Nimeguen or Nijmegen, Zutphen, and Thiel. The capital is Arnheim. Pop. (1854) 390,512.

GUELDERS, or Geldern, a town of Rhenish Prussia, government of Düsseldorf, on the Niers, 26 miles N.W. of Düsseldorf. Pop. 3974. It was the capital of the old duchy of Guelders, which subsequently formed part of the duchy of Burgundy; and by the peace of Utrecht one part was ceded to the republic of the Netherlands and the other to Prussia.

GUELPH, Order of, or Royal Guelphic Order, a Hanoverian order of knighthood, founded in 1815 by the Prince Regent, afterwards George IV. It consists of grand crosses, commanders, and knights; and is both a civil and a military distinction. It is sometimes styled colloquially the "*Order of Merit.*"

GUELPHS, or Guelfs, the designation of a powerful party in the middle ages, which, in Germany, and at a later period in Italy, opposed the German emperors and their adherents, who were called Ghibelins. The wars of the Guelfs and Ghibelins became the struggle between the spiritual and secular power—the Guelphs standing for the Pope, and the Ghibelins for the Emperor. These factions filled Italy with bloodshed for nearly 300 years.

The rise of the Guelphs is referred by some to the time of Conrad III. in the twelfth century; by others to that of Frederick II.; and by others, again, to that of his successor, Frederick III., in the thirteenth century. The name of *Guelph* is commonly said to have been formed from *Welfe*, or *Welfo*. The Emperor Conrad III. having taken the duchy of Bavaria from Welfe VI., brother of Henry, Duke of Bavaria, Welfe, assisted by the forces of Roger king of Sicily, made war on Conrad, and thus gave birth to the faction of the Guelphs. Some derive the name *Guelfs* from the German *Wolff*; and others deduce it from the name of a German called *Guelfe*, who lived at Pistoia; adding, that his brother, named *Gibel* or *Ghibel*, gave his name to the Ghibelins. See Ghibelins.

GUERANDE, a town of France, department of Loire Inférieure, arrondissement of Savenay, about 3 miles from the sea, 23 miles W. of Savenay. It occupies the slope of a hill, is surrounded by walls, and commanded by an old castle. The chief manufactures are woollen and cotton stuffs; and large quantities of salt are procured from salt marshes in the vicinity. Pop. 8550.

GUERCINO. See Barbieri.

GUERICKE, Otto Von, a highly distinguished experimental philosopher, was born at Magdeburg in 1602; died at Hamburg in 1686. It is to him that we owe the first construction of the air-pump, afterwards improved by Boyle. (See Pneumatics.) He was also the first to prove the force of the pressure of the atmosphere, by applying to each other two hemispheres of brass, from which he exhausted the air, and which sixteen horses were unable to pull asunder. These experiments are all detailed under Pneumatics. Guericke's observations on these subjects, and also on astronomy, which he had studied with care and success, were published under the title of *Experimenta Nova, ut vocat. Magdeburgica, &c.*, Amsterdam, 1672.

Guericke's personal character seems to have been a highly amiable one. He was held in high esteem by his fellow-citizens, who elected him burgomaster. He was also honoured with the title of Counsellor to the Elector of Brandenburg.

GUERNSEY, one of the islands in the English Channel, belonging to Britain, and lying between N. Lat. 49. 24. and 49. 33., W. Long. 2. 32. and 2. 48. It is situated in the Bay of St Michael, 30 miles W. of the coast of Normandy, 52 miles S. of Portland, the nearest point of land to England, and 15 miles W.N.W. of Jersey. It is of a triangular form, is 9 miles in length, by from 3 to 4 in extreme breadth, and has an area of about 16,000 acres. The northern part of the island is a low level tract, but towards the S. the land becomes more elevated and hilly, with deep and narrow valleys and glens intervening. It has about 30 miles of coast deeply indented with commodious bays and harbours; on the N. side low and flat, on the S. bold and precipitous. Off the coast are numerous sunken rocks and crags, which, together with the rapid currents among them, causing the tides frequently to rise to the height of 32 feet, render the approach extremely hazardous to strangers. The geological formation of the island is almost entirely granite, the prevailing rocks being gneiss, granite, and sienite. These are extensively quarried in several parts, and are sent in large quantities to Portsmouth, London, and other places. Some trap-rocks and micaceous schist occur on the western side of the island. It is tolerably well watered with springs and clear gravelly streams. The climate, though moist and subject to sudden changes, is not unhealthy. The winters are mild; and the summers, though hot, are less oppressive than on the neighbouring coast of France, or even than in the S.W. of England. Snow is rare, and the frosts are neither severe nor continuous. The mean winter temperature is about 41° 62′, that of summer 60° 7′. The thermometer seldom rises above 80°, or falls below 37°. Easterly winds prevail during spring, and westerly during the rest of the year. Guernsey is not equal in fertility to Jersey, neither is it so well wooded; but fruit-trees are numerous, especially the fig and apple. From the fruit of the latter much cider is made. Agricultural improvement is much retarded by the very small size of the farms, arising from the custom of each son sharing equally in his father's landed property. Few of them are exclusively devoted to agriculture, but generally carry on also some other profession or trade. Farms most generally vary in size from 5 to 12 acres, and very few of them exceed 30. The chief of the agricultural productions are wheat, barley, potatoes, and parsnips. Sea-weed is the principal manure in use. Oranges, melons, and other fruits, which in England require shelter, grow here in the open air. Flowers are also extensively cultivated, among which is the Guernsey lily. The people devote their attention greatly to the rearing of cattle and the dairy. The cows are much esteemed, and the butter is excellent. The native breed of horses is poor, but it has been much improved of late years. Hogs are numerous, and of great size, but few sheep are reared or fattened. Guernsey is divided into ten parishes, and its chief town is *St Peter Port*. The trade of Guernsey is very inferior to that of Jersey, and has greatly decreased since 1807, when it was made subject to our revenue laws, previous to which time its trade had chiefly consisted in smuggling. Steamers ply between Guernsey and London, Southampton, Plymouth, and Weymouth. The imports are British manufactures, wheat, flour, wines, sugar, coffee, &c.; exports—cider, apples, potatoes, cattle, granite, and wine. Guernsey and the rest of the Channel Islands came to England with the duchy of Normandy, and are now all that remain to the English Crown of that possession. The inhabitants are simple and thrifty in their habits, and still retain many of their ancient customs. Their language is the Norman French of some centuries ago, though English is very generally understood among the upper classes. The government of the island is vested in the hands of the states, composed of the bailiff, the procureur or attorney of the royal court, twelve jurats, eight rectors of parishes, and the constables of parishes, one from each of the country parishes, and six from the town parish—in all thirty-seven. The bailiff and procureur are nominated by the crown, the rectors by the governor, while the constables are chosen by the inhabitants. The "Royal Court," the supreme court of justice, consists of a bailiff appointed by the crown, and twelve jurats elected by the people. Guernsey, with Alderney and its other dependencies, in 1851 had 64 places of worship, of which 16 belonged to the Church of England, 7 to Independents, 6 to Baptists, 26 to various classes of Methodists, 2 to Roman Catholics, and the rest to minor bodies. The total number of sittings was 23,827. There were 115 day schools, of which 28, with 2477 scholars, were public, and 87, with 1994 scholars, private; and 33 Sunday schools, with 4315 scholars. Pop. (1851) of Guernsey, 29,757; of adjacent islands, 3962.

GUESCLIN, Bertrand du, Count of Longueville, constable of France under Charles V., was born at the castle of Lamotte-Broon, near Rennes in Brittany. His birth, the exact date of which is not known, is variously assigned to the years 1314, 1318, and 1320. At the proper age he was put under the care of a tutor; but he had little taste for learning, and it was found impossible to teach him either to read or write. But in all manly games and exercises he displayed a most precocious dexterity; and at the tournament given at Rennes in 1338, on the occasion of the marriage of Jeanne-la-Boiteuse with Charles of Blois, he was eleven times victorious, and gained the great prize of the day, which he presented to the friend who had lent him the arms and horses he had fought with. He grew up strong and tall, but ill-made, and, as he himself said, so ugly, that he knew he would never please the ladies; "but," he added, "I shall make myself dreaded by the enemies of my king." Entering on the military career, he distinguished himself by many deeds of chivalrous daring against the English, who had at that time overrun the fairest provinces of France; and when the battle of Poitiers threw King John into the hands of Edward of England, he alone upheld the fortunes of his country, and checked in many places the victorious progress of the foe. Du Guesclin's next great exploit was the defeat of the allied forces of England and Navarre at the famous battle of Cocherel, on the banks of the Eure. For this achievement, which established Charles V. on the throne, Du Guesclin was made Comte de Longueville and Maréchal de Normandie. His usual good fortune, however, was clouded towards the close of this same year (1364), by a sad disaster. At the battle of Auray in Brittany, he was taken prisoner by the English under the redoubtable Sir John Chandos. After peace was restored between France and England, Du Guesclin, who had been ransomed for 100,000 crowns, was once more free to serve his country. An opportunity was not long wanting. A great number of French and English adventurers whom the peace had thrown out of employment had joined their forces, and under the title of *Les grandes Compagnies*, were laying waste the richest provinces of France. Du Guesclin, who had been commissioned by Charles V. to get rid of them either by violent or by gentle means, induced them to take service with him against the Moors, whom he professed himself anxious to drive out of Spain. His real motive, however, was to help Henry of Transtamare, who was then at issue with his brother Peter the Cruel for the throne of Castille. As the "compagnies" were passing Avignon, they demanded from the Pope, then living there, a reversal of the sentence of excommunication, formerly pronounced against them, and a black-mail of 200,000 florins. The Pope refused to grant either request; but when he saw the "compagnies" laying waste the country, and carrying their devastations into Avignon itself, he gave them his blessing and half the required amount of gold. Du Guesclin, without difficulty, placed his friend, Henry of Transtamare, on the throne of Castille; but the dethroned Don Pedro invoking the assistance of the Black Prince, once more took the field, and in the engagement which followed, Du Guesclin's army was annihilated. Seeing resistance useless, he surrendered to his noble captor, saying, "J'ai du moins la gloire de ne remettre mon épée qu' au plus vaillant prince de la terre." When the subject of his ransom was mentioned, "I am but a poor knight," said Du Guesclin. "Then I shall only ask you for a hundred francs, or less, if you choose," said the chivalrous Englishman. Du Guesclin, however, declining to rate himself so meanly, offered 100,000 gold florins. "It is too much," said the Black Prince, "and if it be true that you are a poor knight, whence will you get the means?" "The kings of France and Castille are my friends," said he, "and will not allow me to want for anything; and there are, besides, a hundred Breton chevaliers who would sell their lands to make up the sum." He was no sooner free than he took the field again in the interest of Henry, routed and slew Don Pedro; and after many bloody encounters with the Moors, seated his friend securely on the Castillian throne. His last exploit in the service of France was to drive back the English from the walls of Paris, which they had threatened; and he afterwards re-annexed to the French crown many places that had long groaned under the English yoke. He failed, however, in some enterprises in Brittany; and his enemies having maligned him to the king—who was foolish enough for a moment to doubt the honour of the warrior who had saved France and his throne—Du Guesclin, stung by the affront, resolved to quit his country and seek an asylum with his friend Henry of Castille. On his way into exile, he found his old brother-in-arms, Saucerre, engaged in the siege of Randam. The governor of the town, reduced to the last extremity, offered to surrender, if he were not relieved within fifteen days. In this interval Du Guesclin fell sick and died (July 13, 1380), and the next day the governor of Randam, marching out of the town at the head of his garrison, laid the keys of the gate on the breast of the dead knight.

The name of Du Guesclin is still held in veneration by the French. His bravery, his gentleness, his generosity, and his modesty, have all contributed to make him one of the most popular heroes of France. His name is generally associated with that of Bayard, as the two last examples of all knightly virtues and accomplishments.

GUIANA, GUYANA, or GUAYANA, an extensive territory in the north-eastern part of South America, comprehending in its widest acceptation all that extent of country lying between the rivers Amazon and Orinoco, between Lat. 3. 30. S., and 8. 40. N., and Long. 50. 22., and 68. 10. W. It is bounded on the N. by the Orinoco and the Atlantic, E. by the Atlantic, S. by the Amazon and the Rio Negro, and W. by the Orinoco and the Cassiquiare. Its greatest length from E. to W. is about 1200 miles, and its greatest breadth about 850 miles; estimated area 700,000 square miles. This vast territory is divided into Brazilian (formerly Portuguese) Guiana, Venezuelan (formerly Spanish) Guiana, and Colonial Guiana. The two former, comprising about five-sixths of the entire region, are now included within the limits of their respective countries; while Colonial Guiana is that to which the general term of Guiana is now commonly applied. It is subdivided into British, Dutch, and French Guiana.

GUIANA, *British*, the most westerly of the three colonies, is bounded on the N. and N.E. by the Atlantic, E. by Dutch Guiana, from which it is separated by the River Corentyn, S. by Brazil, and W. by Venezuela. It lies between N. Lat. 0. 40. and 8. 40., and W. Long. 57. and 61., and has an estimated area of 76,000 square miles; but the possession of much of this has been disputed by Brazil and Venezuela. It is divided into three counties, Demerara, Essequibo, and Berbice, so named from the three principal rivers which drain them. Demerara, situated between the other two, occupies the centre of the seaboard for nearly 90 miles. To the N.W. the county of Essequibo stretches along the coast towards the swamps and forests of the western frontier; and to the S.E. lies the county of Berbice.

The entire coast of British Guiana is low, and generally bordered with a sandy flat extending far out to sea, so that vessels drawing more than 12 feet of water cannot approach within 2 or 3 miles of land. The rivers, too, deposit at their mouths large quantities of mud and sand, and are thus inaccessible to vessels of large size. Extending from low-water mark to a distance of 5 or 6 miles inland, is a tract of rich alluvial soil of recent formation. This is succeeded by a flat narrow reef of sand running exactly parallel with the present line of coast. Here remains of stranded vessels and anchors eaten through with rust have been found, indicating that within a comparatively recent period it had been washed by the waves of the Atlantic. Running parallel to this reef, at irregular distances, varying from 10 to 20 miles, is a second and higher range, composed of coarse white sand; and which at a period more remote probably formed the sea-limit. In the wet seasons the intermediate tract between these two reefs becomes the bed of extensive savannahs; for the creeks being then unable to carry off the torrents of rain which fall, overflow their level banks, and inundate the surrounding country to the depth of 5 or 6 feet. On the return of dry weather the waters gradually subside, leaving behind them a thick layer of decayed grasses and aquatic plants which had floated and flourished on their surface, and these in time produce a vegetable mould of considerable thickness. Beyond the second reef are swampy plains, intersected by sand-reefs, and extending to the mountainous regions of the interior. The high land does not rise immediately from the plain to a great elevation, but begins with a range of sand hills of from 50 to 200 feet above the plain. Behind these the high land stretches out in level or undulating plains, rising here and there into eminences. About N. Lat. 5., a mountain chain, an off-set of the Orinoco Mountains, and composed of granite, gneiss, and other primitive rocks, runs from W. to E. through this territory, forming large cataracts where it is crossed by the rivers, and rising frequently to the height of 1000 feet above the sea. About a degree farther south is the Pacaraima chain, which, in like manner, runs from W. to E., and is of primitive formation. Its highest point, called by the natives Roraima, in N. Lat. 5. 9. 30., W. Long. 60. 47., is 7500 feet above the level of the sea. The plains south of this range are in general level, and form extensive savannahs, covered with grasses and plants. The Sierra Acarai is a densely-wooded chain of mountains, forming the southern boundary of Guiana, and the watershed between the basins of the Amazon and the Essequibo. This chain rises to the height of 4000 feet. The Conocou or Cannucu Mountains, running S.E. and N.W., connect the Pacaraima with the Sierra Acarai.

The principal river of British Guiana is the Essequibo, which rises in the Sierra Acarai, and after a course of at least 600 miles, discharges itself into the ocean by an estuary 20 miles in width, in N. Lat. 7., W. Long. 58. 40. In the estuary of the Essequibo are a group of beautiful islands partially cultivated, the principal of which are Varken or Hog Island, about 21 miles in length by 3 in breadth, Wakenaam and Leguan, each about 12 miles by 3, and Tiger Island, about half that size. The entrance is difficult and dangerous, even for vessels of small size, on account of the banks of mud and sand. Its course lies through forests of the most gigantic vegetation. In N. Lat. 3. 14. 35., it forms a great cataract, named by Schomburgk, King William's Cataract. In N. Lat. 3. 57. 30., and W. Long. 58. 3., it receives the Rupunoony, which has a course of about 220 miles. At various points of its course it forms rapids and cataracts which impede its navigation. About 60 miles from its mouth occur the last of these, the Falls of Etabally, after which it pursues its course through the low alluvial plain. In this part of its course it receives the united waters of the Cuyuni and the Massaroony. The Demerara or Demerary rises probably near N. Lat. 5., and after a northward course, nearly parallel with the Essequibo, of more than 200 miles, it enters the Atlantic near N. Lat. 6. 50., W. Long. 58. 20. It is navigable for 85 miles, and at its mouth at Georgetown it is more than a mile and a half across. Farther east runs the Berbice, whose source is probably about N. Lat. 3. 40. It joins the Atlantic by an estuary 5 miles in width, 10 miles N. of New Amsterdam, and in

N. Lat. 6. 21., W. Long. 57. 12. It is navigable for 165 miles from the sea, by vessels drawing 7 feet water. The Corentyn which forms the eastern boundary of British Guiana, and probably has its source in the Sierra Acarai, flows generally northward and falls into the Atlantic in N. Lat. 6., W. Long. 57. It is navigable for boats for 150 miles. The mineral productions of Guiana are necessarily but imperfectly known. Clays of various kinds, including excellent pipe-clay, are found near the coast. The chief rocks are granite, porphyry, gneiss, clay-slate, sandstone, &c. Traces of iron are found in various parts; and gold has been recently (in 1852) discovered in considerable quantities on the Upper Essequibo.

The climate of Guiana is more healthy than that of most places in the West Indies. Its salubrity has been much increased since the occupation of the country by Europeans, the gradual clearing and cultivation of the surface having done much to mitigate those diseases so fatal in a low, marshy, and hot region. The hurricanes so destructive in the West Indies are unknown here, and gales are unfrequent. Thunder-storms occur only during the rainy seasons, but like the few occasional shocks of earthquakes, are not attended with danger. The year is divided into two wet and two dry seasons. The long rainy season sets in about the middle of April, when light showers begin to fall. The rain increases till the middle of June, when it falls in torrents; in the beginning of July these heavy rains begin to decrease; and in August the long dry season begins, and continues till November. December and January constitute the short rainy season, and February and March the short dry season. The winds during the rains are generally westerly; in the dry season they blow mostly from the ocean, loaded with moisture, and thus render the heat less oppressive than it would otherwise be. The thermometer seldom rises above 90°, and rarely falls below 75° Fahr. The mean annual temperature at Georgetown is 81° 2′; the total annual fall of rain averages about 100 inches.

The vegetation of Guiana is most luxuriant. The interior is thickly wooded with valuable timber, with the exception of the swamps of Berbice and the savannahs. The trees are of great size, and many of them are valuable for their timber or their fruits, or as dyewoods. Medicinal plants, including quassia, gentian, the castor-oil plant, and many others, are abundant. Arnotto, so extensively used in the colouring of cheese, grows wild in profusion on the banks of the Upper Corentyn. That largest of the water lilies, the *Victoria Regia*, was first discovered here by Mr Schomburgk on the banks of the Berbice. The *hai-arry*, an indigenous plant deserving of notice, is a papilionaceous vine, the root of which contains a powerful narcotic, and is commonly used by the Indians in poisoning the waters to take the fish, which are not thereby deteriorated.

The domestic animals are the same as those in England, and the wild animals are those common to tropical South America generally. Black cattle here attain a larger size than in Europe, but their flesh is not so tender nor so fine flavoured. The wool of the sheep is converted into hair. Game, chiefly deer, range the upper savannahs. Tigers, little inferior in size to those of Asia, but different in character, being rarely known to attack man, abound; as do also jaguars, which prey upon the herds of wild cattle and horses that graze on the extensive plains among the mountains. Among the other animals are the tapir, armadillo, agouti, ant-bear, sloth, and a great variety of monkeys. Lizards, snakes, and alligators are numerous. There are several kinds of parrots, mackaws, and humming-birds; also the flamingo, Muscovy duck, toucan, spoonbill, and vampire bat. Troublesome insects are numerous, as might be expected from the swampy nature of the coast districts. The rivers and coast abound with a great variety of fish.

The cultivated portion of British Guiana is merely a narrow strip along the sea-coast, and for a few miles up the rivers, including a portion of the islands of Essequibo. The whole surface of the coast lands being on a level with high-water mark, when these lands are drained and cultivated they consolidate and become fully a foot below it, so that the estates require to be protected from inundation by dams and sluices. Each estate has therefore a strong dam or embankment in front; while a similar erection at the back or inland boundary, as well as on each side, is requisite to keep off the immense body of water accumulated on the savannahs during the wet seasons, and which, if not repelled, would rush down to the sea, carrying everything before it. The state of his dams, therefore, requires the planter's unremitting attention; not the slightest hole or leakage is allowed to exist in them, and by law their wilful injury is considered felony. One inundation destroys a sugar estate for eighteen months, and a coffee one for six years. "The original cost of damming and cultivating is fully paid by the first crop, and the duration of the crops is from 30 to 50 years; so that though great capital is required for the first outlay, the comparative expense of cultivation is a mere trifle compared with that of the West India Islands, notwithstanding that the expense of works, buildings, and machinery may be treble or quadruple, being built on an adequate scale for half a century of certain production." (*Geog. Jour.*, vol. iv., 323.) Inside and at the foot of these dams are trenches 12 to 18 feet wide, and 5 feet deep, running round the whole plantation, and into these, smaller trenches and open drains convey the water that falls upon the land. These large trenches discharge their contents into the sea through one or more sluices, which are opened as the tide ebbs, and shut against the returning flood.

The staple productions of the colony are sugar, coffee, and cotton. From an official table of the exports of British Guiana from 1826 to 1851, we find that in 1827, 15,904 bales of cotton were exported; but from that period this cultivation gradually gave place to sugar, and in 1844 ceases to appear in the table as an article of export. Since 1851, however, it seems to have received more attention, for among the exports from British Guiana into the United Kingdom in 1854, we find 1093 cwt. of cotton. Coffee, from upwards of 9,500,000 lbs. in 1830, gradually fell off to only 3198 lbs. in 1851. As to sugar, making a due allowance for the difference of seasons, the quantity exported remained pretty steady from 1826 to 1837, the year preceding the termination of the apprenticeships,—averaging about 66,000 hogsheads; but in the year following that event it fell down to nearly half its former average, being in 1839 only 3827 hhds. In 1846 it had sunk as low as 26,201 hhds., owing in a great measure to a protracted drought through a great part of that season. In 1851, 43,034 hhds. were exported. In proportion to the sugar obtained the quantity of molasses is large, owing partly to the defects of the common process of preparation, but chiefly to the fact that the soil is so rich an alluvium, and so abundant in alkaline and earthy saline matter. Little of the molasses is boiled down into sugar in the colony; it is chiefly made into rum, or sold to the refiners, by whom it is much prized. In 1851 the quantity of molasses exported was 9530 puncheons. Although the rum produced in this colony does not equal in character that of Jamaica, it yet occupies a respectable place in the market. The quantity exported in 1851 was 15,848 puncheons. With respect to the cultivation of the sugar cane, by reason of the lowness of the land and the plan of drainage in use—namely, that known as the open-drain and round-bed method—the system of cultivation remains exactly as in the times of slavery, every part of the operations of culture being performed by manual labour. The plough and other implements have been tried, but cannot succeed in effecting a cheap and effective tillage till a system of covered drainage is resorted to. It is said that "were the system of drainage improved so as to admit of cattle and implemental labour, and were a mixed system in which the rearing and feeding of cattle formed a part, and a judicious system of manuring adopted, there is good reason to believe that three times our present return would be secured, and at little greater cost than the present." Among its other cultivated products are Indian corn, rice, tobacco, indigo, yams, sweet potatoes, and arrowroot. According to the governor's report for 1851, "the revenue has been flourishing, population augmenting, education spreading, crime diminishing, and trade increasing." The commercial state of the colony is still flourishing. In 1853 the value of imports from Great Britain was L.456,803; from British colonies, L.134,817; and from foreign countries, L.255,563—being in all L.847,183. Exports to Great Britain, L.958,616; to British colonies, L.26,856; to foreign countries, L.29,472—in all, L.1,014,944. Shipping, tonnage of, in 1853: inwards, from Great Britain, 42,815; from British colonies, 50,579; from United States, 17,822; and from foreign states, 13,772—in all, 124,988: outwards, to Great Britain, 49,339; to British colonies, 28,323; to United States, 5814; to foreign states, 25,630—in all, 109,106. In 1854 the computed real value of exports to Great Britain was L.1,636,267; of imports therefrom, L.492,646—of which L.460,867 was the computed real value of the manufactures and produce of the United Kingdom. The exports to Britain in 1854 included sugar, 898,240 cwt.; molasses, 39,035 cwt.; rum, 3,360,920 gallons; and coffee, 3664 lb. The revenue in 1853 was L.250,017, being L.32,002 above that of 1852; and the expenditure, L.236,557, or L.9487 above that of the previous year.

The constitution of Guiana still retains many traces of its Dutch origin. The government is vested in a governor and a court of policy; the latter composed of ten members, five being government officers (the governor, chief-justice, colonial secretary, attorney-general, and collector of customs), and five elected from the colonists by the College of Justice. This college is composed of seven members chosen for life by the inhabitants possessing the right of suffrage. The unofficial members of the court of policy serve for three years, and go out by rotation. The general legislative business is carried on by the court of policy, but it has no power of imposing taxes, that being reserved for the "combined court," composed of the court of policy and six representatives, termed "financial representatives," chosen by the people for two years, and who are annually summoned to "combine" with the court of policy for the purpose of transacting the financial business of the colony. In the combined court every member, whether a representative or a member of the court of policy, has an equal vote. The governor not only has a casting vote as president of the court of policy, but an absolute veto on all laws passed by a majority. The qualification for seats in the two legislative chambers are of four kinds; either, 1st, ownership of 80 acres of land, of which 40 must be in cultivation; or, 2dly, ownership of houses or land worth 1200 dollars per annum; or, 3dly, a leasehold interest in one or other of these, and to the same amount for a term of at least 21 years; or, 4thly, the possession of an income from any other source of 1440 dollars clear. Neither ministers of religion nor schoolmasters can, however, be chosen for either of the chambers. For electoral purposes the colony is divided into five districts. Electors must be in possession of an income of 600 dollars, or pay 20 dollars per annum of direct taxes, with some other minor qualifications.

The supreme civil court consists of a chief judge, two puisne judges, a secretary, registrar, and accountant. The supreme criminal court is composed of the three civil judges and three assessors chosen by ballot. The colony is also divided into nine judicial districts, each under the charge of a stipendiary magistrate appointed and removeable only by the secretary for the colonies, assisted by unpaid justices holding their commissions from the governor. Courts are held in each district two or three times a week.

The population of British Guiana is composed of aboriginal tribes and foreign settlers. The aborigines consist of six tribes of Indians, a copper-coloured, lank-haired race, and evidently members of the one great family which is spread over the entire continent of America. When slavery existed these were found useful allies and auxiliaries of the planters in capturing runaway negroes who had taken refuge in the "bush." They still enjoy British protection from the officers charged with the superintendence of rivers and creeks, who, while they look after the rights of the crown on ungranted lands, at the same time prevent acts of oppression or injustice on the part of the woodcutters and squatters towards the native Indians; and also, as far as possible, all quarrels among the different tribes and families. Nor is their spiritual welfare neglected. Numerous schools and missions have been established by the bishop for their instruction in the remotest parts of his diocese.

The census taken on 31st March 1851 gives the following results:—

	Demerara.	Essequibo.	Berbice.	Total.
Natives of British Guiana	51,044	15,776	19,631	86,451
Natives of Barbadoes............	3,644	794	487	4,925
Natives of other W. I. Islands...	2,756	1,077	520	4,353
African Immigrants	6,336	3,368	4,547	14,251
Madeirans	6,204	1,301	423	7,928
British, Dutch, & Americans...	1,486	269	320	2,088
Coolies from Hindostan	4,284	2,332	1,066	7,682
Unknown..........................	...	8	9	17
Total.........	75,767	24,925	27,003	127,695

The population of Georgetown, the capital (25,508), and of New Amsterdam (4633), are included in Demerara and Berbice respectively. Under the head Natives of British Guiana are comprised 2000 aborigines living near the cultivated parts of the territory; those beyond the settled districts are estimated at 7000.

Religion was here in a very neglected state till 1827, when British Guiana was included in the see of Bishop Coleridge; and shortly after this it was divided into parishes. In 1838 an archdeaconry was constituted, and there were then 13 clergymen of the Church of England in the colony. In 1842 the number had increased to 28, and the colony was erected into a bishopric, with a salary of L.2000 per annum attached. In 1851 there were 112 churches and chapels in British Guiana; of these 41 belonged to the Church of England, 15 to the Church of Scotland, 19 to the London Missionary Society, 15 to the Wesleyans, 6 to the Plymouth Brethren, 3 to the Roman Catholics, and 12 to other bodies. The numbers connected with each denomination were—Church of England, 39,787; Church of Scotland, 11,664; Wesleyans, 8438; London Missionary Society, 15,502; Roman Catholics, 9938; dissenters, whose denominations not ascertained, 13,639; Hindus and Mohammedans, 7037; not given, 21,710. The number attending public worship, by the religious census of 1851, was 33,034; of whom 10,210 were of the Church of England. The schools in the colony in 1852 connected with religious bodies, were 118; other schools, 32; the number of enrolled scholars, 10,877.

It is generally believed that this portion of South America was discovered by Vicente Yanez Pinzon, a Spanish navigator, in 1499. In 1580 the first settlement was formed by the Dutch on the rivers Pomeroon and Essequibo, and they afterwards established themselves in other places. The English began to form settlements about 1630 in the neighbourhood of the rivers Berbice and Surinam. Most of Guiana, however, remained in the hands of the Dutch till

1796, when it surrendered to the English. It was restored to the Dutch in 1802; but was again taken by the English on the breaking out of the war in 1803, and has since remained in their possession. In 1831 Demerara, Essequibo, and Berbice were formed into one colony, under the name of British Guiana. In 1834 slavery ceased in the colony, but parliament at the same time decreed that the negroes should undergo an apprenticeship—handicraftsmen and domestic servants for four years, and agricultural labourers for six. The inconvenience and trouble resulting from this system was so great that in 1838 an ordinance was passed by the local legislature discharging from their apprenticeships all those who by the imperial act were liable to serve for a further period of two years. The number of slaves for whom compensation was claimed was 82,824; and their value, according to an appraisement based on the average sales of the eight preceding years, was L.9,489,559. The amount of compensation actually paid was L.4,494,989. The imperial weights and measures were, by an ordinance passed in 1851, substituted for the Dutch weights and measures formerly in use.

(See R. H. Schomburgk's *Description of British Guiana*; Various articles in the *London Geographical Journal*; *Parliamentary Reports*; *Demerara after Fifteen Years of Freedom*, by a Landowner; Martin's *British Colonies*; *Reisen in Britisch Guiana*, von Richard Schomburgk; *The History of British Guiana, comprising a general description of the Colony, its climate, geology, staple products, and natural history*, by H. G. Dalton, M.D., 2 vols., London, 1855.)

GUIANA, *Dutch*, or *Surinam*, lies between British and French Guiana, being separated from the former on the W. by the River Corentyn, and from the latter on the E. by the Maroni; on the N. it has the Atlantic, and on the S. Brazil. It lies between N. Lat. 1. 30. and 6., and W. Long. 53. 30. and 57. 30., being about 300 miles in length from N. to S., and 260 in extreme breadth. Area, about 38,500 square miles. In physical geography, climate, productions, &c., it differs but little from British Guiana. The principal river is the Surinam, which flows northward through the centre of the territory, and falls into the Atlantic after a course of nearly 300 miles. It is navigable for large ships for about 4 leagues from its mouth. Along the coast and on the banks of the rivers are many settlements and plantations; and the higher parts of the country are occupied chiefly by the Maroons, the descendants of runaway negroes. In the last century they were very troublesome to the colonists, but they have now adopted more settled habits. Slavery has been recently abolished here by the Dutch government, but, in lieu of compensation, the slaves remain apprenticed and work without wages to their proprietors for twelve years. The colony is ruled by a governor appointed by the crown, and a council elected by the freeholders. Justice is administered by a supreme court, courts of minor jurisdiction, and a court of inheritance and orphans. The receipts in 1850 amounted to L.89,485; the expenditure to L.85,564. On 273 plantations, consisting of 366,548 acres, 48,815 acres were under cultivation. The chief productions are sugar, rum, molasses, coffee, cacao, and cotton. Its chief trade is with Holland. Imports in 1851, L.171,395; exports, L.236,162. At the close of 1850 the colony numbered 61,080 inhabitants—of whom 12,401 were Europeans and creoles, 8000 bush negroes, 1000 Indians, and 39,679 slaves. Of the religious sects, the Moravians amounted to 17,933, and the Jews to about 680. The live stock consisted of 168 horses, 59 mules, 5564 cattle, 3155 sheep, 454 goats, and 4664 hogs. The army consists of 610 men of all arms; and the navy of 11 vessels, chiefly small. Paramaribo, the capital, is situated on the right bank of the Surinam, about 10 miles from its mouth. It is built in the Dutch style, with wide and straight streets planted with orange trees; and the houses are generally two storeys in height, and built of wood. Pop. about 20,000. A little north of the town is the fort of Zeelandia, where the governor resides, and where are also most of the government establishments.

GUIANA, *French*, is the smallest and most eastern of the three colonies. It lies between N. Lat. 2. and 6., and W. Long. 51. 30., and 54. 30.; being bounded on the N. and N.E. by the Atlantic, E. and S. by Brazil, and W. by Dutch Guiana. It is about 250 miles in length from N. to S., and varies in breadth from 100 to 150 miles. Area, 27,560 square miles. It has a coast line of 200 miles, extending from the Maroni to the Oyapoc. The low alluvial tract along the coast is of great fertility. The mountain chains run E. and W., and are almost wholly of granite, but do not attain a great elevation. The country is abundantly watered; and the coast-lands appear to be less unhealthy than in British Guiana. The island of Cayenne, at the mouth of the Oyak, is about 30 miles in circumference, and is separated from the continent by a narrow channel. The roadstead at the mouth of the Oyak, though small, is the best on the coast, having everywhere from 12 to 13 feet of water. The capital, Cayenne, is situated on the northern side of this island, and contains 5220 inhabitants. The new town is well built, and has good streets; the government house is in the old town. The harbour is protected by a fort and several batteries. The colony is divided into two districts, Cayenne and Sinnamary, and fourteen communes. The government is vested in a governor, a privy council, and a colonial council composed of sixteen members elected by the colonists. The cultivated lands are estimated to be about $\frac{1}{80}$th of the whole territory. Besides the staples of British and Dutch Guiana, its productions comprise pepper (including Cayenne, which is so called from the island of that name), cloves, cinnamon, and nutmegs. Trade is chiefly with France and its colonies. In 1854 the official value of the imports into France from French Guiana was L.20,000; exports, L.192,000. The French first settled in Cayenne in 1604; the British and Portuguese captured the colony in 1809, but restored it to the French in 1814, in whose possession it still remains. It has recently been made a place of banishment for French political offenders, and in 1852, 2500 of these were sent out. Pop. about 22,000, of whom about 15,000 are emancipated slaves.

GUIBERT, JACQUES-ANTOINE-HIPPOLITE, Count de, a well-known writer on tactics, was born at Montauban, on the 12th of November 1743. Before he had completed his fourteenth year, he accompanied to Germany his father, who acted as major-general to the army commanded by Marshal de Broglie; and he served, either as captain in the regiment of Auvergne, or as an employé in the staff, during the six campaigns of the war of 1756. He also displayed great zeal in raising and training the Corsican legion, of which he was appointed colonel-commandant in 1772. The year following he published his *Essai Général de Tactique*. But not wishing to abide, in his own country, the explosion which such a work was calculated to produce, he set out for Germany, which opened to him a vast field of instruction. He repaired to Prussia, and although a species of celebrity had preceded him, he had still considerable difficulties to encounter. Among these were certain prepossessions of Frederick, who judged severely the theoretical attainments and views of the young tactitian, and who besides was not by any means satisfied with Guibert's views of the Prussian system. With this view he addressed a letter, in explanation and in defence, to the Prussian monarch, who was so well pleased with the composition that he received the writer with particular distinction. Ever since the year 1772 Guibert had conceived the design of also entering on the career of literature; and, from year to year, after his return from Prussia, compositions of his, either in the shape of tragedies, or of panegyrics on the great men of France, procured him much reputation in the *salons*, where they were generally read by the author. He was, however, recalled to his original occupation, by the appointment of the Count de Saint-Germain to the department of war; and having been honoured with the confidence of that minister, he had the rare merit of not abandoning him in his disgrace. In 1776 he was made colonel-commandant of the regiment of Neustrie; in 1782, brigadier-general; in 1788, *maréchal-de-camp*, or major-general; and next inspector of infantry in the province of Artois. In 1787 he was appointed member and reporter of the council of administration in the department of war. But as Guibert, in the discharge of his functions, combined his own peculiar ideas with those which the deliberations of the council rendered common, the whole appeared to emanate from the reporter, whose proper duty it was merely to give expression to the views of the council; and it was consequently against him that all the complaints and accusations of the discontented were directed. We have already seen that no species of ambition was foreign to Guibert. Accordingly, in 1789, he aspired to become a member of the states-general of the kingdom, and thereby prepared for himself the bitterest mortification which he had ever yet experienced. His pretensions, both as a military man and a writer, had provoked censure, and even excited hostility. He was accused of having attempted to subject officers to imprisonment in irons; proposed to introduce the cane as an instrument for chastising the common soldiers; and recommended the detestable barbarity of hamstringing deserters. Guibert replied by a most formal denial of these imputations, but met with no credit; and in the assemblage of the bailliage of Bourges, the people went so far as to refuse him a hearing. Inconsolable at this injustice, Guibert retired from public life; and, after a short illness, died on the 6th of May 1790, in the forty-seventh year of his age.

His works are,—*Essai Général de Tactique*, already mentioned, Liège, 1773, in one vol. 4to, and two vols. 8vo; *Eloge de Catinat*, Edinburgh (Paris), 1775, in 8vo; *Connétable de Bourbon*, a tragedy; *La Mort des Gracques*, a piece in three acts; *Anne de Boulen*, the best of his dramas; *Eloge Historique de Michel de l'Hôpital, Chancelier de France*, 1777; *Défense du Système de Guerre Moderne, ou Réfutation complète du Système de M. de Mesnil-Durand, par l'auteur de l'Essai Général de Tactique*, Neufchâtel, 1779, in two vols. 8vo; *Discours de reception à l'Académie*, 1786; *Eloge du Roi de Prusse*, London (Paris), 1787, in 8vo; *Letter addressed to the National Assembly, in the name of the Abbé Raynal*, Marseilles, 1789, in 4to; *Traité de la Force Publique*, Paris, 1790, in 8vo, the last production which he acknowledged; *Journal d'un Voyage en Allemagne fait en 1773 par Guibert*, Paris, 1803, in two vols. 8vo; *Œuvres Militaires de Guibert*, published by his widow, Paris, 1803, in five volumes 8vo; *Voyages de Guibert dans diverses parties de la France et en Suisse, faits en 1775, 1778, 1784, et 1785, ouvrage posthume*, Paris, 1806, in 8vo; A volume of *Eloges*, including that of *Claire-Françoise de l'Espinasse*, Paris, 1806, in 8vo.

But of all the works of Guibert, that by which he is best known is his Essay on Tactics, so often quoted and referred to under the head ARMY. (J. B—E.)

GUICCIARDINI, FRANCISCO, a celebrated Italian historian, was born at Florence in 1482. His ancestors had held the most distinguished offices in the Florentine republic. Simon Zanuccio Guicciardini was gonfalonier of justice in 1302; his grandfather, an able politician and a great warrior, beat the Genoese near Sarzano in 1412, and defeated the troops of Sixtus IV. in 1478; and Pietro, the father of the historian, acquired a great reputation by his talents for the conduct of public affairs. Francisco Guicciardini was originally intended for the bar, to which he was at length called; and so great was his success that, at the age of twenty-three, he became professor of jurisprudence at a time when all the chairs in Italy were occupied by the ablest jurisconsults. His inclination, however, leading him to public affairs, he quitted his chair, and in 1512 was appointed ambassador to Ferdinand king of Aragon. Having succeeded in gaining the favour of that prince, he thus secured a powerful protector to the Florentine republic. Pope Leo X., a discriminating judge of real merit, called Guicciardini to his court, loaded him with honours, and named him governor of Modena and Reggio, at the same time conferring on him unlimited powers. In this capacity he also served under the pontificate of Adrian VI.; nor did his firmness, his beneficence, and his equity, fail to secure him the attachment of the people over whom he had been placed. But as Romagna was dreadfully distracted by the irreconcilable factions of the Guelphs and Ghibelins, Clement VII., on succeeding to Adrian VI., sent thither Guicciardini, who in a little time re-established tranquillity in that unhappy country, caused the most rigid justice to be enforced, founded useful establishments, opened new roads, and ultimately rendered himself the idol of all parties. Being afterwards appointed lieutenant-general to the Holy See, he acquired much glory by his defence of Parma, when besieged by the French; and after the death of Giovanni de' Medici, the Florentine republic chose him to succeed that famous captain in the command of the black bands, the *élite* of the Italian troops. But as Clement VII. required a man of tried ability and courage, he obtained the consent of the Florentines to retain Guicciardini some time longer in his service. The city of Bologna was about to escape from the domination of Rome; the senate had raised the standard of revolt; the great family of the Pepoli openly aspired to the supreme power; the vindictive passions were indulged without restraint, and assassinations multiplied. Guicciardini, in the capacity of governor, presented himself in this city, whither his renown had preceded him. His severe deportment, his activity, his eloquence, tranquillized the people, disarmed the senate, and deprived the Pepoli of all hope of obtaining the object they had in view. By his talents, prudence, firmness, and justice, Bologna, which would otherwise have been lost for ever, was saved to the patrimony of St Peter. After this expedition, Guicciardini, notwithstanding the entreaties of Clement, returned to his own country, where he lived in retirement, being wholly occupied with the composition of his history, which he commenced about the end of 1534. But this did not prevent him from rendering the most important services to Florence. His counsels moderated the prodigality and ambition of Alessandro de' Medici; and, at the suggestion of Naples, he effected an advantageous arrangement between this prince and Charles V. Alessandro having been assassinated in 1536 by one of his near relatives Lorenzino de' Medici, Cardinal Cibo immediately assembled the council, when it appeared that all the other members were inclined for a republican government. But Guicciardini perceiving that by this means the country would become a prey to civil war, declared in favour of a monarchical government; and as his persuasive eloquence at length overcame the predilections of the council, Cosmo de' Medici was proclaimed sovereign of Florence. From this moment, Guicciardini took no further concern in public affairs; and after having passed four years in study and retirement, he died in May 1540.

The memory of this able and excellent person is endeared to men of letters by his *History of Italy*, Florence, 1561, in folio, or two vols. in 8vo. The original edition, though much sought after, is incomplete; that of Venice, 1567, in 4to, is augmented by four books, viz., from seventeen to twenty inclusive; and that of Venice, 1738, in two vols. folio, has, besides, a life of the author by Manni, with a fragment containing some passages previously inedited. But the first complete edition is that of Friburg in Brisgau (Florence), 1775, 1776, in four vols. 4to, printed from an autograph manuscript in the Magliabecchi library, under the auspices and care of the canon Bonso Pio Bonsi, who has supplied the defects of former editions, and otherwise discharged his editorial duties with fidelity and talent. The most correct and complete edition is that by Professor

Rosini of Pisa, 10 vols. 8vo, 1819–20, prefaced by an essay on Guicciardini's life and writings. The history has been translated into English by Chevalier Austin Parke Goddard, 10 vols. 8vo, Lond., 1753–61. The *History of Italy* commences in 1490, and terminates in the month of October 1534. It consists of twenty books, sixteen of which are, in the opinion of the best critics, of superior merit; but the last four are little more than draughts of memoirs, death having prevented the author from bestowing on them all the care and attention which the subject required. The historian commences by giving an exposition of the tranquil condition of Italy before the breaking out of the troubles which desolated its finest provinces. He then proceeds to describe the bloody wars which the French carried on in that country, under three successive kings. By these the face of Italy was almost entirely changed; the popes aggrandized themselves by the ruin of several petty states; Naples and Milan, torn from their respective princes, recognised the domination of Charles V.; and Genoa, which had thrown itself into the arms of France, recovered its liberty under the protection of the same monarch, who, on the other hand, gave a sovereign to the republic of Florence. If, in this revolution, the greater part of the princes of Italy maintained themselves, they owed their preservation to their own weakness, and a timely submission to a conqueror whom fortune seemed to lead on, by rapid strides, towards universal monarchy. Such, in a few words, is the grand spectacle presented by the *History of the Wars in Italy*, a production which has immortalized the name of Guicciardini. The hatred of vice, which breaks out in every page of his work, satisfies the reader as to the probity of the historian, who was, moreover, concerned in most of the events which he relates, and performed a brilliant part both in the cabinet and in the field. His style, sometimes nervous and sublime, sometimes lively and rapid, always noble, perspicuous, and appropriate to the subject, fixes the attention and hurries along the mind of the reader. His reflections, equally judicious and profound, show the wise republican, the able politician, the enlightened philosopher; as the friend of humanity and justice, he unsparingly attacks the abuses of the sovereign power, and vindicates that virtue which the great so often profane for the gratification of their interests and passions. He has left us faithful portraits of the celebrated men of his time; he has represented with equal genius and accuracy the force and manners of the nations which figure in his history; and he has made us acquainted with the real interests of the princes of his time, as well as with the origin of those jealousies which then divided the powers of Europe. Guicciardini has been reproached with the length of the harangues which he puts into the mouths of his characters; but these he has enriched with so much eloquence, with thoughts so new and profound, with images so just and striking, that they are always interesting, and never felt as impeding the progress of his narrative. He has also been accused of prejudice against the French; yet he never exaggerates their losses in battle; and Father Daniel, in his history, has merely copied the narrative of Guicciardini. If the latter, like several French authors, has traced an unfavourable portrait of Charles VIII., he has, on the other hand, done ample justice to the equity and the virtues of Louis XII., the valour and prudence of La Tremouille, and the brilliant qualities of Gaston de Foix and Francis I.; whilst, in speaking of the Italian and French militia, he always declares in favour of the latter. These, and other facts of a similar description, which might easily be produced or referred to, are sufficient to show that the charge of partiality is groundless, and that what has been mistaken for prejudice is nothing but the severity of truth. Guicciardini is also the author of *Advice and Counsel in matters of State*, Antwerp, 1527, in 8vo.

GUICCIARDINI, *Luigi*, nephew of the preceding, was born at Florence, in the year 1523. He held different employments under Alessandro de' Medici and his successor Cosmo II.; then he travelled, and remained a long time at Antwerp, where he obtained the favour of the Duke of Alva; but having reflected on this general's system of government, in a work which he published (*Memoirs*), he was thrown into prison, whence he was liberated only through the intercession of the Grand Duke of Tuscany. The remainder of his life presents no event worthy of notice, and seems to have been chiefly passed in the composition of his works. These are *Memorie*, &c., or Memoirs of what passed in Savoy from 1530 to 1565, Antwerp, 1565, in 4to. *Raccolta dei Detti e Fatti notabili*, 1581, in 8vo; *Descrizione*, &c., or Description of the Low Countries, Antwerp, 1567, in fol.; *Ore di Recreazione*, Florence, 1600, in 12mo. Luigi Guicciardini died in 1589.

GUIDO ARETIN. See ARETINO.

GUIDO RENI, one of the most famous and distinguished painters of the Italian school, was born at Bologna in 1575. He was trained first by Denis Calvart (see CALVART), and finally by the Caracci; but having had the misfortune to excite the jealousy and suspicion of the latter, he deemed it expedient to remove to Rome, where he studied specially Raffaelle and Caravaggio, whose works had the strongest influence in moulding his yet unformed style. A commission from the Pope Paul V., was among the first earnests of his future distinction; but as he had great difficulty in getting payment for his work, he quitted Rome in disgust, and retired to his native town, where he extended his already wide reputation. He afterwards returned to Rome, where he seems to have contracted habits of gambling and dissipation. To repair his losses, he seems to have begun the practice of painting swiftly and carelessly; but his spirits gave way, and he sank into a sort of lethargy, from which nothing could rouse him. He died in great poverty in 1642. Guido's personal beauty was so striking, that when in the *atélier* of the Caracci, he often sat to Ludovico, whose favourite pupil he was, as a model for an angel. His own pieces are distinguished by a grace, lightness, elegance, and delicacy, that will secure for him a lofty niche in the artistic temple of fame. For a detailed criticism of his works, see PAINTING; and Lanzi's *Storia Pittorica della Italia*.

GUIDONES, a company of priests established by Charlemagne at Rome, to conduct and guide pilgrims to Jerusalem, to assist them if they felt sick, and to perform the last offices to them if they died.

GUIENNE, or GUYENNE, an old province in the S.W. of France, the capital of which was Bordeaux. In 1790 it was divided into the departments of Gironde, Landes, Dordogne, Lot, Aveyron, and Lot-et-Garonne.

GUIGNES, JOSEPH DE, a learned orientalist, born at Pontoise on the 19th of October 1721, was, in 1736, placed under the celebrated Fourmont by his cousin M. le Vaillant, professor in the university. Being endowed with the happiest dispositions, and directed by an able master, he, in a short time, acquired a knowledge of Chinese, and of the different idioms of the East. When Fourmont presented to the king his Chinese Grammar, in the year 1742, the young De Guignes accompanied him, and was received in the most flattering manner by the monarch, who immediately conferred on him a pension. On the death of his master, which took place in December 1745, De Guignes succeeded him at the Royal Library in the office of secretary-interpreter of the eastern languages. The Memoir on the Origin of the Huns having given the learned world a foretaste of the talents and erudition of De Guignes, he was admitted a member of the Royal Society of London in 1752, and an associate of the Academy of Belles-Lettres the following year. About the same time he was also appointed royal censor, and attached to the *Journal des Savans*. These different favours were the just recompense of the important labours in which M. de Guignes was engaged. The first two volumes of his History of the Huns appeared in 1756; and in 1757 the chair of Syriac in the Royal College having become vacant by the death of Jault, De Guignes was appointed to succeed him. Upon this occasion he pronounced a Latin discourse, the principal object of which was to prove, what certainly needed little demonstration, that the kings of France were much more friendly to letters than the princes of Asia. In 1769 he became keeper of the antiquities in the Louvre, and, in 1773, pensionary of the Academy of Belles-Lettres; in 1774 he resigned the chair of Syriac, not choosing to consent to the re-union of the Royal College with the university; and, lastly, in 1785, he was named one of the committee appointed by the academy for the publication of Notices of Manuscripts. The Revolution did not deprive De Guignes of his pensions, which, notwithstanding his great labours, had never been demanded by him; but it deprived him of his moderate allowance as pensionary of the academy, keeper of antiquities in the Louvre, and redacteur of the *Journal des Savans.* Faithful to his principles, and to the cultivation of letters, however, he made no remonstrance, declined accepting any favour, and consoled himself for the sufferings of his country, and the personal privations he experienced, by applying with greater assiduity to his favourite pursuits. These he continued, without intermission, until his death, which took place at Paris on the 19th of March 1800. De Guignes left a son, who had been consul at Canton, and who, on his return to France, published an account of his voyage in three volumes 8vo, and a Chinese Dictionary. The following is a list of the printed works of the father :—

Abrégé de la Vie d'Etienne Fourmont, with a notice of his works, Paris, 1747, in 4to; *Mémoire Historique sur l'Origine des Huns et des Turcs,* Paris, 1748, in 12mo; *Histoire Générale des Huns, des Turcs, des Mogols, et des autres Tartares occidentaux, avant et depuis J. C. jusqu' à present,* preceded by an introduction containing historical and chronological tables of the princes who have reigned in Asia, Paris, 1756, 1758, in five vols. 4to; *Mémoire dans lequel on prouve que les Chinois sont une colonie Egyptienne,* Paris, 1759, 1760, in 12mo; The *Chou-king,* or sacred book of the Chinese, with a translation corrected from that of Father Gaubil, and most useful notes, Paris, 1770, in 4to; An edition of the *Eloge de Monkden* and of the *Art Militaire des Chinois,* 1770, 1771; Twenty-eight papers in the *Mémoires of the Academy of Inscriptions.* These papers or memoirs may be divided into three classes; the first of which has for its object to develope more fully various points which are only treated cursorily in the History of the Huns; the second includes the papers intended to establish his system of the Egyptian origin of the Chinese; and the third comprehends those of a miscellaneous character, such as the memoir on the commerce of the French in the Levant before the Crusades, that on the Oriental Zodiac, and observations on the origin and antiquity of the Indians, as well as on the geography of their country. Besides the works mentioned above, De Guignes left several manuscripts, particularly, *Notices d'Ecrivains Arabes; Mémoire sur le Commerce des Chinois avec les Russes; Histoire de la Chine,* translated from the Chinese Annals, and divided into three parts; *Mémoires Historiques et Géographiques sur l'Afrique, d'après les auteurs Arabes.* Such were the works which occupied the life of this scholar. Considered as a learned man, he may be said to have possessed vast knowledge, and to have employed it in the most useful manner. Although he cannot be called an elegant writer, his style is easy and clear; and even the paradoxes which he defended prove, by his ingenious approximations and original views, that he was endowed with a lively imagination and extraordinary sagacity.

In his history, the object of De Guignes was to collect facts rather than to digest them according to a rigorous chronology; and the disorder which, in this respect, reigns in his work, proceeds partly from the multitude of sources whence he derived his information, and partly from the vice of the oriental writers amongst whom the irregular method of computing dates renders it impossible to restore the precise chronology of events. On this ground the writers in the *Journal de Trevoux* attacked the History of the Huns. De Guignes replied to this criticism, in a letter inserted in the *Journal des Savans* for 1757, and also at the end of the fifth volume of his History. The journalists rejoined; and the dispute terminated by a note appended to the same volume, in which the author refers to the *Annales Chinoises.* The History of the Huns has been translated into German by Daenhert, who appears to have done ample justice to the original. (J. B—E.)

GUILD (from the Saxon *guildan,* to pay), signifies a fraternity or company, because every one was *gildare,* that is, had to pay something towards the charge and support of the company. As to the origin of guilds or companies in Britain, it was a law among the Saxons that every freeman of fourteen years of age should find sureties to keep the peace, or be committed. This led to the formation among neighbours of associations, each consisting of ten families, which became bound for one another, either to produce him who committed an offence, or to make satisfaction to the injured party; and that they might the better do this, they raised a sum of money amongst themselves, which they put into a common stock, and when one of their pledges had committed an offence, and fled, then the other nine made satisfaction out of this stock, by payment of money, according to the offence. Because this association consisted of ten families, it was called a *decenary*; and hence arose other kinds of fraternities. But as to the precise time when these guilds had their origin in England there is nothing certain to be found; since they were in use long before any formal license was granted to them for such meetings. It seems to have been about the close of the eleventh century, according to Anderson (*History of Commerce,* vol. i., p. 70), that merchant-guilds, or fraternities, which were afterwards styled corporations, came first into general use in many parts of Europe. Madox (*Firma Burgi,* chap. i., sect. 9) thinks they were hardly known to our Saxon progenitors, and that they might probably have been brought into England by the Normans, although they do not seem to have been very numerous in those days. The French and Normans might perhaps have borrowed them from the free cities of Italy, where trade and manufactures flourished at a much earlier period, and where such communities appear to have been first in use. These guilds are now companies or associations having laws and orders made by themselves, in virtue of authority from the prince to that effect.

GUILD, in the royal burghs of Scotland, is still used for a company of merchants, who are freemen of the burgh. Every royal burgh has a dean of guild, who is the next magistrate below the provost.

GUILD, *Gild,* or *Geld,* is also used by ancient writers to signify a compensation or mulct for an offence.

GUILD-HALL. See LONDON.

GUILDFORD, a municipal and parliamentary borough, and market-town of England, county of Surrey, on the right bank of the Wey, 29 miles S.W. of London. It is the chief town of the county, is governed by a mayor, four aldermen, and twelve councillors, and returns two members to parliament. It stands on the declivity of a chalk down, at the foot of which flows the Wey, here crossed by a bridge of five arches. The town consists chiefly of one long, wide, and well-built street, and is divided into three parishes, each of which has a parish church. It has a fine old town-hall, a county-hall, theatre, market-house, county gaol, house of correction, union workhouse, hospital, grammar-school, blue-coat and other schools, &c. The Guildford Institute, formed in 1844, has a museum, library, and reading and lecture rooms. It has an iron-foundry, and paper, powder, and corn mills on the Wey. Guildford was a residence of the Anglo-Saxon kings; and traces of an ancient palace are still to be found. On an eminence on the south side of the town stands the ruined keep of a castle of Norman date. A considerable trade is carried on by means of the Wey, in corn, malt, timber, &c. Market-days Wednesday and Saturday. Pop. (1851) 6740. Electors, 648.

GUILLIM, JOHN, a celebrated heraldric writer, was born in Herefordshire about the year 1565. Having completed his education at Brazen-nose College, Oxford, he became a member of the College of Arms in London; and he was made rouge-croix pursuivant, in which post he died in 1621. He published, in 1610, a work entitled the *Display of Heraldry*, folio, which has gone through many editions. To the fifth, which appeared in 1679, was added a *Treatise of Honour Civil and Military*, by Captain John Logan, which is generally considered the standard work on the subject it discusses.

GUILLOTINE, an instrument for inflicting capital punishment by decapitation. It consists simply of two upright posts, surmounted by a cross-beam, and grooved for the purpose of guiding an oblique-edged knife, the back of which is heavily weighted to make it fall swiftly and with force, when the cord by which it is held aloft is let go. It takes its name from Joseph Ignace Guillotin, a physician in Paris, who was a member of the French National Assembly at the time of the Revolution, and proposed its adoption by the Assembly. In a decree of March 20, 1792, its adoption was proclaimed. It is a mistake to suppose that Guillotin was the inventor of this instrument, as is often alleged. Centuries before his day it had been in use in many parts of Germany, in England, Scotland, and Italy. By the Italians it was called Mannaia; and an engraving of it, as used in Italy, may be seen in the *Questiones Symbolicæ* of Achilles Bocchius, printed at Bologna in 1555. It is also minutely described by Father Labat in his *Voyage en Italie*. In the *Chronique de Jean d'Auton*, first published in 1835, there are some curious details of an execution that took place at Genoa in 1507, with a machine, of which the guillotine is only an ingenious adaptation. In the museum of the Antiquarian Society of Edinburgh is preserved to this day the rude guillotine, or *Maiden*, by which the famous Regent Morton was decapitated. In the *Description of Tweeddale*, Pennicuik alludes to this event in the following terms:—"This mighty earl, for the pleasure of the place and the salubrity of the air, designed here a noble recess and retirement from worldly business, but was prevented by his unfortunate and inexorable death, three years after, anno 1581, being accused, condemned, and executed by the *Maiden* at the cross of Edinburgh, as art and part of the murder of King Henry, Earl of Darnley, father to King James VI., which fatal instrument, at least the pattern thereof, the cruel regent had brought from abroad to behead the Laird of Pennicuik, who, notwithstanding, died in his bed, and the unfortunate earl was himself that handselled that merciless *maiden* who proved so soon after his own executioner."

Though Dr Guillotin gave his name to this engine of death, he had in reality nothing to do with it beyond bringing it under the notice of the National Assembly. The real mover in the affair was the famous surgeon Antoine Louis, but his designs would never have been carried out but for the mechanical ingenuity of a young German by name Schmitt, then residing in Paris, who, after a great many trials and experiments, succeeded in making the guillotine, as it now works. The first execution with the new machine took place at Paris, April 25, 1792. A curious question has been started in connection with the use of the guillotine. The celebrated anatomist Sömmering, denounces it as too rapid in its operation, and maintains that sensation does not cease immediately after the head of the sufferer has been severed from the body. Among other instances he adduces that of Charlotte Corday, whose face seemed to blush with indignation, when the executioner, holding up the head to the public gaze, struck it with his fist. This subject is fully discussed in the *Moniteur* for November 1795, and in Sédillot's *Reflexions historiques et Physiologiques sur le supplice de la Guillotine*, and in the *Anecdotes sur les Décapités*.

It is sometimes, though erroneously, stated that Dr Guillotin, like Phalaris, was the first to hansel the work of his own hands. He survived the Revolution, and died in 1814.

GUIMARAENS, a fortified city of Portugal, province of Entre-Douro-e-Minho, 28 miles N.E. of Oporto, between the rivers Sollio and Visela, in N. Lat. 41. 25., and W. Long. 8. 15. It is well built on the acclivity of a hill. The chief manufactures are leather, paper, hardware, cutlery, cottons, linens, &c. Hot sulphurous springs, with a temperature of 164° Fahr., have retained their celebrity, and have been much frequented here since the foundation of this city in 500 B.C. It was made the capital of Portugal by Henry of Burgundy, in 1107 A.D.; and Alfonso I., as well as Pope San Domaso, were born here. The population is now nearly 10,000.

GUINEA, the name assigned to a large tract of country on the W. coast of Africa, commencing at Cape Verga, in about 10° N. Lat., and terminating with the Cameroon Mountains in the Gulf of Biafra. These are the limits more commonly given to what is called Guinea; by some they are greatly extended, so as to comprise the whole of the Portuguese settlements south of the equator, under the name of Southern Guinea, while the coast north of the equator is called Northern Guinea.

The term Guinea is not of African origin, or at least not among those to whom it is applied. There is, according to Barbot, a district of country north of the Senegal known by the name of *Genahoa*, the inhabitants of which were the first blacks that the Portuguese encountered in their explorations along the coast in the fifteenth century; and they applied this name indiscriminately afterwards to all the black nations which they found farther south. In the two succeeding centuries it was applied in a more restricted sense to that portion of the coast which is now better known as the Gold and Slave Coasts; owing to the fact, perhaps, that this region for a time offered a larger number of slaves for the foreign market than any other part of the country. The natives here acknowledge this term as applied to themselves, but it was undoubtedly borrowed in the first instance from the Portuguese.

The physical aspect of the country, as might be inferred from the large extent we have under consideration, is very variable, but is characterized everywhere by excessive richness of natural scenery. In the region of Sierra Leone, Cape Mount, and Cape Mesurado, the eye rests on bold headlands and high promontories covered with the richest tropical verdure. In the vicinity of Cape Palmas there are extended plains, slightly undulating, and covered with almost every variety of the palm and palmetto. On the coast of Drewiss the country rises into table-lands of vast extent, and apparently of great fertility. The Gold Coast presents every variety of hill and dale; and as we approach the equatorial region we are saluted by mountain scenery of unrivalled beauty and surpassing magnificence.

The inhabitants consist chiefly of the following tribes:—The Vais, the Manou or Kru, the Kovakeras or Avekroom, the Inta, the Dahomey, Ashanti, and the Benin. There are no large or extended political organizations, with the exception, perhaps, of the kingdoms of Ashanti and Dahomey, and neither of these has a larger population or greater extent of territory than the smaller kingdoms of Europe. For the most part, the people live together in independent communities, of not more than eight or ten villages, and with an aggregate population of from 2000 to 25,000 or 30,000. In these different communities they have no written forms of law, but are governed for the most part by certain traditional usages that have been handed down from generation to generation. Nominally, monarchy is the only form of government acknowledged among them; but, when closely scrutinized, their systems show much more of the popular and patriarchal than of the monarchical element. They are essentially a pagan people; but in their religious notions and idolatrous worship they differ very much from each other. There are many decided traces of the Jewish origin. Among these may be specified the rite of circumcision, which, with the exception of the Kru or Manon family, is, we believe, universal; the division of the tribes into families, and in some cases into the number of twelve; bloody sacrifices, with the sprinkling of blood upon their altars and door-posts; the observance of new moons; a formal and specified time for mourning for the dead, during which period they shave their head and wear tattered clothes; demoniacal possessions, purifications, and various other usages of probable Jewish origin.

Respecting the natural products and trading capabilities of the country, the articles exported consist chiefly of ginger, gum, mendobi (Guinea grains, a species of seed), palm-oil, some ivory, a wood used for dyeing called camwood, and which is worth in England about L.15 sterling a ton. Vessels visiting that coast take on board—at Sierra Leone, or on the coast of Malagueta, between Cape Mesurado and Cape Palmas—some black sailors, called krumen, who are of great use in doing the heavy work on board, and for boat service; thus saving the European seamen from exposing themselves too much to the sun's rays, &c. The services of these krumen are recompensed with two or three pieces of cotton cloth per month each. Their chief food is rice, which may be purchased at a very cheap rate on the coast of Malagueta; the price of a "kru" (a measure of capacity weighing about 30 lbs.) being a fathom and a half of cotton cloth, or any other article of proportionate value.

On the coast of Malagueta (Grain Coast), the articles received principally in barter are rice and millet; also ivory, palm-oil, and camwood, especially at Monrovia, the capital of Liberia. At Sierra Leone, the pepper-tree (called malagueta) is cultivated on an extensive scale, and its fruit—Guinea pepper—after being dried, is purchased in large quantities by the Americans, and imported into the United States.

English muskets, gunpowder, rum, and tobacco, are the principal articles of traffic on the whole of the coast as far as Onim at the bottom of the Bight of Benin.

At Jaque Lahoo and Jaque Jaque, two considerable towns, situated at the extremity of the bight formed by Cape Palmas and Cape Three Points, commences the trade in gold-dust; here also a considerable quantity of palm-oil and some ivory are found. After passing these towns, the European settlements commence. The first are Great Bassam and Assine, belonging to France, and situated at the mouths of the rivers of the same names. Five leagues to the west of Cape Three Points, is the small Dutch fort of Axem; and on the other side of the same cape is the English port of Dick's Cove.

From Cape Lahoo to Acora, and to all the European settlements on the coast, the monetary standard is the "ake" (ackie) of gold-dust, which weighs half a dram English, and is worth nearly 5s. The kru on this part of the coast is almost double that assigned to it on the coast of Malagueta—averaging L.50, more or less.

Between Dick's Cove and the castle of St George of the Mine (S. Jorge da Mina) are situated the small forts of Serunde, Sanca, and Commendo; after which we come to the first large European settlement, viz., the castle of St George of the Mine, belonging to Holland. The castle is a Portuguese structure, and was formerly the most important of the Portuguese colonies on this coast. Next to it is Cape Coast Castle, belonging to England, and situated in sight of the former. The next place is Annamaboo, a small English fort, formerly abandoned, but where for some years past trade has been again in some degree developed. To this fort succeed others in ruins, as Winebah and Assam. Millet is found in abundance at these places, as well as palm-oil and gold-dust.

Proceeding along the coast, we come to the great English settlement of Acora, where there are at present two fortresses. The first, that of St James, was built by them many years since; the second, that of Christianburg, was purchased from Denmark, together with all its possessions on that coast, in the year 1850. Then follow the small settlements of Ningo; after passing which, Cape St Paul, a little to the east of Rio da Volta ("Return River"), is doubled.

From Cape St Paul to Onim or Lagos, many negro towns or villages are met with stationed along the coast. These communicate with each other by means of the lake situated at no great distance inland from the beach; and then the ford converges to the principal points, which are Quita, Popo-pequeño, Ajuda, Porto Novo, and Onim.

The trade which formerly flourished at all these places was that in slaves; but for some years past that in palm-oil, or *den-den*, has greatly developed itself, the quantity produced amounting annually to more than 7000 tons, which are shipped to England, America, and France.

On this section of the coast there are no European establishments, properly so called; but at Ajuda, Porto Novo, and Onim, there are factories; and Europeans are also resident in the country, and traffic with vessels, as they do at those establishments.

The trade of the Benin, Brass, Bonny, Calabar, and Cameroon Rivers, is all in palm-oil, and carried on exclusively by the English.

The whole coast has been arbitrarily divided into five parts:—

1. The Sierra Leone district, from Cape Verga to Cape Mesurado.
2. Malagueta, Pepper or Grain Coast, from Cape Mesurado to Cape Palmas.
3. The Ivory Coast, from Cape Palmas to Cape Three Points.
4. The Gold Coast, from Cape Three Points to the River Volta.
5. The Slave Coast, or Benin district, from the River Volta to the Cameroons. (A. P.)

GUINEA, *New*. See AUSTRALASIA.

GUINEA, a gold coin formerly struck and current in Britain, and so denominated because the gold of which the first specimens were struck (*temp*. Car. II.) was brought from the coast of Guinea; and for a like reason it originally bore the impression of an elephant. The value of the guinea varied greatly at different periods, but latterly it was worth 21 shillings. Its weight was 5 dwts. 9·4125 grs. On the introduction of the *sovereign*—first coined in 1817—the old guinea coinage was gradually superseded. See COINAGE, and MONEY.

GUINEA-Fowl. See index to ORNITHOLOGY.

GUINEA-Pig. See index to MAMMALIA.

GUINGAMP, a town of France, capital of a cognominal arrondissement in the department of Côtes-du-Nord, on the right bank of the Trieux, 17 miles W.N.W. of St Brieuc. It was formerly surrounded by walls, part of which still exists. It has an old parish church with a tower and spire, and several other good buildings; also manufactures of *ginghams*, to which it gives name; of linen fabrics, thread, leather, hats, &c.; and some trade in wine, brandy, cattle, and agricultural produce. Pop. (1851) 6718.

GUIPUZCOA, the most easterly of the four Basque provinces of Spain, bounded on the W. by Biscay, S. by Alava, E. and N.E. by Navarre, N.E. by the Bidasoa, the mutual boundary between it and France. Its form is nearly that of a right-angled triangle, having the hypothenuse towards the S.E., and its area is nearly 600 square miles. Its coast is so much indented, that it contains no fewer than nine harbours—none of which, however, are very important. From the immense variety of surface in mountain, hill, and valley, the scenery of this small province is highly picturesque and romantic. Lofty mountains—partly clothed with evergreen forests, and partly barren—shoot out from the Pyrenees, and spread over the whole surface. In this province commences the Cantabrian ridge, to which belongs the Alzanja, over which the great road of the Romans was conducted. To the coast belong the Cabo San Antonio, and the Cabo de Higuera; and numerous small bays, forming good harbours—Orio, Zarauz, Guetaria, Zumaya, Deva, Motrico, Fontarabia, Le Passage, and San Sebastian. The streams are all short, rapid, unnavigable, and fall into the Bay of Biscay; the principal of these are the Deva, Urola, Oria, Urumea, Lezo, and Bidassoa. The soil—especially in the lower valleys—is very fertile, and is cultivated very carefully; but, from the nature of the surface, agricultural labours are prosecuted with considerable difficulty. The climate, though moist, is mild, pleasant, and healthful; and the inhabitants often attain to a great age. The frequency of rain preserves the freshness of the verdure throughout most of the year; but thunder-storms often occur during December and January. The chief wealth of the province arises from its mineral stores and excellent fisheries, which supply the neighbouring provinces of Alava, Navarre, part of Castile, and Aragon, with excellent sea-fish. The grain raised falls considerably short of what is necessary for home consumption. The minerals chiefly wrought are iron, of excellent quality, being smelted with wood; argentiferous lead, copper, marble, and gypsum. The people are remarkable for their fine physical form, and bold, manly spirit; and, notwithstanding the simplicity of their manners, the prominent features of their character are industry, honesty, benevolence, gallantry. They are fond of games requiring bodily strength and exertion, in which even their women join. But they especially delight in dancing; and their great favourite amusements are their national dance, the *zorcico*, and a kind of bullfight called *novillos*. Tolosa is the capital. San Sebastian as a seaport has a good trade, and gives name to the province of San Sebastian since the administrative division of 1822. The other principal towns are Fuenterabia or Fontarabia, a small fortress on the Bidassoa, close to the French frontier; Mondragon, where are rich iron mines; Salinas, on the Deva, has a salt-work (whence its name) which produces about 1000 tons per annum. La Isla de los Faisanes, an island in the Bidassoa, is celebrated as the place where the "Peace of the Pyrenees" was concluded in 1659 between France and Spain. Though the Spaniards name this island "Isle of Pheasants," yet these birds are now quite unknown there. The population of Guipuzcoa in 1849 was 141,752.

GUISBOROUGH, or Gisborough, a market-town of England, North Riding of Yorkshire, at the foot of the Cleveland Hills, not far from the mouth of the Tees, and 40 miles N. of York. It consists chiefly of one wide and handsome street, having many good houses. It has a handsome town-hall, under which the market is held; a church, a free grammar-school, and an hospital for old men and women. The first alum-works in the kingdom were established here about 1600. An Austin priory was founded here in 1129, of which some remains still exist. Market-day Tuesday. Pop. (1851) 2062.

GUISCARD, Robert (1015–1085), Duke of Apulia and Calabria, one of the most famous captains of his age, was the son of the Norman Tancred Hauterville. His life, exploits, and character, are given in great detail in chap. lvi. of Gibbon's *Decline and Fall.* See also Naples.

GUISE, a town of France, department of Aisne, on the left bank of the Oise, 13 miles N.W. of Vervins. It ranks as a fortified town of the third class, being surrounded by walls, and having a strong citadel. Pop. 3500.

GUISE, or Guyse. The family of Guise, which plays a distinguished part in certain eras of French and Scottish history, was sprung from the royal house of Lorraine. It did not become known in France till the sixteenth century, when Claude, son of René II., Duke of Lorraine, driven from home by an elder brother, entered the French army, distinguished himself on many battle-fields, and was desperately wounded at Marignan in 1515. For these services he was made Duke of Guise in Normandy and a peer of France by Francis I. He died in 1550, leaving, by his wife Antoinette de Bourbon, a large family, of which three members became especially notable. These were Marie, married to James V. of Scotland, and mother of Mary Queen of Scots; Francis, renowned as a soldier; and Charles, the Cardinal of Lorraine. For the history and character of Marie de Guise, see Scotland. Francis, surnamed "le Balafré," from a scar on his face left by a wound received at the siege of Boulogne in 1545, was the noblest of his race. He was brave, generous, and gentle-hearted, and was as able a commander as a valiant soldier. He greatly distinguished himself in the wars between France and Spain, and retook Calais from the English, almost the last relic of their ancient conquests in France. Under Francis II. his power, which in the last reign had been counterpoised by that of the Montmorencys, became almost absolute. The Calvinists and the Prince of Condé made an effort to overthrow it; but this attempt, known in history as the conspiracy of Amboise, was defeated by the vigilance of the duke. Soon after this he had himself appointed lieutenant-general of the kingdom, while the parliament voted him the title of "conservateur de la patrie." His first step was to take vengeance on the conspirators, which he did in a manner bordering on cruelty. Under Charles IX. his influence was checked, to a certain extent, by that of Condé and Coligny. The unfortunate affair at Vassi was the signal for a general war of religion in France; and shortly after the battle of Dreux (1563), in which the duke had distinguished himself, he was assassinated by Poltrot de Mérey, a Calvinist nobleman, who regarded him as the most dangerous enemy of the Reformed faith. He was succeeded in his title and estates, and the leadership of his party, by his son Henry, who, like himself, enjoyed the surname of "le Balafré." This son inherited all the talents, but few of the virtues of his father, except his courage. He seconded his uncle, the Cardinal of Lorraine, in carrying out all the schemes of the "Ligue," which, under the pretence of protecting the Catholic faith, was to serve the ulterior purpose of concentrating all the power of the kingdom in the hands of the Guises and their party. To prove his sincerity in the cause of the faith, Henri de Guise helped to carry out the massacre of St Bartholomew, planned the murder of Coligny, and hunted down the defeated Huguenots with pitiless cruelty. His successes at length made him insolent and overbearing even at court; and the king (Henri III.) forbade him ever to appear there again. Upon this the duke armed his retainers, and endeavoured to raise Paris in rebellion against its sovereign. This day, the 12th of May 1588, is famous in French history as the "Journée des Barricades." The king fled, and summoned a meeting of the states-general at Blois. He found the deputies almost all in the interest of his revolted subject, and was obliged to make the most humiliating concessions to retain even the semblance of royalty. After enduring for a few months more the insolence of his too-powerful vassal, Henry had him privately assassinated, December 23, 1588; and next day the Cardinal of Lorraine met a similar end. Even this double shock, however, was hardly sufficient to break the power of the Guises. Under Henri IV. they had recovered so far as to be able to organize the League against that prince, and did not acknowledge his allegiance until he had abjured the Protestant faith. The dukedom of Guise became extinct in 1675.

GUITAR (Span. *Guitarra*), a musical instrument much used in Spain for accompanying songs. It is supposed to be of Arabian origin, and is the last relic of instruments of the lute kind. There are different kinds of guitars—Spanish, French, and German; but the one most in use has six strings, generally tuned E, A, D, G, B, E, which chiefly belong to the bass register. Music for the guitar is written in the treble clef, though every note is an octave lower than represented. The guitar finger-board is furnished with frets, upon which the fingers of the left hand press down the strings, while these are struck by the fingers of the right hand. The Spanish and French guitars are nearly alike.

GUJERAT, a town of Hindustan, in the Punjab, about 8 miles from the right bank of the River Chenab, and 75 miles N. of the city of Lahore. The place has acquired celebrity from the victory gained in the vicinity on 21st Feb. 1849, by a British force, commanded by Lord Gough, over a Sikh army greatly superior in point of numbers, under the command of Sirdar Chuttur Singh and Rajah Shere Singh. The British, notwithstanding their numerical inferiority, gallantly attacked the Sikhs, drove them in succession from point to point, put them to disorderly flight, and captured their artillery and baggage. N. Lat. 32. 35., W. Long. 74. 8.

GUJERAT, GAJRAT, or GUZERAT, a very large province of Hindustan, comprising within its limits the dominions of the Guicowar, besides several British districts, and situated principally between the 21st and 24th degrees of N. latitude. It has been computed to be 320 miles long by about 400 broad. On the N. it is bounded by Rajpootana, S. by the Presidency of Bombay, E. by Central India, W. by Cutch and the sea. The S.W. quarter of this province is inclosed on the S.W. and N.E. by the Gulfs of Cutch and Cambay, and has the form of a peninsula. A considerable portion, particularly towards the eastern frontier, is hilly, and much covered with jungle. On the N.W. boundary, along the bank of the River Banas or Bunass, the country in some parts produces good pasture; in other parts it is either an arid plain or a low salt swamp, which, where it is dried up, is barren and unproductive. The interior is hilly and rocky; but there are spots, where water is accessible, that are extremely fertile, especially in sugar and tobacco, and which yield all sorts of grain, oats excepted; also cotton, tobacco, indigo, gum, and sugar. The country, notwithstanding its smoothness to the eye, is in many parts intersected by ravines, and much broken by the heavy rains; and some of these chasms contain, during the season of the rains, a large volume of water, not to be crossed without the assistance of rafts or boats; and, accordingly, the natives in these cases establish temporary ferries. The climate is reckoned one of the worst in India, being intensely hot during the greater part of the year, with a heavy thickness in the atmosphere, which is extremely oppressive. A hot wind blows fiercely all the day; and when it ceases at night, it is followed by a still more close and oppressive calm. "I had certainly," says Bishop Heber, "no conception that anywhere in India the month of March could offer such a furnace-like climate." "It is," he adds, "in the same latitude with Calcutta, and seems to be what Bengal would be without the glorious Ganges."[1] During the hot and dry months the surface of the country appears mostly sand or dust, and in the rainy season a thick mire. In the N.W. parts, along the banks of the River Bunass, where there is good pasturage, and in various other parts of the province, they breed excellent horses and camels; and the cattle are superior to those of any other part of India. Some of their bullocks, which are in general white, with large bumps, are sixteen hands high, and will trot in a carriage as fast, and perform as long a journey, as good horses. This province is traversed by several large rivers, namely, the Bunass, the Nerbuddah, Tuptee, Mahy, Mehindry, and Sabermatty, which, being navigable from the sea to a considerable distance up the country, afford great facilities for commerce. But there are many large tracts which experience a great scarcity of water; and the inhabitants are forced to dig wells, which are in many parts from 80 to 100 feet deep. In some particular portions of this province not a stone is to be met with, whilst in some others nothing else is to be seen.

In so extensive a province, never completely subdued by any of its numerous invaders, a great diversity of population may be expected. The population of Gujerat is accordingly very strangely diversified by numerous sects and castes, under the various designations of Grassias, Catties, Coolies, Bheels, Mewassies, Charons, Bhatts, Dheras, and others. In some parts of the province the Grassias form a numerous class of landholders, and in others they merely possess a sort of feudal authority over certain portions of land and villages. The origin of their rights is a controverted point of Hindu history, which has never been very satisfactorily explained. The common account of their title to the land is, that they were robbers and plunderers, who inhabited the hills and jungles, and by their incursions the country was so much infested, that, after the decease of the Emperor Akbar in 1605, the nabobs of Surat ceded to them certain lands in each village in lieu of all demands. But it is asserted that, encouraged by this success, they still continued their depredations; and the Zemindars, in order to purchase peace, agreed to the payment, on certain lands, of what is called *toda*, or ready money; and the lands which are liable to this payment have been continually increasing, owing to the anarchy which so long prevailed in Gujerat. The proprietors of these claims never allow them to die out; and it is seldom that they prosecute them in person, but, having retired to some secluded residence, they rally round them a band of desperate adventurers, to whom they farm out the Grassia claim, and depute them to levy it. Hence the country, prior to the war of 1817, and the consequent interference of the British government, was a prey to the greatest disorders; it was ravaged by predatory hordes, who acquired new rights, and in this manner it was plundered, and the rent of the land misappropriated. These claims have been involved in such complication and obscurity, that the British officers have found it impossible to reduce them to any accurate standard of law or justice. On the rugged margins of all rivers in Gujerat, many of these Grassias resided in a kind of independence; and also all over the Gujerat peninsula, usually denominated Cattywar by the natives. Their numbers were recruited by criminals from the plains, who fled to their haunts for refuge, and were supposed to amount to one-half of the population N. of the Mahy River. Attempts made by the Bombay government to extinguish the Grassia claims by a payment from the public treasury, and thus to prevent the disorders which they occasioned, have been crowned with success.

Of all the disorderly hordes which infested this country, the most bloody and ferocious were the Coolies. The most barbarous were those in the vicinity of the Runn, the salt morass which bounds the province on the W., and communicates with the Gulf of Cutch. These were taught to despise every approach to civilization; they are of the most filthy habits, and consider it a mark of effeminacy to wear clean clothes; and the priests and other persons of note exceed the laity in dirtiness. They consider cleanliness as indicative of cowardice. That class of men named Bhatts, or Bharotts, abound more in Gujerat than in any other province of India. They cultivate the land; but the greater part of them are recorders of births and deaths, and beggars or itinerant bards, and very frequently traders. They often stand forward as security for the public revenue, and guarantee observance of agreements and rewards. They always possess, however, an intimate knowledge of the person for whom they become security, of his character and resources; and when they find that they have been deceived, and are pressed for money for which they have become security, such is their proud and obstinate character, that they sometimes sacrifice their own lives, or some aged female or child of the family, in the presence of the person for whom they have broken their word. They form, in the rude state of society which prevails in India, a sort of middlemen between the contributors and the government; every Grassia, Coolie, and Bheel having his Bhatt, a class who are rewarded by a small percentage on the amount of the revenues for which they have become surety, and for the security which they afford against the importunity of the inferior agents of government, their persons being regarded as sacred, and their influence over the persons of the natives very great. They were chiefly employed under the Mahratta princes, between whom and the landholders they stood as middlemen, being bound to the government for the revenue, and acting as a security to the landholders against the oppressions of the government. Within the limits of British rule this agency has been discontinued, being found inefficient as an instrument of control for the unruly tribes of the country. The Charons are a sect of Hindus, allied in manners and customs to the Bhatts. They are often possessed of large droves of cattle for carriage, by means of which they carry on a distant inland traffic in grain and other articles. They also often hire themselves out as protectors of travellers in the wildest parts of the country; and so faithful are they to their charge, that when a band of predatory horse appears, these persons take an oath to die by their own hands, in case those whom they have engaged to protect are plundered; and this threat is always found effectual to restrain those superstitious thieves, who hold the Charons in great veneration. There is in Gujerat, as in other parts of Hindustan Proper, a race of people called Ungreas, whose profession is that of money-carriers, which they contrive to conceal in their quilted clothes. Although they are miserably poor, they may be trusted with large sums of money to carry many miles off, merely on the responsibility of the superior, who is frequently richer than the others. They are of all castes, and in general athletic and well armed; and they are of such singular habits, that in performing distant journeys they form themselves into parties, and fight with desperation to defend a property for which their only recompense is a mere subsistence.

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[1] Heber, vol. iii., p. 10.

The Bheels are generally described as the original inhabitants of the country, who have been driven to their present fastnesses and their miserable way of life by the invaders of their country, whether Mohammedans or Hindus. These people were, in the first instance, treated with extreme severity by the British;[1] but in 1825 a mild and conciliatory course of policy was introduced; and they have been reclaimed from their barbarous habits and formed into regiments, subject to such discipline as was suited to their turbulent character. They also received grants of land, and freedom from taxes for a number of years; and they were in this manner trained to industrious habits.

The Dheras of this province are of a very degraded caste, and their employment is to carry filth of every description out of the roads and villages. They are miserably poor; they scrape bare the bones of every animal which dies within their limits, and share out the flesh, which they cook in various ways, and feed upon. They are obliged to serve travellers as carriers of their baggage to the village nearest their own. In the course of their business they are always committing petty thefts, and are much given to intoxication.

The Vaneeya, or the merchants and traffickers, form a numerous class in Gujerat. Many of them travel to remote parts of India, where they remain from one to ten years, after which they return to their wives and children. Many also finally settle in the towns of foreign countries, where their descendants continue to speak and write the Gujerattee tongue. The Jains are also a more numerous class here than in any of the contiguous provinces, and possess many handsome temples adorned with well-wrought images. Besides its native hordes or castes, Gujerat, along with Bombay, contains nearly all the Parsees, or fire-worshippers, to be found in the continent of India, the feeble remains of the once numerous sect of the Magi. In all the larger towns are to be found that remarkable race of men named the Boras, who, though Mohammedans in religion, are Jews in features, manners, and genius. They form a community amongst themselves, and are everywhere noted for their address in bargaining, minute thrift, and constant attention to lucre. The washermen are also considered as a degraded and cruel class, on account of the numerous deaths which they involuntarily occasion to the animalcula in the process of washing.

The province of Gujerat flourished chiefly during the era of the Mogul government, and even during the most convulsed periods it carried on a much more extensive trade than ever it has done since. The principal trade is with Bombay, and the chief exports are cotton, piece goods, and grain. The imports are chiefly sugar, raw silk, pepper, cocoa nuts, and British fabrics. Its manufacturing industry has decayed, and in general has nearly disappeared, in consequence of the greater cheapness of British wares. The principal towns in this province are Surat, Ahmedabad, Broach, Cambay, Gogo, and the Guicowars capital of Baroda. Gujerat contains populous districts, but in other parts the country is extremely desolate. Surat and the neighbouring country is thickly planted with inhabitants, and the north-western districts are equally naked and destitute of people. The country has been so much exposed to the depredations of thieves and banditti from the jungles and mountains, that, for the sake of security, the great body of the people live, not in sequestered houses, but in villages; and these villages are frequently visited by travelling companies, who exhibit puppet-shows, and histrionical representations. They are also occasionally frequented by musicians, dancing girls, singing men and women, wrestlers, expert jugglers, dancing bears, goats, and monkeys. In the remote and savage districts of the country, where there are no villages, fortifications are numerous; but in all the parts to which the British influence extends, they are fast crumbling into decay. In many parts the people are of savage and cruel manners; and amongst the tribe of Jahrejahs the practice of female infanticide prevails, and the united exertions of all the British officers and statesmen have been employed to prevent it. There is another crime peculiar to this province, known in the British courts of justice by the name of *jhansa*, which is the writing of threatening letters, the destroying of gardens or plantations, and the burning of stacks, in order to extort money, or to enforce a compliance with any other unjust demand. These offences were not formerly confined to the Grassias, but were resorted to in village feuds, even by the heads of villages. But since the regular administration of justice by the British, such disorderly practices have become less frequent. There is a class of persons, the Mahy Kaunta Coolies, who are so named from their residence on the Mahy River, who are thieves by profession, and also very ingenious, active, and courageous. They lurk on the highways, and intercept families and individuals proceeding to distant pilgrimages and religious fairs. They frequently visit Surat and other

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[1] Heber, vol. ii., p. 496.

large cities in pursuit of their illicit occupation, though, from the increasing vigilance of the British police, their depredations are now more frequently checked. But, beyond the precincts of the British authority, in the northern and western quarters, and the centre of the Gujerat peninsula, the number of societies of armed and sanguinary thieves is scarcely credible; and it is rather surprising that even the thinly scattered population of the country should keep its ground amid the many excesses and outrages which are committed.

There are many remarkable wells and watering-places in Gujerat. One near Baroda is said to have cost nine lacks of rupees. There is another at Vadwa, in the vicinity of Cambay, which, from the inscription, appears to have been erected in 1482.

The province of Gujerat was first invaded about A.D. 1025, by Mahmood of Ghizni, who subverted the throne of its native prince, named Jamund, and plundered his capital. After the establishment of the Delhi sovereignty, Gujerat was subject for many years to the Patan conquerors. In the fifteenth century it came under the dominion of a dynasty of Rajpoot princes, converted to the Mohammedan religion, who removed the seat of government to Ahmedabad; and under their rule it flourished greatly as a maritime and commercial state. This race of princes was overthrown by the Emperor Akbar in 1572; and after the death of Aurungzebe in 1707, hordes of Mahratta depredators overran the province, which in 1724 was finally separated from the Mogul empire.

Until 1818 the Mahratta Peishwa and the Guicowar possessed large tracts of country, but at present only the last remains, the authority and dominions of the other having devolved to the British. The annual revenue of the Guicowar is estimated at L.668,744. The military establishment of this prince, in addition to his regular troops, amounting to 6000 cavalry and infantry, comprises also the subsidiary force at the disposal of the British government, which consists of five regiments of infantry, two of cavalry, and a company of artillery. He also maintains a contingent force of 3000 cavalry, and a corps of irregulars, known as the Gujerat irregular horse, commanded by British officers. In 1802 the British government negotiated with the Guicowar as a sovereign in his own right, and thus secured his independence of the Peishwa. Under the treaty then concluded the Guicowar agreed to receive a British subsidiary force. When, as a result of his first discomfiture, the Peishwa yielded to the British government his rights in Gujerat, the Guicowar received an accession of territory, and a new treaty supplemental to the former was concluded. Under this treaty the subsidiary force was to be increased by a battalion of native infantry, of not less than 1000 men, and two regiments of native cavalry. The establishment of British authority in this country experienced very serious obstructions from the intermixture of the territories ceded by the Peishwa with those of the Guicowar; also from the Nabob of Cambay, and the unsettled tributaries of Cattywar and Mahy Caunta, and still more from the lawless habits of a large proportion of the people, especially beyond the Mahy River. But, by a wise and conciliating policy, these difficulties have been surmounted, and tranquillity has gradually arisen from the confusion which at first overspread the country. (E.T.)

GULDENSTAEDT, JOHN ANTONY, a Russian traveller and naturalist of some celebrity, was born at Riga in 1745, died at St Petersburg in 1781. He took part in some of the scientific expeditions organized by the Russian government in the latter half of last century, and distinguished himself especially by his travels in the Caucasus. His memoirs on the natural history, languages, &c., of these countries, though they have been long superseded, were highly esteemed in their day, and even now possess a certain historical value. His name is associated with that of the celebrated Pallas, who after Guldenstaedt's death published an edition of part of his works.

GULES, in *Heraldry*, a corruption of the French word *gueules*, which in this science signifies *red*, and is represented in engraving by perpendicular lines. See HERALDRY.

GULF, an arm of the sea. See GEOGRAPHY.

GULF-STREAM. See ATLANTIC, vol. iv., p. 176.

GULL. See index to ORNITHOLOGY.

GUM, the hard fleshy substance which invests the teeth of either jaw. See ANATOMY.

GUM (Lat. *gummi*). This term is applicable solely to those concrete vegetable exudations which soften or dissolve in water, and afford a more or less perfect mucilage, but which are wholly insoluble in alcohol. Gums are thus distinguished from *resins*—those fusible and combustible vegetable substances which are totally insoluble in water, but which soften and dissolve in ether, essential oils, and alcohol. Gum, properly so called, is used in large quantities for a number of purposes in the arts. There are six varieties of this substance, viz., gum-arabic, gum-senegal, cherry-tree gum, with that of other stone-fruit trees, gum-tragacanth, gum of Bassora, or Bazrah, and that extracted from seeds and roots by boiling water.

Gum-arabic is the purest of these, and consists almost entirely of the principle called *arabine*. It forms a clear mucilage with water, and is clearer, and keeps better if dissolved in cold water than when prepared with warm water, which is the common method. Gum-arabic is the produce of several species of *Acacia;* as *tortilis, seval, Ehrenbergii, vera, arabica.* One hundred parts of good gum were found to consist of 70·40 of arabine, 17·60 of water, and a few per cent. of saline and earthy matters.

The method of collecting this gum as practised in Morocco may be briefly described:—About the middle of November, that is, after the rainy season, a gummy juice exudes spontaneously from the trunk and principal branches of the acacia-tree. In about fifteen days it thickens in the furrow, down which it ran either in a vermicular form, or, more commonly, in the shape of oval and round tears, about the size of a pigeon's egg, and of different shades of colour as they belong to the white or red gum-tree. About the middle of December the Moors encamp on the border of the forest, and commence the harvest, which lasts six weeks. The gum is packed in very large bags of leather, and brought on the backs of bullocks and camels to certain ports, where it is sold to French and English merchants. It is highly nutritious. During the whole time of harvest, of the journey, and of the fair, the Moors of the desert live almost entirely upon it; and experience proves that six ounces of gum taken during the twenty-four hours are sufficient to support a man for a considerable period.

The quantity of gum-arabic imported into Britain in 1852 amounted to 48,484 cwts.; that of gum-senegal to 4267 cwts.; of tragacanth, 1151 cwts. Previously to the year 1832, the duty on gum-arabic from a British possession was 6s. a cwt., and from other parts, 12s.; but the duty on all gums, from whatever part of the world, was then equalized, being fixed at 6s.; in 1841 it was further reduced to 1s.; and it was finally repealed in 1845. Of the 48,484 cwts. of gum-arabic imported in 1852, Egypt produced 16,414 cwts.; Morocco, 7131; Italy, 3952; East Indies, 16,089; other countries, 4898.

Gum-senegal is also a very pure gum, much resembling gum-arabic, and is applied to many of the same purposes as that of gum. It is also much employed in calico-printing. The tree which yields it is the *Acacia senegal*, so named from the country of the River Senegal in Africa, whence this gum is procured. Its constituents are arabine 81·10, water 16·10, with 2 or 3 parts of saline matters.

Cherry-tree gum is an inferior and less soluble kind of gum, containing 54·90 parts of cerasine, 52·10 of arabine, 12 of water, and 1 of saline matter.

Gum-tragacanth, familiarly called *gum-dragon*, is the produce of several species of *Astralagus*, but more particularly of *A. verus* and *A. gummifer;* the former a native of the north of Persia, Armenia, and Asia Minor, and the latter of Mount Lebanon, Arabia, &c. These at least are the chief sources of the tragacanth met with in commerce. It is likewise yielded, though less abundantly, by *A. creticus* and *A. aristatus*, and some other species. It is imported in twisted thread-like pieces, or in flattened cakes, is of a whitish or yellowish colour, devoid of taste and smell, nearly opaque, and a little ductile. It swells in water, and dissolves in part, forming a very thick mucilage. One hundred parts of it consist of 53·30 arabine, 33·30 bassorine and starch, 11·0 water, and from 2 to 3 parts of saline matters. It is used in medicine as a demulcent, and to form lozenges and pills, &c. It is also employed to stiffen and to glaze silks; and the inferior kinds are used by shoemakers to finish off the edges of their work.

Gum of Bassora, or that brought from Bassora in Arabia, possesses most of the properties of tragacanth, and gives its name to the principle called *bassorine*, which forms a constituent part of this gum and of tragacanth.

Gum from roots and seeds is extracted by boiling water. Linseed, for example, yields, by boiling, a gum consisting of 52·70 arabine, 28·9 insoluble matter, 10·3 water, and 7·11 saline matter.

The substance called *British gum*, so largely used in calico-printing, is noticed under the head British Gum.

Gum-Resin. This term is applied to an inspissated juice afforded by many kinds of plants, which combines the properties of gums and resins, being partly soluble in water, partly in alcohol. The principal gum-resins are aloes, ammoniac, assafœtida, galbanum, gamboge, euphorbium, olibanum, scammony, besides a great variety of other concrete juices. The chief of these are noticed under their respective names, as also the resins properly so called.

GUMBINNEN, a town of Prussia, province of East Prussia, and capital of a government of the same name, on the Pissa, 70 miles E.S.E. of Königsberg. The town is well built, with spacious and regular streets, and fine promenades, shaded by linden trees. It is the seat of the different governmental courts, and has a gymnasium, schools of architecture and midwifery, a public library, and an hospital. It has manufactures of woollen and linen stuffs, leather, and brandy; and some trade in corn. Gumbinnen was only a small village till 1732, when it was improved and made a town by Frederick William I., to whom a statue was erected in the market-place in 1832. Many Protestant families from Salzburg, driven from their homes, settled here and contributed to its rise and prosperity. Pop. (1849) 6794. The government of Gumbinnen has an area of 6312 English square miles, and is almost one continued flat, extensively covered with lakes. The cultivated land is fertile, but a large portion of this government is densely wooded, or covered with heath and morass. The chief products are wheat, rye, flax, and hemp; and cattle and sheep are numerous. Pop. (1849) 614,047, of whom 601,016 are Protestants.

GUMPELTZHAIMER, Adam, a musician, born at Trosberg, in Bavaria, in 1560. The year of his death is not known. In 1581 he was appointed *cantor* of the school of Augsburg. He merits historical notice as one of the early creators of that German style of harmony which was afterwards employed with such effect by Handel, J. S. Bach, and others. "His modulations," says an eminent critic, "were based on the modern system of tonality; and while they were lively and unexpected, were still smooth and natural." There are several published collections of his *Spiritual Songs for Four Voices.*

GUN. See Gun-making, and Rifle.

GUN-COTTON. Cotton is one of the numerous forms of lignine, a compound of carbon, oxygen, and hydrogen; but when it is subjected to the action of nitric acid, nitrogen, which exists in most explosive bodies, enters into its composition. The action of nitric acid on lignine had long attracted the attention of chemists; but the nearest approach to the formation of gun-cotton was made by Pelouze, who, in 1838, writes in the *Comptes Rendus* of the properties of a substance named *Xyloidine*, from ξυλον, wood, discovered by Braconnet in 1833:—"It is very combustible, taking fire at 356° Fahr., burning with great rapidity; and almost without residue. This property has led me to an experiment, which I think susceptible of some application, especially in artillery. By plunging paper in nitric acid of sp. gr. 1·5, leaving it there the requisite time for the acid to permeate the paper, which is usually accomplished in two or three minutes, then withdrawing it, and, lastly, washing it in water, we obtain a kind of parchment impermeable to moisture, and extremely combustible." In 1846, Schönbein exhibited to the British Association at Southampton specimens of cotton, which appeared to be as explosive as gunpowder; but it was not till April 1847, on the enrolment of the patent, that the method of preparing this cotton was known, although, in the interval, Otto of Brunswick, Morel of Paris, and Böttger of Frankfort, published recipes for making explosive cotton. Schönbein's method consisted in mixing three parts of sulphuric acid, sp. gr. 1·85, with one part of nitric acid, sp. gr. 1·45 to 1·50; and when the mixture had cooled down to between 50° and 60° Fahr., clean rough cotton in as open a state as possible was immersed in the acid; when well soaked, the excess of acid was drawn or poured off, and the cotton pressed lightly in order to separate the principal portion of the acid. The cotton was then covered over and left for half an hour, when it was pressed and thoroughly washed in running water to get rid of all free acid. After being partially dried by pressure, it was washed in an alkaline solution made by dissolving one ounce of carbonate of potash in a gallon of water. The free acid being thus got rid of, it was put into a press, the excess of alkaline solution was expelled, and the cotton left nearly dry. It was then washed in a solution of pure nitrate of potash, one ounce to the gallon, and being again pressed, was dried at a temperature of from 150° to 170°. It was stated, that three parts of the gun-cotton thus prepared were equal in force to eight parts of Tower-proof gunpowder.

Cotton gains considerably in weight by the above treatment, but it is scarcely changed in colour or in general appearance, if the process has been carefully conducted: it is, however, harsh to the touch, and gives a crepitating sound when pressed by the hand. It differs from common cotton by its electric excitability, the slightest degree of friction causing it to be powerfully attracted and repelled by other bodies; and also by its action on a ray of polarized light, which it does not depolarize like ordinary cotton. It explodes at a temperature of from 350° to 400°, with such rapidity as to interfere with its practical application, for if applied to the purposes of artillery, it may burst the gun before it has time to move the shot, and some of the products of its combustion make it also objectionable for fire-arms. Among these products water may be mentioned, and, should the cotton not have been well washed, nitrous acid. Another great impediment to the use of gun-cotton is its hygrometric condition, for if exposed to a damp atmosphere, it will in an hour or two absorb a considerable portion of moisture. Many attempts have been made to apply it to mining purposes on account of its enormous force, and the small quantity of smoke which it produces; but the objections to its use are numerous, the most fatal objection being its liability to spontaneous ignition.

Nevertheless, gun-cotton continues to be an object of great interest on account of its application to the beautiful art of photography. When the cotton is prepared in such a way as to burn slowly, it is not liable to spontaneous ignition, and in this state it is perfectly soluble in sulphuric ether, which the more explosive cotton is not. If the ethereal solution, called *collodion*, be poured on the surface of cold water, a paper is produced, which is prepared for the use of the photographer. This paper is a very active electric, and is perfectly soluble in ether. Collodion has also been made use of in surgery, by applying the ethereal solution to a wound, when a thin delicate artificial skin is formed by it, which perfectly excludes the air.

In the preparation of gun-cotton, nitric acid is the active agent in the formation of xyloidine: the sulphuric acid has no direct action on the lignine, its use being to retain the water abstracted from the cotton, and prevent the solution of the compound which takes place to a greater or less extent in nitric acid alone. The purity and exact strength of the acids are matters of great importance. Mr Hadow found that the best mixture for producing collodion wool is obtained by mixing 89 parts by weight of nitric acid, sp. gr. 1·424, with 104 parts by weight of sulphuric acid, sp. gr. 1·833.

On trying the effect of various re-agents on gun-cotton, Mr Hadow found that it could be perfectly restored to the original cotton, without loss of form, by means of an alcoholic solution of hydro-sulphuret of potassium. On this, and other points connected with the chemistry of gun-cotton, we must refer to Mr Hadow's paper, published in the *Transactions of the Chemical Society*. (C. T.)

GUNDAMUK, a walled village of Afghanistan, on the road from Jelalabad to Cabool, 28 miles W. of the former. Here, on its retreat from Cabool, in 1842, the remains of the British force, amounting to about 100 soldiers and 300 camp followers, were massacred, and only one man escaped.

GUNDUCK, a large river of Hindustan, flowing from the Himalaya Mountains, and falling into the Ganges. Its source is presumed to be in the territories of a native chief, named the Moostang Rajah, now tributary to the Rajah of Nepaul. After a course of about 200 miles, it sweeps round the base of the Maddar Mountain, where the river is perfectly clear, and broader than the Thames at Chelsea, with banks of abrupt rocks alternating with levels covered with stately forests. In the upper part of its course the river is called Salgrami, from a curious species of stones found in its bed and held sacred by the inhabitants. They are mostly round, and perforated in one or more places with worms, which the Hindus, in their degraded superstition, believe to have been done by Vishnu in the form of that reptile; and the stones are prized in proportion to the number of perforations or spiral curves in each. These stones are called Salgrams. A few grains of gold are occasionally separated from the sand of the Gunduck. From the Maddar Mountain the course of the river is in a south-easterly direction for the further distance of 200 miles, when it falls into the Ganges, at the town of Hajeepoor, opposite the city of Patna, in N. Lat. 25. 39., W. Long. 85. 16.

GUNDWANA, a large province of Hindustan, in the Deccan, extending from the 19th to the 25th degree of N. latitude. The tract may be considered as comprising part of the British territory of Saugor and Nerbudda with the districts of Singrowlee, Chota Nagpore, and Sirgooja, the petty native states on the S.W. frontier of Bengal, the Cuttack Mehals and the northern portion of Nagpore. It is estimated to be 400 miles in length, by 280 in average breadth. Gundwana, in its most extensive sense, includes all that part of India within the above-mentioned boundaries which remained unconquered by the Mohammedans up to the reign of Aurungzebe. But Gundwana proper is limited to four districts, named Gurrah-Mundela, Choteesgur, Nagpore, and Chandah, and it stretches S. along the E. side of the Wurda and Godavery, to within 100 miles of the mouth of the latter. The greater part of this province is a mountainous, unhealthy, and ill-watered country, covered with jungle, and thinly inhabited; and to its poverty and other bad qualities its independence may be ascribed. A continued chain of moderately elevated hills extends from the southern frontier of Bengal almost to the Godavery, and by these the eastern was formerly separated from the western portion of the Nagpore dominions. This province contains the sources of the Nerbudda and the Soane, and is bounded by the Wurda and Godavery; but a want of water is still the general defect, the streams by which it is intersected, namely, the Mahanuddy, Caroon, Hatsoo, and Silair, being inconsiderable, and not navigable within its limits. The Goands, or the hill tribes, who took refuge in the mountains and fastnesses from the invaders of the country, are the original inhabitants of the country, and still retain all their primeval habits of barbarism. The country which they inhabit is a mere wilderness, its inhabitants scarcely rising above the level of beasts. Their habits are loose and disorderly, and they frequently descend from the mountains which they inhabit to plunder the plains below, from which they were originally driven. In the course of the last century they have acquired an increasing appetite for salt and sugar, and the desire to procure these articles has operated as a stimulus to their industry, and tended more than any other circumstance to promote civilization amongst them. These Goands are Hindus of the Brahminical sect; but they retain many of their impure customs, and abstain from no flesh except that of the ox, cow, and bull. The more fertile tracts of Gundwana were subdued at an early period by the Bhoonsla Mahrattas, who claimed as paramount over the whole. The inhabitants were rendered nominally tributary; but it was found impossible to collect any revenue from them without a detachment, so that in fact the collection of the revenue was rather like a plundering expedition, the cost of which always exceeded the profit. During the war against the Pindarees in 1818, when the British troops invaded the territories of Appa Saheb, the Rajah of Nagpore, their operations were greatly facilitated by the insurrection of the hill tribes, who occupied the passes into the Nagpore territories. For a long series of years it was the policy of the rajah of this territory, a descendant of Sevajee, to interfere as little as possible with the neighbouring powers. At length, in 1803, Ragojee Bhoonsla was induced, in an evil hour for himself, to depart from this system of neutrality, and to join Scindia in a confederacy against the British. He was soon reduced, however, by the defeats which the confederates sustained at Assye and Argaun, to sue for peace, as the price of which he ceded a large portion of his dominions to the conquerors, namely, the province of Cuttack, including the pergunnah and port of Balasore. After the death of this rajah, whose sole object seemed to be to amass treasure, and who, for this purpose, laid the country under heavy contributions, and even joined with the Pindaree plunderers, the throne, contested by various competitors, was at last secured by Appa Saheb, his nephew, who, in the war against the Pindarees, joined the coalition against the British power, and was involved in ruin along with his other allies. A treaty of peace was concluded with him, which he violated; and he was finally deposed in 1818, and the grandson of the late rajah put in his stead. The latter prince, after a reign of 35 years, died in 1853; and leaving no issue, the dynasty became extinct, and the kingdom of Nagpore was incorporated with the British empire. (E. T.)

GUN-MAKING.

The term gun-making is applied to the manufacture of small arms generally—including the fowling-piece, the musket, the rifle, and the pistol. The rifle, being an arm of peculiar construction, and having properties distinct from those of other fire-arms, is treated separately. (See Rifle.)

The parts of a gun are the barrel, the lock, the stock, and the furniture.

1. *Of Barrels.*—Gun-barrels being made for various purposes and for different classes of purchasers (some of whom are willing to pay the highest price for the most perfect weapon, while others desire the cheapest article), vary considerably in the quality of their material, the mode of their construction, and the amount of labour expended on them. The material is in general iron, but steel is used to some extent in the preparation of the best and highest-priced barrels for sporting guns, and also, in the form of cast-steel, for a new species of rifle-barrel that has been used in America with the greatest success, and which recently has been introduced into this country both at Birmingham and Glasgow.

In the selection of iron for barrel-making, two qualities are absolutely essential—tenacity and elasticity. The first that the barrel may not burst under the explosive action of the powder, which does not expand gradually, but strikes suddenly like a hammer; the second that the barrel may not bulge, and also that it may preserve a certain sharpness of reaction requisite for the good shooting of the piece. It is therefore of the first importance that the iron should be of the best description that can be procured. Common iron, such as is used for the heavier works of ordinary manufacture, is so large and loose in the grain, that it could not stand the shock of explosion; and the gun-barrel makers from an early period have made strenuous endeavours to improve the quality of the metal, which in their hands has been brought to a higher state of perfection than in any other art. The finest iron ever used in this or any other country has probably been produced by the gun-makers in their attempts to work the metal up to its limits of excellence. The more iron is drawn out and forged under the hammer the more its quality improves, provided it is not burnt; and this circumstance induced barrel-makers to select the materials that had already undergone the utmost amount of work by fire and anvil. Hence arose the manufacture of gun-barrels from *stubs* or horse-shoe nails, which were not only made from rods of the best iron, but heated and hammered into their peculiar form, and afterwards *cold-hammered* to render them smooth, and to give the turn to the point which brings the nail out of the hoof. The *stub* was therefore the article that had most hammering expended on it, and was the best material for the manufacture of gun-barrels. So great was the superiority of the iron, that since stubs have ceased to be employed—either from the scarcity of the nails, or from the fact that inferior metal was employed in their manufacture—the efforts of barrel-makers have been directed to the production of an iron that should equal the stub; it being considered the standard of excellence to which all iron employed for good barrels should be made to approach more or less nearly. The barrels of the best sporting guns are now made of a mixture of iron and steel, which passes under the name of *laminated steel.* These barrels are of excellent quality, and shoot better than iron barrels on account of the elasticity of the metal.

When the iron is selected, whether of ordinary or superior quality, it is clipped by a pair of shears worked by steam into pieces the size of stubs. These are then washed to remove dirt, and cleansed in dilute acid to remove rust. They are then placed in a drum which revolves rapidly on a shaft, and the pieces are rolled and tumbled over each other till they become as bright as silver. They are now carried to the air-furnace, where they are heated almost to a state of fusion, so that they adhere together into a ball called a bloom of iron. From the furnace the ball, weighing about 40 lbs., passes to the forge-hammer, where it is drawn into a bar; and the bar then passes to the rolling-mill, where it is reduced to the requisite size for the manufacture of the barrels.

Iron barrels in Britain being made exclusively at Birmingham, we describe the process as at present practised by the Birmingham forgers. When the forge fire is first lighted it will not make what are termed best barrels. It requires to be burning and at work for several hours before it comes into working order for the fine twist barrels, and consequently the men begin by welding a number of the commonest and cheapest barrels. To each fire there are three men, the foreman and two assistants. They begin by making *rolled* barrels, which are the simplest in construction and most common in quality. A rolled barrel is merely a strip of iron folded up lengthwise like a boy's pea-shooter, and welded along the joint. The fore-part of the barrel, however, being required of less thickness than the breech end, these barrels are usually made of two lengths or tubes. The strips or plates of iron are heated and beat in a groove until they form a tube half closed. They are then heated again and closed with the edges overlapping. The edges are then welded on a mandril, and when a certain number of pieces are prepared the men proceed to weld together the two pieces of each barrel. The end of the breech part is opened a little on the beam of the anvil, the end of the fore-part is introduced, and the joint completed.

The fire being in proper order for the finer kinds of work, the welders proceed to forge twisted barrels, which differ from plain barrels in the circumstance that the grain of the iron, instead of running longitudinally, runs diagonally across or round the barrel, making a more perfect, stronger, and safer tube, neither so liable to burst nor to bulge. If we take a strip of paper half-an-inch broad and roll it diagonally round a ruler, we have a representation of the construction of a twisted barrel; and the joint that is welded, instead of being straight from end to end of the piece, is a spiral that makes a certain number of turns, according to the breadth of the rod of iron employed in the process. For the finest barrels the rod is nearly square, being $\frac{6}{16}$ths of an inch in breadth, and $\frac{5}{16}$ths in thickness. For very common barrels the rod is rather a ribbon of iron, being an inch or more in breadth. The latter will make only six turns in six inches of length, the former will make about fifteen or sixteen turns in six inches. The one makes a diagonal or open twist, the other a transverse or close twist; and in general the quality of a barrel may be ascertained by observing whether the twist be close or open, as only the best materials and the best workmanship are employed on the closest twisted guns.

The welders now take a rod four feet long and turn it into the form of a corkscrew (except that the turns lie close together), by means of two iron bars, one fixed and the other loose, the loose bar having a notch to receive the end of the rod. When inserted, the bar is turned by a handle until the whole of the rod is twisted, leaving a short end on which to weld a new rod. A sufficient number of pieces being prepared, the piece intended for the breech end is heated to a welding heat for about three inches, and *jumped* close by striking the end on the anvil. It is then hammered in a groove to make it round. One piece being welded, another is joined on by a single stroke of the hammer. The process continues till the barrel is of the required length, when it is again heated, a mandril introduced, and the tube is hammered in a groove. When cold, it ought to be cold-hammered to condense the iron and give the close grain that produces elasticity.

A patent has recently been taken out for making twisted barrels by machinery. A strip or ribbon of iron is first taken, bevelled at the edges, and slightly concave on the under side. This strip of metal is coiled round a mandril and welded at one heat, and the process combines rapidity with economy. Best barrels, however, are still made by the hand-hammer.

The plain barrel and the twisted barrel are those most commonly in use—the former for military and export purposes, the latter for sporting purposes. But another kind of barrel is made, being a combination of both. This is called the plated barrel, and is used for heavy rifles. Twisted iron being dearer than plain iron, the plated barrel has only a thin ribbon of twist rolled round a plain tube. If well made it is quite safe, and is perhaps as good for a rifle as if the twist were through the whole thickness of the metal; but it is to some extent an imposition, at least when sold as a genuine twisted barrel.

The Damascus barrel, so attractive from its handsome appearance, is made of iron and steel. Alternate bars of iron and steel are placed on each other in numbers of six each, after which they are rolled into rods $\frac{3}{8}$ths of an inch square. The rods are heated throughout their whole length, and the two ends put into the heads of a description of lathe worked by a handle. It is then twisted like a rope, or, as Colonel Hawker says, wrung as wet clothes are. Three of the rods are then placed together, and welded with the twists or figures running in opposite directions, and from these rods the barrel is welded in the same manner as a twist barrel. The Damascus barrel is beautiful in figure, and shoots well, but is greatly inferior in strength to the stub or best iron barrel. It is much used on the Continent for double rifles and for the double guns with one barrel rifled, but in Britain it has ceased to be esteemed, except for a few fancy articles.

Boring of Barrels.—When a barrel is forged and welded it is taken to the boring-bench and secured on a sort of carriage that can travel the requisite length. A boring-bit of suitable size is fixed into a revolving spindle, and the point introduced into the end of the barrel. The bit is worked by steam, water, or hand, and is pressed forward by a weight until it has passed through the tube. During this operation a stream of water plays on the barrel to keep it cool. Bits of larger size are then used till all the blacks and scales are bored out, and the tube rendered of the proper calibre. (See BORING).

From the boring-bench it passes to the grindstone. The stones are of very large size, and revolve at a terrific rate; and the workmen have a method of allowing the barrel to turn in their hands at half the rate of the stone. By this means they produce a fine surface, and remarkable accuracy of form. Best barrels are turned after being ground; inferior barrels are struck up with a large smooth or fine cut file. They are then tapped in a temporary way, the proof-plug screwed in, and in that form they are sent to the proof-house. The London proof-house, however, requires the barrels to be fitted with their permanent breeches, and double barrels to be soldered together.

When barrels are turned they are fixed in the lathe—usually self-acting—by means of plugs or mandrils, made perfectly true, and of various diameters, to fit different bores. These are placed on the centres of the lathe, and a carrier is fastened on the plug that projects from the breech end of the barrel. The leading screw that travels the slide-rest is then set at the angle to which the barrel is to be turned, and the tool proceeds until the whole exterior of the tube is finished.

The next process is breeching, of which there are three kinds—common-plug breeching, chamber-plug or mortar breeching, and patent breeching. The first is used for the plainest and cheapest guns. The second is a slight improvement on the first, and consists in making a small ante-chamber in the body of the plug, so that the grains composing the main body of the charge of powder may be ignited simultaneously. These breeches are neither so convenient, nor do they generate as much force as the patent breech. They are screwed to the stock instead of being hooked to the break-off, and consequently the barrel cannot be removed from the stock without considerable trouble. The patent breech, the invention of Mr Henry Nock, is one of the greatest improvements ever made in fire-arms, and is the only form of breeching suitable for fowling-pieces and other guns of a superior description. Its great advantage is its superior strength and neatness; and the circumstance that the touch-hole, whether for a flint or percussion gun, passes into the solid breech, and not through the breeching-screws. It also permits the barrel to be removed from the stock by the sliding of a single bolt, which can be withdrawn by the finger.

Double Barrels.—Double barrels are made of two single barrels, flattened a little by the file on one side, and soldered together, with a rib on the top-side, along which aim is taken, and a rib on the under-side, to which the pipes for the ramrod are attached. Some makers have had a practice of *brazing* the breech-ends of double guns for about five or six inches; but this practice is altogether to be condemned, as the heat required for brazing is so great that it softens the metal, and deprives it of the elasticity and density produced by hammer-hardening. The other portion of the jointing being effected by soft solder, there is also a danger that the solder does not come perfectly up to the brazed portion, and that the barrels may rust away in a place that is out of sight, and perhaps may ultimately burst in consequence of the defect. The patent breeching of a double gun is an extremely ingenious piece of work. The breech of the left barrel, after being tapped, is screwed into its place, and a cutting tool with a directing plug is introduced into the right barrel. The tool is then turned either by a lathe or brace, and removes the metal so as to form the concave breech. The other breech is then turned to the exact size, and forms the cylindrical or convex breech.

The Proof of Barrels.—Whatever care may have been taken in the forging of barrels, it is requisite that they should undergo a proof before use, as defects may exist which are imperceptible to the eye. This is done under the authority of the government—an act of parliament having been passed in 1813, and another in 1815, to insure the efficient proving of barrels, and to inflict penalties on any maker who should "rib, stock, or finish a barrel that has not been duly proved." The proof-houses are situated at London and Birmingham, and to these two establishments all barrels must be sent, with the exception of those belonging to the East India Company, which has a proof-house of its own in London. A recent and most judicious regulation requires that barrels should be proved a second time, *when percussioned*, as serious accidents are supposed to have arisen from makers reducing the barrels by reboring them after they had been proved and stamped. The proof consists in firing the barrels with a very heavy charge of powder, over which is a wadding of paper, then a leaden ball to fit the bore, then another wadding of paper. If the barrels burst, bulge, or exhibit any perceptible flaw, they are at once rejected; if not, they are washed in the water, impregnated with saltpetre, in which former barrels have been washed. They then stand for a day, and cracks or fissures become apparent by the saltpetre crystallizing on the defective weld. The Birmingham makers have an ingenious plan of filing out a crack, and hammering in a piece of wire to conceal the defect, and such barrels are sold at a lower price.

The following table exhibits the proof charges of powder for the respective calibres:—

Proof Scale.

No. of Balls to the pound avoird.	Weight of Powder for proof.		No. of Balls to the pound.	Weight of Powder for proof.		No. of Balls to the pound.	Weight of Powder for proof.		No. of Balls to the pound.	Weight of Powder for proof.		No. of Balls to the pound.	Weight of Powder for proof.	
	oz.	drs.		oz.	drs.		oz.	drs.		oz.	drs.		oz.	drs.
No. 1	11	0	No. 11	1	0	No. 21	0	10	No. 31	0	7½	No. 41	0	6
2	5	5	12	1	0	22	0	9	32	0	7½	42	0	6
3	3	8	13	0	15	23	0	9	33	0	7	43	0	6
4	2	11	14	0	14	24	0	8½	34	0	7	44	0	6
5	2	2	15	0	14	25	0	8½	35	0	7	45	0	5½
6	1	12	16	0	13½	26	0	8½	36	0	7	46	0	5½
7	1	8	17	0	13½	27	0	8½	37	0	7	47	0	5½
8	1	6	18	0	12½	28	0	8½	38	0	6½	48	0	5½
9	1	2	19	0	11	29	0	7½	39	0	6½	49	0	5½
10	1	1	20	0	10	30	0	7½	40	0	6½	50	0	5½

The powder used is the best round granulated government powder.

Gun Locks.—Next in importance to the barrel of the gun is the lock, which has undergone many successive improvements, and has now arrived at a state of remarkable excellence and efficiency. It commenced as the matchlock, still used by some of the eastern nations, was improved into the wheel-lock, which generated sparks by the revolution of a notched wheel of steel, then became the snaphance, which is the foundation of the common flint-lock, was then changed into the ordinary flint-lock, with a single hammer and pan; and finally has resulted in the percussion-lock, which ignites the charge by means of a copper cap, containing detonating powder. The percussion-lock has so completely superseded the flint that the latter may be termed antiquated; and, though still used, is no longer manufactured. It is unnecessary, therefore, to describe more than the percussion-lock. The merit of applying detonating powder as a substitute for flint in the discharge of firearms belongs to the Rev. Mr Forsyth, minister of Belhelvie, a parish in Aberdeenshire. Fig. 1 is a representation of the original percussion-lock. It is ingenious; and if it would work with safety and efficiency, would be even preferable to the lock used in the present day; but it is unsound, and liable to accidents. It has a magazine, *a*, for containing the detonating powder. This magazine revolves round a roller, *b*, the end of which is screwed into the breech of the barrel. A small hole is opened in the roller, through which the priming-powder passes. This hole communicates with a channel which leads to the chamber of the gun. Right above the little hole in the roller is the pan for containing the priming. The magazine is provided with a steel punch, the under end of which is right above the pan, ready to ignite the priming when struck on the upper end by the cock, *d*, in firing the gun. When the punch is struck down into the pan it is raised up again to its former position by a spiral spring. Every time the gun is fired the magazine is turned round, so as to drop a priming of detonating powder into the pan. It is then turned back again, and the steel punch is found in the position ready to fire the gun when the trigger is drawn. The defect of this lock was, that the magazine containing the detonating powder was apt to explode; but if the principle could be carried out with safety it would form a self-priming lock—a great desideratum both for military and sporting purposes.

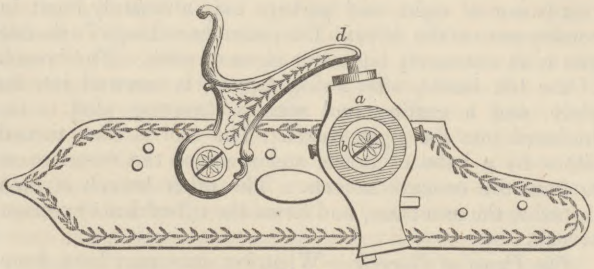

Fig. 1.

Another form of lock, called the tube-lock, fired the charge by means of a tube containing detonating powder introduced into the side of the breech. Another form was the patch-lock, which gave fire by means of a patch of detonating powder on the face of the hammer. Another form, used in America, gave fire by means of a small globe of detonating powder crushed into the touch-hole, and struck by a steel point. All these forms, however, have given way to the copper cap, which appears to have the suffrages of all the best gun-makers. Other forms must at present be regarded rather as fancy articles than as belonging to ordinary gun-making.

Fig. 2 represents one of the best British locks, as received by the gun-maker from the lock-maker—the hammer being afterwards supplied by the former in making up the gun.

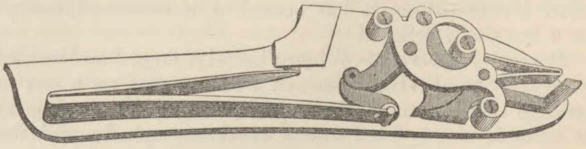

Fig. 2.

Fig. 3 represents the separate pieces of the same lock, technically called the *works*. A, the lock-plate; B, the

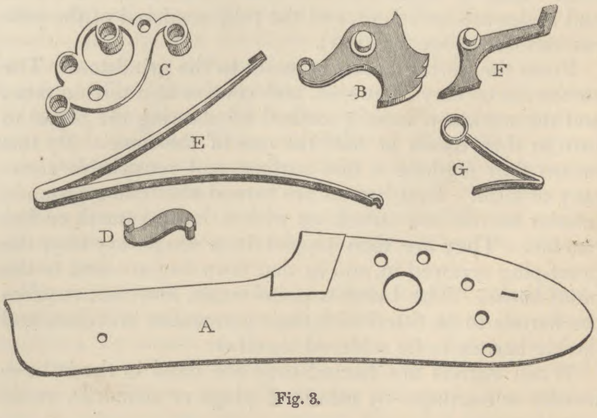

Fig. 3.

tumbler; C, the bridle; D, the swivel; E, the main-spring; F, the scear, on the projecting branch of which the trigger acts; G, the scear-spring, which resists the pull of the finger, and keeps the scear in the notch of half-bend or full-bend. Fig. 2 represents the pieces in position when the hammer is down. This is termed a *bar*-lock, on account of its being fitted under a projecting bar at the breech end of the barrel. The works, however, may be partially reversed so as to place the lock in the hand of the stock, in which case the lock is termed *back-actioned.* The back-actioned lock was popular some years since; but the general opinion of makers and sportsmen seems to have decided so completely in favour of the bar-lock, that no other is now made in the ordinary way of business.

Very common locks, such as those applied to the old muskets, were made with a hook instead of a swivel. Such locks have a dull, heavy action, and never work with the lively motion of the swivel-locks. The swivel, although apparently a mere means of connecting the main-spring with the tumbler, is a very important part of the mechanism. If well hung, it has the effect of making the heaviest pull or greatest force of the main-spring—not when the hammer is on full-bend, as might be supposed from the circumstance that the more a spring is bent the greater its force—but when the hammer is down on the nipple. This, in fact, is one of the principal tests of a well-made lock; and an experienced finger will at once detect a bad lock, from the mere circumstance that the pull increases instead of decreases as the hammer is drawn up. For military purposes it has not been customary to use the swivel-lock, except for the most recently-made rifles; but it is poor economy on the part of the government to arm a soldier with an inferior weapon, when the extra cost would not amount to more than a couple of shillings for each musket or rifle.

Some locks, especially those intended for rifles where a hair-trigger is used, have a *detant*—that is, a small piece of moveable steel attached to the tumbler in such a way that when the lock is on half-bend the detant lies behind the point of the scear. When the lock is on full-bend the detant lies in front of the scear, and projects beyond the half-bend notch, so as to carry the scear clear of the notch even if there be no pressure on the trigger. With a detant the lock cannot be let down from full to half-bend without being let down past the notch, and drawn up again—an advantage which insures that the scear shall be securely inserted into its proper place, and shall not hang on the edge of the notch, where it might slip and produce accidents. The detant is not generally used for sporting fowling-pieces, but it has advantages even for those guns.

Many safety-locks have been invented, in the hope of obviating the distressing accidents caused by the improper use of fire-arms, but not one has ever obtained the approbation of the mass of sportsmen or gun-makers. The true safety-lock is *caution.* Habitual caution in the use of arms is preferable to any mechanical device, which, while inefficient in the hands of a careless bungler, has the additional disadvantage of inducing the want of caution. All sorts of complicated devices are to be avoided in fire-arms. Those who use them must learn that the only security from accident is the most careful and constant prudence, and the habitual conviction that caution must never be relaxed. The practice of *caution* can be acquired by attention, and it is one of the first requisites of all who handle arms. A ship of war, for instance, is filled with the most tremendous materials of destruction, yet very few accidents occur, even in the gigantic navy of Great Britain. The reason is that one and all are taught *habitual caution*—systematic prudence reduced to one of the ordinary rules of life. So it should be with the sportsman; and no man ought to be trusted with arms who cannot acquire an intelligent and vigilant habit of using his weapon with careful prudence. What are termed self-acting *safeties* are, in general, devices, not for obviating accidents, but for extending the reputation or traffic of the inventor. A common bolt, however, which can be moved by the finger, and which checks the lock by bolting into the back of the tumbler, is a simple and useful appliance, and might be more generally used. In crossing a fence, jumping a ditch, or passing through a hedge—the occasions on which accidents frequently occur—the bolt prevents the discharge of the gun. Sportsmen do not generally use the bolt, except to rifles. In this perhaps they err, as it may safely be affirmed that bolt-locks would have prevented many of those accidents caused by twigs catching the triggers, or by some impediment coming in contact with the hammers that have improperly been left down on the caps, when, if they are not forced up to the half-bend, the gun is fired, and perhaps a catastrophe takes place. The disadvantage of the bolt is, that if the sportsman neglect to unbolt his lock, and a bird rises, he pulls hard, and risks breaking the scear. On the whole, however, the balance is in favour of the bolt, which is the only safety appliance that can be thoroughly recommended for general use. At the same time it is quite possible that a simple safety-lock may yet be devised; and, perhaps, this desideratum may be found in some method of locking the trigger in such a manner that the check shall be relieved at the moment of firing. There have been plans of this kind, but too complicated for general use.

The trigger, although not a constituent portion of the lock, is connected with the lock mechanism. The plain trigger is merely a piece of iron or steel hung upon a pin so as to press up the branch of the scear and relieve the tumbler. The introduction of a slight spring called the trigger-spring was one of the refinements which have now brought the best British guns up to such an admirable state of perfection. This spring prevents the triggers from hanging loose or rattling, and it brings them forward to the finger. Much of the excellence of a fowling-piece depends on the manner in which the triggers are hung.

The hair-trigger, used for pistols and rifles, is a construction by itself, and when well made is a remarkably neat piece of mechanism. Its object is to discharge the gun with the slightest possible pressure of the finger on the trigger. It can be made to any degree of fineness, and is called a *hair*-trigger, because, when finely set, a single hair will discharge the piece. It is then, of course, dangerous, as a jar or shake might produce an accident. It requires the most careful manipulation, and at all times is rather a critical appendage to fire-arms. Above all, it requires to be well made, an inferior hair-trigger being positively worthless. No part of a gun requires more perfect materials and workmanship, and therefore every purchaser of a weapon fitted with a hair-trigger should make sure that it is a good one. There can be no doubt that the hair-trigger is an advantage for rifle-shooting, where extreme accuracy is required, and where the pull on the common trigger is apt to diverge the gun from the line of aim, but it is so delicate in action that it can only be used safely in experienced hands. The principle of a hair-trigger is to make a spring do the work of the finger—the spring being set beforehand, so that when we wish to fire we have only to detach the spring and it strikes up the scear. When we fire a gun we do not take a hammer in our hand and strike the percussion-cap; we draw up the hammer of the lock to full-bend, and the main-spring exerts the required force. And so with the hair-trigger, we first set its spring, and when we wish to fire, the spring relieves the tumbler and discharges the gun. Hair-triggers are made single or double. With the former there is only one trigger to the gun, which can be used either with or without the hair. To set it, we press it forward until it locks into a catch. With the latter there are two triggers, the foremost of which is the common trigger, while the other, nearest the hand, sets the hair. The advantage of the double construction is, that we can put the gun to the shoulder and direct the line of fire *before setting the hair-trigger*. The double trigger is most used on the Continent. In Britain the single is most in vogue.

Gun-Stocks.—Gun-stocks are made almost exclusively of the wood of the walnut tree, which appears to combine in a higher degree than any other wood the qualities of soundness, strength, durability, and beauty of appearance, without excessive weight, hardness, or brittleness. Other woods have been tried to a considerable extent, but the walnut holds its ground without a rival. Birds'-eye maple, rosewood, the root of ash, &c., may be occasionally used according to the fancy of a purchaser, but no wood except the walnut enters as a general material into the manufacture of gun-stocks. The English wood is considered preferable to the French or German, being closer in the grain, finer in the texture, and generally of a more handsome figure. Before Joseph Manton improved the manufacture of fowling-pieces, the stocks were made too short; and after he had designed a new pattern of sterling excellence, other makers fell into the extreme of length, and made the stocks absurdly long. The rule is for each purchaser to suit himself, without being overstretched by a long stock, or obliged to bend the head inconveniently to a short one. In Britain stocks are made plain; on the Continent they are frequently ornamented by elaborate carving sometimes of great excellence. The stocks of Lebeda of Prague are models of elegance; and as this system of ornamenting fire-arms was a national peculiarity, it is perhaps to be regretted that the French and Belgians are departing from their own style and merely imitating the English patterns. In the Great Exhibition there was a brace of pistols stocked in ivory, the carving of which alone would probably cost from L.50 to L.100. The Americans stock their rifles differently from the British. They use much less wood, thin off the butt, and do not now carry the stock forward under the barrel. The heel or end of the butt is also hollowed out to fit the arm, as the American rifle-shooters fire from the upper part of the arm, and not from the shoulder as is customary in Britain. A pistol-hand is a handsome, and perhaps useful addition to the gun-stock. A very experienced gun-maker informed the writer of this article that he had never seen a broken stock that had a pistol-hand. Musket stocks have not hitherto been made by machinery in Great Britain or on the continent of Europe, except in Belgium, where the experiment failed. In America they are made in the following manner:—A stock is taken in the roughly-sawn state, and placed in a machine, in which it revolves. This first machine cuts out the portions on which the banding is placed. The stock is then taken to another machine, which, by a revolving drill, cuts the groove for the barrel down to the breech, and at the breech a cutter squares the groove at a right angle. Another machine turns the hold of the stock; another drills out the portion where the lock is fitted; another cuts the placing for the trigger-guard plate. Other machines cut the placings for the rest of the furniture, and the stock is so far finished as only to require a slight rasping to complete it. The parts are thus so perfect that a lock taken out of a heap will fit any stock with sufficient accuracy for military purposes. Altogether, sixteen different machines are required for forming the stock, and the operation occupies about half-an-hour.

Gun-Furniture.—The portions of a gun other than the barrel, the lock, and the stock, are termed gun-furniture. They consist of the heel-plate, which covers the butt; the break-off, into which the breeching hooks; the trigger-plate; the trigger-guard; the hammers; the escutcheons and bolt which fasten the barrel into the stock; the cap or tip of the stock; the tops, worms, and caps of the ramrod; and the screws necessary to put the gun together. Iron furniture of the best quality is made under the hammer, but a large proportion of the inferior furniture is stamped, not forged. The stamped or *pressed* articles are used for cheap guns, but they never possess the strength and solidity of the forged work. In the manufacture of gun-furniture—a scroll-guard for instance—the forgers exhibit marvellous dexterity, and turn out the article so accurately shaped that it requires little more than to be cleaned up with the file.

Pistols.—Pistols, although not generally manufactured by the same parties, are made in much the same manner as guns, with this exception, that where they are made in pairs the two barrels are forged and bored in one piece, and afterwards cut through the middle. This method saves labour, and insures that the calibres of the two barrels shall be exactly similar.

The Gun Trade.—The manufacture of guns may be divided into two great branches. The wholesale trade, which includes military arms and the commoner classes of export arms, and the retail trade, which includes the fowling-pieces and rifles of an expensive character used by sportsmen. The wholesale trade is carried on almost exclusively at Birmingham, which is now the only place in Great Britain where gun-barrels are forged. Formerly fine barrels were made in London; but the metropolitan forgers found that they could not compete with the local advantages of Birmingham, and the manufacture of barrels has centred exclusively in the latter town. Gun-furniture is also made at Birmingham; and gun-locks, especially those of the best quality, are made at Wolverhampton, where the lock-filers have acquired a high reputation for the excellence of their productions. For military muskets it has hitherto been customary for the government to contract with the Birmingham makers; but a large establishment is now in progress at Enfield, where muskets are to be made by machinery, on the plan adopted by the American government, and introduced into this country by Colonel Colt, who manufactures his revolvers by machines not previously used in Britain, and which bid fair to revolutionize the wholesale manufacture of arms. Inferior guns are finished at Birmingham, and sent out for sale. They are retailed by ironmongers and other traders, who are not gun-makers, and have no knowledge of the quality of the wares further than the price they pay, and the character of the wholesale merchant from whom they purchase. Many of these guns are of fair sound quality, and may be used for boating and rough work, but many also are blemished, being made up from articles that have been cast on account of what are termed *faults*. A barrel, for instance, that has a crack in it will be mended by hammering in a small piece of wire, and neither the salesman nor the purchaser is able to detect the artifice. The fine or *best-gun* trade, which is carried on at London, Birmingham, Edinburgh, Dublin, and the provincial towns, is of an entirely different character from what is termed the sale-shop trade. The master gun-maker is here an artist, and not merely a salesman. He receives his barrels from Birmingham, his locks from Wolverhampton, and the furniture he partly purchases from the forgers, partly makes at home. His business is to *screw the gun together;* but this technical term includes everything of importance, except the production of the raw material on which he works. He purchases the very best materials, as the price of these does not constitute nearly so large an item as the after-work to be expended on them. He subjects them to the closest inspection; and in proceeding to make up the gun he discovers the quality of every individual part. His position in the gun-trade is much the same as that of the British watchmaker who receives his materials from Clerkenwell, or of the Parisian watchmaker, who receives his from Geneva. The making of the watch is a different art from the making of the plates, wheels, and cases. And so with gun-making. The gun-maker is the artist who superintends the production of the finished work.

This branch of the gun manufacture has rapidly increased within the last few years. A London gun was formerly esteemed as superior to all others; and in the days of Joseph Manton, Henry Nock, Durs Egg, &c., it was no doubt superior to any piece that was made elsewhere in Britain. But the making of fine guns has extended to almost every part of the kingdom, and Birmingham now produces sporting guns of the very best quality, while Edinburgh has become celebrated for the accuracy of its rifles, and for the extreme finish of its higher class of fire-arms. An Edinburgh gun is now in every respect equal to the best guns of the metropolis.

When guns are stocked and screwed together, their barrels are browned to prevent them rusting. There are several methods of browning, and each maker has little modifications of his own. The following is the recipe for the wash with which barrels are stained:—

1 oz. muriate tincture of steel,
1 oz. spirits of wine,
¼ oz. muriate of mercury,
¼ oz. strong nitric acid,
⅛ oz. blue-stone,
1 quart of water.

These are well mixed and allowed to stand a month to amalgamate. The oil or grease is carefully removed from the barrels by lime, and the mixture is laid on lightly with a rag or sponge every two hours, and scratched off with a steel scratch brush every morning until the barrels are dark enough. The acid is then quenched by pouring boiling water on the barrels. Inferior barrels are stained by a different process. Muriate of mercury is dissolved in a wine-glassful of spirits of wine, and this solution is mixed with a pint of water. Some of the mixture is then poured on a small quantity of whitening, and laid on the barrel with a sponge; as soon as dry it is brushed off, and a fresh coat laid on. This is continued till the colour is dark enough, which is generally in about two days. Hot water is then applied, and the barrels are suddenly immersed in cold water to heighten the colour. Another method, called smoke-brown—although the colour produced was a greyish black—was also employed, and is strongly recommended in Mr Greener's *Treatise on the Gun;* but it is apt to injure the barrels unless performed with the utmost dexterity and care. It has therefore fallen out of use, except for a few rifle barrels. The plan is to anoint the barrels with a little vitriolic acid, which is then washed off, and the iron rubbed dry. They are then passed through the flame of the forge-fire until covered with a sooty covering, then allowed to stand in a damp cellar till rust is produced—after which they are scratched with the wire brush. The process is repeated until the colour becomes permanent. This stain looks well and stands well, but is not suited for general use.

In finishing a gun, the hammers, break-off, lock-plate, and breeches are case-hardened by the ordinary mode of case-hardening iron. The heel-plate and trigger-guard are blued, and the screws, which ought always to be of steel, are tempered. The stock is stained and oiled—or varnished and polished in the same manner as a coach pannel. The latter mode best resists rain and moisture, and is to be preferred where the varnish is good. Few of the ornamental arts of this country have made more progress than that of gun-engraving. Where formerly there were merely a few scrolls and some rude attempts at a sporting dog or game bird, we now find the gun-furniture ornamented with elaborate work of the most tasteful design and most careful execution. As the British taste, however, rejects fanciful ornament, the engraving is almost exclusively in lines cut with the graver, whereas the Germans employ the method called *cutting out,* the ground being cut away, and the figures left in relief. The latter mode produces remarkably handsome work.

The American Rifle.—The American rifle having attained to great celebrity from the unusual accuracy of its fire, we may describe one of the most recent construction. It is rather remarkable that in the Great Exhibition of 1851 there should have been no specimen of this weapon publicly exhibited. The barrel is made of cast steel thoroughly annealed, and is cut or planed outside into an octagonal shape. The barrel is 2 feet 8 inches long, and is fitted with a loading muzzle—its weight ten pounds. The patent breech is made of wrought iron, case-hardened, and is joined to the break-off by a hook, with the addition of a half-lap joint secured by a square-headed screw. This mode of fastening does away with the wood in front of the breech. The false or loading muzzle is put on by means of four steel pins about ⅛th inch in diameter, and ⅜th inch long, and the holes for these pins are drilled before the muzzle is cut off. When the muzzle is cut it is held in its place by a cramp, and the rifling is cut through both muzzle and barrel. A small globe of steel is fixed on the upper part of the muzzle to prevent the front sight being seen when the muzzle is on the barrel, so that there shall be no danger of firing it away. The bore of the barrel is scarcely ⅜ths of an inch, or about 90 round balls to the pound. The conical balls called pickets are 43 to the pound. The bore is then worked out with lead and emery until quite true. It is then cut with a *gaining* or *graduated* twist, starting at the breech with one turn in 6 feet, and ending at the muzzle with one turn in 3 feet 6 inches. There are six cuts or creases, and the sides of the lands are cut square to their surface. It is then *freed* from the breech to within 1½ inches of the muzzle, so as to reduce the friction. The lock has back-action, and a single hair-trigger. The stock is of black walnut, straight from butt to break-off, and there forms a considerable angle with the barrel. A globe-sight is fixed into the stock just behind the break-off, and a bead-sight at the muzzle. The price of such a weapon in America is from 50 to 200 dollars. With such a weapon, and a telescope sight, Capt. W. Tisdale of Utica made ten consecutive shots at 220 yards, and each shot on the average measured *less than one inch* from the centre of the bull's-eye—the whole string being 9⅝ inches. The whole of the ten shots would have gone into a small-sized playing-card. A feat of this kind is probably unparalleled in Great Britain, and it may draw the attention of our own makers to the propriety of diminishing the calibre, and increasing the speed of the ball. The loading-muzzle used by the Americans is intended to prevent the wearing of the true muzzle; but the superiority of American rifle-shooting is rather to be attributed to the smallness of the ball, and the great velocity with which it travels. The greater the velocity the straighter is the flight—that is, the course of flight has less elevation and depression than when a heavier ball is used.

In the British service the old smooth bored musket is rapidly giving way to the *new Enfield rifled musket,* a weapon of tremendous power and range. This is the arm commonly spoken of as the Minié rifle, but it is no longer a Minié. Minié's principle was to introduce an iron cup into the butt of an elongated ball on the supposition that the cup being driven into the lead by the force of the powder, would expand it and make it fit the rifle-grooves, thereby procuring the advantage of loading without hammering or forcing the ball into the muzzle. The principle was excellent, and has wrought a revolution in the small arm department of the service, but the mode of carrying it out by means of the iron cup was defective. The cup was frequently driven not *into* but *through* the ball, leaving the lead in the barrel. It was then found that the iron was superfluous, and that if the lead was hollowed out or cupped, it would expand quite sufficiently. Such is the ball now in use for the military rifle, and Mr Pritchett received an award of L.1000 from government for its production.

The cost of these muskets as made by contract, has been L.3, 9s. 0¼d. As made at Enfield the cost has been L.3, 4s. 7½d.; but if made by machinery, and an order given for 1,000,000, Col. Colt offered to supply them at 30s. In the opinion that this price was not too low, Col. Colt was borne out by Mr Anderson, chief engineer in the royal arsenal at Woolwich, and by the celebrated engineer Mr Nasmyth. The contract price of the musket in the United States is from 10 to 12 dollars—from L.2 to L.2, 10s. The price at which the Belgian rifled musket is made in the government factory is 42 francs, and a musket of the same pattern could be made in this country at 36s. or 37s.

That the rifled musket used in the British service is one of the most powerful weapons ever invented in the department of small arms, is unquestionable, but it requires improvement. As made at present it has several drawbacks. After being fired even a small number of shots, it is so difficult to load that the men using it have complained that they could not send the charge home. From the method of stocking also it has been found impossible to draw the ramrod in wet weather. The pull on the trigger is considerably too great for accurate shooting, and the method of forging the sight-supports on the barrel instead of using a slide-sight prevents the guns from being correctly regulated. These are serious disadvantages, and they require the renewed attention of the military authorities. It is well known that a good sporting rifle can be fired 100 or 150 times without cleaning. It is therefore a reproach to the military weapon that 20 or 25 shots have been found to disable it. The guns, however, are of admirable workmanship, and only require some slight improvements to render them the best small arms in any service.

The following is the account of the sum voted by the House of Commons for the supply and repair of small arms in each year from 1842–43 to 1854–55, and of the sum actually expended.

Year.	Amount voted.	Amount expended.		
1842–3	L.180,000	L.114,660	15	6
1843–4	136,000	118,936	19	7
1844–5	90,000	111,336	11	9
1845–6	84,379	117,317	13	8
1846–7	120,000	135,377	7	6
1847–8	120,000	134,769	2	10
1848–9	140,000	139,365	8	0
1849–50	120,000	122,885	15	0
1850–1	90,000	88,979	12	4
1851–2	76,000	37,664	0	8
1852–3	78,000	61,639	18	10
1853–4	135,800	*26,931	4	0
1854–5	161,400			

* This account is incomplete.

The following table shows the total supply of arms *made in London* for the Government and East India Company from 1841 to 1850 Since the latter date the government contracts have been almost entirely withdrawn from the metropolis, on account of a trifling difference in price; and the excellent body of workmen formerly assembled in London have betaken themselves to other trades or to other localities:—

Dates.	E. India Company.	Government.	Total.
1841	20,150	7,660	27,810
1842	36,353	12,926	49,279
1843	34,880	12,270	47,150
1844	25,362	13,496	38,858
1845	49,623	12,539	62,162
1846	50,880	16,336	67,216
1847	57,214	18,378	75,592
1848	55,068	23,862	78,930
1849	71,381	26,366	97,747
1850	26,025	13,607	39,632

Total of ten years, 584,376, or an average of 58,437 for each year.

Revolvers.—Among the arms recently introduced into this country and manufactured to a large extent is the revolver or repeating pistol. The principle is not new, as revolvers of a construction nearly similar to those now in use are to be found in the museums of old arms. To Col. Samuel Colt of the United States belongs the merit of reviving this species of weapon; and he has a patent, dated 1836, for his pistol, which is universally known as Colt's revolver. Messrs Deane, Adams, & Deane of London have also a patent for another form, which differs from Colt's in several essential particulars. Revolvers have long been made in this country, but they were made of a large mass of metal bored into the required number of barrels, the whole of the barrels being of the same length. This weapon was so clumsy as to be almost useless. The new revolver is made with one single barrel of the full length, and a revolving chamber only long enough to contain the charge, and bored into five or six compartments. This chamber is made of cast steel, and is so fitted that it can be removed by drawing a bolt. This gives the advantage of enabling a spare chamber to be used, which can be kept ready loaded, and the number of shots is thus doubled. With a 5-shot pistol and two chambers 10 shots can be fired without re-loading. In introducing the revolver in America, Col. Colt expended a very large amount of money without reaping a return until 1849-50, when the disturbed state of Florida and Texas, and afterwards the Mexican war, established the reputation of his arms. In his evidence before a select committee of the House of Commons in 1854, he mentioned the curious fact that, while he was supplying the American government with pistols at 25 dollars each, the soldiers were selling them to traders at 75 to 150 dollars, and sometimes as high as 200 dollars each. He has now a manufactory at Hartford, in America, where, in 1853, he turned out about 50,000 revolvers; and another manufactory at Vauxhall, London, where he employs between 200 and 300 workmen, and where he could produce nearly 1000 pistols per week, made almost entirely by machinery. The difference between a Colt and a Deane & Adams pistol is, that the Colt has a lever ramrod under the barrel, which is part of his patent, and that the hammer requires to be drawn up every time the pistol is fired. The Deane & Adams, on the contrary, has a lever at the side, and can be fired by merely drawing the trigger. A recent improvement of Mr Adams has produced a pistol that will fire either by drawing up the hammer or by pulling the trigger, and this pistol is considered the most perfect that has hitherto appeared. Another form, and one of great merit, has a spur under the trigger-guard, and the arm can only be fired when the spur is pulled by the middle finger, while the trigger is pulled by the fore finger. Between the merits of these weapons it is difficult to institute an impartial comparison. It may, however, be laid down as a general maxim, that every pistol that will fire by merely drawing the trigger is a dangerous weapon. The trigger may be drawn by accident, as in the case of the late lamented Dr Hector Gavin, who was shot by one of these weapons, to the regret of the service and the nation. It may perhaps be said, however, that Colt's pistol is more safe in its construction—Deane and Adams's more effective in competent hands. But all the revolvers require to be handled with caution.

Another objection to any arm that fires merely by the draw of the trigger is, that if the main-spring be strong enough to explode the percussion cap with certainty, it becomes too strong for the finger, and the shooter swerves from his aim. If, on the contrary, it is so weak as to pull easily, there is no certainty that the cap will explode except under the most favourable circumstances. In very dry weather, and with good caps, it may explode every time it is struck by the hammer; but in damp weather, or with inferior caps, the arm misses fire, and the shooter is disappointed, or it may even be that his life is endangered. There is thus a compensation of advantages in each weapon, and a selection must be made according to the purpose for which the arm is intended. Repeating rifles, on the same principle as the pistols, are manufactured and used in the United States, but they have not yet been adopted in Britain.

(P. E. D.)

GUNNERY

Is the art, in a restricted sense, of determining the motions or ranges of projectiles discharged from cannon, mortars, howitzers, and other kinds of artillery; and, in a more general sense, of determining not only the motions of such bodies, but also the arrangements by which they are rendered effective instruments of war.

I.—THEORY OF GUNNERY.

The use of fire-arms had been long known before any theory concerning them was attempted. Nor is this remarkable, as the theory of the motion of projectiles depends on a knowledge of certain laws of nature which were not discovered till many years afterwards. It was different as regards the improvement of those defensive arrangements which had been found sufficient in the earlier times to afford protection against the more ancient engines of war, or, on the other hand, to cover those who were called upon to use them. The architects of the middle ages (see FORTIFICATION) quickly saw the necessity of modifying the forms and proportions of the ancient walls which then surrounded fortified towns, and rendering them more suitable both for the use and for the resistance of the newly-discovered artillery adapted for the use of gunpowder. The Cavaliere Saluzzo of Turin has indeed shown, from the archives of his native town, that Giorgio Martini, Architetto Senese, undertook the task of remodelling the ancient walls of castles and of towns even before the commencement of the sixteenth century, as Martini died in 1506. In his plans the profiles of the old castle are not much altered; but the trace is greatly modified, so as to produce a more perfect reciprocal or flanking defence, either by a combination approximating to something like the bastioned trace, or by *capannati*—so called from their resemblance to a woodman's hut—in the ditch, a work in principle the same as the caponnieres subsequently invented by Dürer. Nothing, perhaps, is more calculated to exhibit the military spirit which pervaded the Italian architects, sculptors, and others, as well as those of the military profession, than the list of Italian authors on the art of war, in the corps papers of the Royal Engineers, which was drawn up by an accomplished lady, Mrs Lennox Conyngham, from an inspection of the libraries of Rome alone. In that list appears the name of Nicholas Tartaglia, who was the first author who wrote professedly on the flight of cannon-shot. In 1537 he published a book at Venice, entitled *Nova Scientia;* and afterwards another, printed at the same place in 1546, in which he treats of these motions. His discoveries were but few, on account of the imperfect state of mechanical knowledge at that time. He determined, however, that the greatest range of cannon was with an elevation of forty-five degrees; and he likewise ascertained, contrary to the opinion of practitioners, that no part of the track described by a bullet is a right line, although the curvature is in some cases so small that it is not attended to. He compared it to the surface of the sea, which, though it appears to be a plane, is yet undoubtedly incurvated round the centre of the earth. He also assumes to himself the invention of the gunner's quadrant, and often makes shrewd guesses as to the results of untried methods. But as he had not opportunities of observing practice, and founded his opinions solely on speculation, he was condemned by most of the succeeding writers, though often without any sufficient reason. The philosophers of those times also intermeddled in the questions which hence arose; and many disputes on motion occurred, especially in Italy, where they continued till the time of Galileo, and probably gave rise to his celebrated *Dialogues on Motion.* These were published in the year 1638; but in the interval, and before Galileo's doctrine was thoroughly established, many theories of the motion of military projectiles, and many tables of their comparative ranges, at different elevations, were published; all of them egregiously fallacious, and utterly irreconcileable with the motions of these bodies. Many of the ancients, indeed, indulged in speculations concerning the difference between natural, violent, and mixed motions; but when they did so, scarcely two of them could agree in their theories.

It is strange, however, that during all these contests so few of those who were intrusted with the charge of artillery thought it worth while to bring these theories to the test of experiment. Mr Robins informs us, in the preface to his *New Principles of Gunnery*, that he had met with no more than four authors who had treated on this subject. The first of these is Collado, who has given the ranges of a falconet carrying a three-pound shot to each point of the gunner's quadrant. But, from his numbers, it is manifest that the piece was not charged with its customary allotment of gunpowder. The results of his trials were, that the point-blank shot, or that in which the path of the ball did not sensibly deviate from a right line, extended 268 paces. At an elevation of one point (or $7\frac{1}{2}$° of the gunner's quadrant), the range was 594 paces; at an elevation of two points, 794 paces; at three points, 954 paces; at four, 1010; at five, 1040; and at six, 1053 paces. At the seventh point, the range fell between those of the third and fourth; at the eighth point, it fell between the ranges of the second and third; at the ninth point, it fell between the ranges of the first and second; at the tenth point, it fell between the point-blank distance and that of the first point; and at the eleventh point, it fell very near the piece. The paces spoken of by this author are common steps.

The year after Collado's treatise, another appeared on the same subject, by one Bourne, an Englishman. His elevations were not regulated by the points of the gunner's quadrant, but by degrees; and he ascertained the proportions between the ranges at different elevations and the extent of point-blank shot. According to him, if the extent of the point-blank shot be represented by 1, the range at 5° elevation will be $2\frac{2}{9}$, at 10° it will be $3\frac{1}{3}$, at 15° it will be $4\frac{1}{3}$, at 20° it will be $4\frac{5}{6}$, and the greatest random will be $5\frac{1}{2}$. This last, he tells us, happens in a calm day, when the piece is elevated to 42°; but according to the strength of the wind, and as it favours or opposes the flight of the shot, it may be from 45° to 36°. He has not informed us with what piece he made his trials, though from his proportions it seems to have been a small one. This, however, ought to have been attended to, as the relation between the extent of different ranges varies extremely according to the velocity and density of the bullet.

After him, Eldred and Anderson, both Englishmen, published treatises on this subject. The first published his treatise in 1646, and gave the actual ranges of different pieces of artillery at small elevations, all under ten degrees. His principles were not rigorously true, though not liable to very considerable errors; yet, in consequence of their deviation from the truth, he found it impossible to make some of his experiments agree with his principles.

Before proceeding further with the history of gunnery, or passing the epoch at which the writings of Galileo had prepared the way for a sounder knowledge of its principles it is only an act of justice to Nicholas Tartaglia to record what he *actually* either knew or conjectured on the subject. The second of his works, published, as before stated, in 1546, was translated into English by Mr Cyprian Lucar, and published in London in 1588. It consists of three books of *Colloquies concerning the Arte of Shooting;* and the motive for writing it is thus stated by Tartaglia in his dedication of the book to King Henry VIII., in the language of Lucar's translation :—"It was never my profession, not at any time have I delighted to shoot in any harchibuse, hande-gunne, or in any other small or great piece of artillerie, nor doe intende to shoote hereafter in any of them; but one only question which a skilfull gunner in 1531 did aske of me in Verona provoked mee at that tyme to thinke thereupon, and by that occasion to finde out the order and proportion of shootes or markes neare hand, and also at markes far off, according to the variable clevation of the piece which doth shoote, whereof I should never have had any care, if that gunner had not with his saide question stirred me up to deale in the same." The idea having been thus raised in his mind, Tartaglia was stimulated by the threatened war with the Turks to publish, in 1537, a short *Treatise of Shooting in Gunnes, to the ende* (as he observes) *that my devises in the same might bee considered of.* This book, he says, did no good; and as he continued to be asked many questions by men of station and learning, as well as by gunners, on the subject, he determined to answer all such queries in his second book, which is therefore arranged in the form of dialogues between Tartaglia and the Duke of Urbino, the Prior of Barletta, the Lord of Achaia, bombardiers, gunners, and gun-founders.

1. In the third Colloquie of the 1st Book he lays down as a proposition, that "a pellet doth never range in a right line except it be shot out of a piece right up towards heaven, or right downe towards the centre of the world."

In proving this proposition, Tartaglia assumes that the effective weight of the pellet, or ball, is diminished in proportion as the velocity is increased, and *vice versa;* and hence that the ball is less drawn to the earth at the first part of its flight than it is at the last. The explanation of the fact is therefore founded upon erroneous principles, but the reasoning from it is good; for Tartaglia says :—

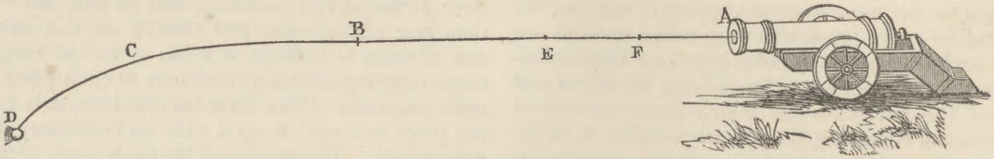

Fig. 1.

"If now it be supposed that in any portion AB of the trajectory of the ball, the ball moves in a right line, divide AB in two equal parts at E; now, as the velocity is greater in AE than it is in EB, the ball will be less urged to the ground in the first than it is in the second half, and hence that the line EB cannot be as nearly straight as AE; or, subdividing again AE into two parts at F, FE will be more removed from a straight line than AF; and so on—proving that no part of the trajectory could be absolutely straight." Considering the imperfect knowledge of the time, this demonstration was perhaps as much as could be expected, as it distinctly recognises the principle, that weight or gravity continued to draw the ball to the earth from the first to the last moment of its motion under the impulse of the propelling force, and hence that it could not at any moment move in a straight line.

2. *Point-blank.*—Tartaglia, in removing the scruples of his imaginary auditors, explains in the most satisfactory manner the different acceptations of this term, as now applied in the British and French service.

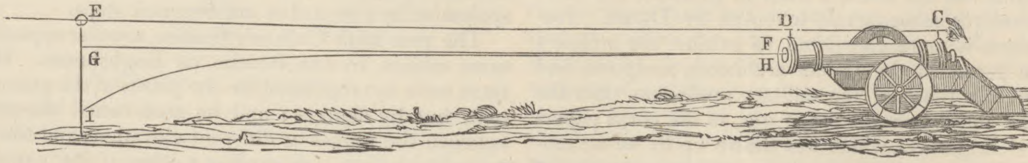

Fig. 2.

In this cut it is assumed that CD is, by a proper arrangement of sights at the breech and muzzle, made parallel to the axis of the gun; and hence, that the line of aim, CDE, is parallel to FG, or to the axis of the gun produced; in which case it is manifest that the ball could not arrive at G, but would come to the ground at I, which point, provided GI be equal to the height of the axis of the gun above the ground, marks the point-blank range of the British artillerist, or the lateral space passed over by the ball in the time it takes to fall to the ground. For convenience sake, the axis is supposed to be horizontal, and the range is also taken on a horizontal plane.

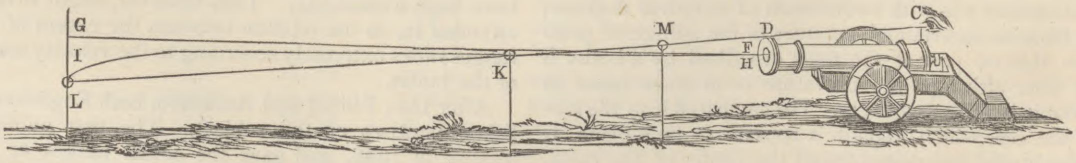

Fig. 3.

If the sights are so arranged that one shall be higher from the axis of the piece than the other, the line of sight or aim will no longer be parallel to the axis, but, when prolonged, will make an angle with, or intersect it. If the muzzle sight be the higher, always estimating from the axis, the intersection will take place behind the breech, and the line of the axis will be depressed below that of sight; if, on the contrary, the breech sight be the higher, the intersection will take place in front of the muzzle, and the line of the axis will be elevated above that of sight. The latter is the case when the line of natural aim, or sight, is used, or that passing through the highest point of the breech-ring and the low sight, or highest point, of the muzzle-ring. The case is analogous to that of fig. 3, where FG represents the line of the axis produced, CDL the visual line, and HI the true line of flight or trajectory. Now, it is evident from this drawing that the shot intersects the line of vision just at K, and hence that if the mark M chanced to be nearer the gun, though on the visual line, it would not be struck, at least in the centre, by the ball, which, in this part of its course, would be below that line. After passing K, the line of flight rises above the visual line, but in its descent, meets it again when I and L coincide, and if the mark M is placed at that point the ball will strike it.

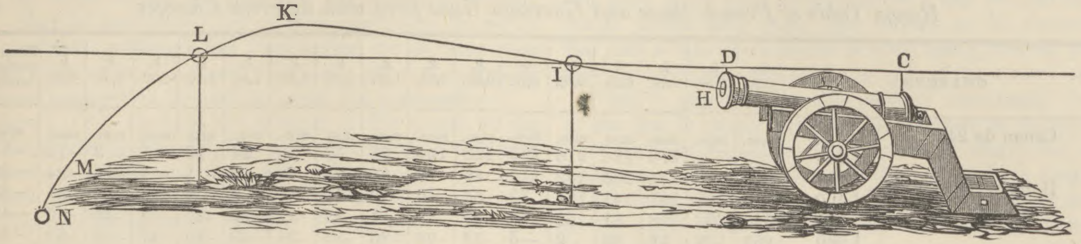

Fig 4.

This is better shown in fig. 4, where the visual line CDL is represented horizontal—the axis, therefore, being elevated by the angle made by the intersection of the axis prolonged and the visual line. In this case, then, the ball rises and intersects the visual line at I, and again on its descent at L, proceeding on to N, so that the mark M would be struck if placed anywhere on the trajectory from L to N; and when the line CD is tangent at once to the muzzle and breech of the gun, or passes through any fixed and invariable marks or sights placed for the purpose on the summit of the base and muzzle rings, it becomes the natural line of aim or sight; and if placed horizontal, as in the figure, determines the point-blank range, or the distance from the gun of the second intersection L of the trajectory with the natural line of sight.

Didion.

In the excellent treatise on artillery by Didion, *chef d'escadron* of the French artillery, the meaning of the term *but-en-blanc*, or point-blank, and the range corresponding to it, are stated as above, and, as observed by Didion, the point K of fig. 3, or I of fig. 4, being, from the ordinary construction of guns, so near to the muzzle (in a 68-pounder about seven feet), may be considered as corresponding with the actual point of intersection of the axis of the gun with the line of sight, the point of second intersection only being therefore of practical importance as determining the range.

It is very necessary to keep in view the two different interpretations of point-blank and point-blank range which have been here explained, in comparing the published ranges of English, as well as American and foreign guns, as will be perceived from the following statement:—

Griffiths (*Artillerist's Manual*, 6th edition, 1854) gives—"The point-blank range of iron 32, 24, 18, and 12-pounders, with solid shot, as varying from 380 to 260 yards; from which to 1200 yards every ¼ degree increases the range 100; and from 1200 to 1500 every ¼ degree increases the range about 50 yards; and the point-blank range of brass medium 12, 9, and heavy 6-pounders, with solid shot, at 300 yards, and from which to 700 yards, every ¼ degree elevation increases the range 100 yards; from 700 to 1000 every ¼ degree increases it 75 yards, and from 1000 to 1500, each ¼ degree increases it 50 yards.

Captain Mordecai, in the *Ordnance Manual of the United States Army*, 1850, gives the following ranges:—

	Charge.	Degrees Elevation.	Yards.
6-pounder field-gun.	1·25 lbs.	0	318
		1	674
		2	867
		3	1138
		4	1256
		5	1523
12-pounder. field-gun.	2·5 lbs.	0	347
		1	662
		1 30′	785
		2	909
		3	1269
		4	1455
		5	1663
24-pounder siege and garrison, on siege carriage.	6 lbs.	0	412
		1	842
		1 30′	953
		2	1147
		3	1417
		4	1666
		5	1901
	8 lbs.	1	883
		2	1170
		3	1454
		4	1639
		5	1834

It may be observed, that both in the American and English service the word "dispart" is used, and means the natural tangent to the angle of natural sight or aim, the length of the gun measured from the rear of the base ring to a line raised vertically at the highest point of the swell of the muzzle, or at the permanent mark or sight fixed there, being the radius; and hence the angle of dispart is synonymous with the angle of natural sight, an angle which in English iron ordnance varies in construction from 1° to 2° 30′, and in the French service varies also, as shown in the annexed table, extracted from *Piobert*.

Table of the Angles of Natural Aim or Sight of French Guns.

CALIBRES.	36	30	24	18	16	12	8	6
Canons de siége et de place	...	...	1° 15′ 49″	...	1° 9′ 4″	1° 6′ 31″	1° 3′ 45″	...
Canons de campagne	...	...	...	...	...	0 59 39	0 59 46	...
				...				
Canons de côte	1° 32′ 0″	...	1 28 0	...	1 21 0	1 18 0	...	...
Canons de marine longs	1 34 17	1° 34′ 0″	1 30 37	1° 31′ 37″	...	1 26 33	1 11 11	1° 18′ 4″
Canons de marine courts	1 56 53	1 57 0	1 49 48	1 50 3	...	1 41 5	1 23 53	1 27 15
Caronades	...	3 40 0	3 50 0	3 50 0	...	3 48 0	...	...
Canon-obusier	...	1 10 15	...	...	...	...	...	...

Now, Griffiths states the point-blank range of the 12-pounder iron, with 4 lbs. of powder, as 360 yards; and in the following table, it will be observed that the point-blank range of the French 12-pounder, a gun which would be equivalent to a 14-pounder English, is given as 650 metres, equal to 710 yards. In like manner Captain Mordecai gives the point-blank range of the 12-pounder American field-gun, with 2 lbs. 5 oz., as 347 yards; whereas the French 12-pounder with a similar charge (see following table) gives 540 metres, or 600 yards nearly. The French point-blank range in the first case corresponds to an elevation of 1° of English practice, and in the second to an elevation of less than 1°, as Captain Mordecai gives the range of 1° as 662 yards, though the angle of dispart of the French siege 12-pounder is 1° 9′ 4″, that of the 12-pounder field-gun being 0° 59′ 39″.

Range Table of French Siege and Garrison Guns fired with different Charges.

CHARGES.		k. 0,20.	k. 0,30.	k. 0,40.	k. 0,50.	k. 0,60.	k. 0,70.	k. 0,80.	k. 0,90.	k. 1,00.	k. 1,20.	k. 1,40.	k. 1,60.	k. 1,80.	k. 2,00.	k. 2,50.	k. 3,00.	Tiers du poids du boulet.
Canon de 24.	m.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Hausses pour les distances................	600	...	...	376	284	216	168	132	104	85	56	38	24	15	8	– 3	–12	–17
	500	...	415	284	205	152	115	89	70	55	33	18	7	– 1	– 7	–18	–24	–30
	400	...	322	207	141	101	75	56	40	28	10	–1	– 9	–16	–21	–31	–35	–40
	300	360	202	128	81	52	33	20	9	1	–12	–22	–29	–32	–35	–40	–45	–49
	200	230	109	57	28	9	–3	–13	–20	–25	–34	–39	–43	–45	–47	–50	–53	–56
Portées de but en blanc.		m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.
Canon de 16..		60	90	120	150	180	210	240	269	298	353	405	455	504	546	628	680	720
	m.																	
Hausses pour les distances................	600	...	350	233	162	119	92	73	58	47	32	21	12	5	– 1	– 8	...	–10
	500	460	265	169	114	80	60	47	36	26	11	0	– 7	–11	–14	–19	...	–21
	400	341	191	115	73	48	33	20	10	2	– 8	–15	–19	–23	–26	–29	...	–31
	300	246	120	65	37	18	3	–8	–15	–19	–24	–28	–31	–34	–37	–39	...	–40
	200	131	55	20	1	–12	–20	–25	–29	–32	–36	–39	–42	–44	–46	–48	...	–49
Portées de but en blanc.		m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.		m.
Canon de 12...............		80	120	160	200	240	280	319	356	390	449	500	545	585	620	675	...	690
	m.																	
Hausses pour les distances................	600	385	221	135	88	63	47	36	27	20	10	4	0	– 3	– 5	...	...	–
	500	315	165	94	60	41	27	17	10	4	– 3	– 8	–12	–14	–16	...	...	–16
	400	223	104	57	33	18	7	0	–6	–10	–15	–19	–22	–24	–26	...	...	–26
	300	140	62	25	8	–3	–10	–16	–20	–23	–27	–30	–32	–33	–34	...	...	–34
	200	68	18	–4	–15	–22	–27	–31	–33	–35	–37	–39	–40	–41	–42	...	...	–42
		m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.	m.			m.
Portées de but en blanc.		109	162	214	265	314	360	400	436	468	523	567	603	630	650	...	...	650

This Table is for guns in perfect condition; when much used the *hausses* must be augmented. The Hausse-de-Mire corresponds to the tangent scale of British ordnance, the degrees being replaced by the natural tangents of the required elevations in millimetres.

Cyprian Lucar—"Dispart."

The term dispart is of ancient use, and Lucar (1588) lays down as one of his maxims, that "every gunner, before he shootes, must trulie disparte his peece, or *give allowance for the disparte;* and when he dispartes a peece, he ought to set the said dispart in the midst and uppermost part of mettall over the mouth of the peece;" a caution equally necessary at the present day, as every gunner ought to make himself acquainted with the dispart of his gun, and with the range corresponding to it, and then familiarize his eye with that distance, which would thus become a base of comparison for ranges within and without.

3. *Mode of action of gunpowder. Resistance of the air.*—As the real nature of the products of combustion, as well as of combustion itself, is a comparatively recent discovery, the exact theory of its action was not to be expected from Tartaglia, and yet he gives a very reasonable account of it. In the 22d Colloquie, in which a gunfounder inquires why guns generally burst at the breech, Tartaglia answers to this effect, that the *great exhalation proceeding from the saltpetre* acts against the ball, and as it is difficult to put it at first in motion, though easy to keep up the motion when once given, should the gun be too weak in that part it will yield to the force of the windie *exhalation* and burst; but if the metal be sufficiently strong, and the ball be moved, there will be no fear of bursting, unless by any accidental cause the motion of the ball be arrested, when the gun may burst, as it sometimes does, near the muzzle; "for, so soone as the pellet is in moving, that exhalation will continue with ease if no other let do happen, but so soone as the pellet commeth to the mouth of the peece, it finds all the aire without the peece, and by how much the pellet, together with the said exhalation that thrusteth it to assault the aire, commeth more swiftly, by so much the more united and with a *greater force,* doth the aire oppose itselfe very strongly to resist that sudden moving, and thereupon, in that place, another difficultie or strife riseth betweene the exhalations within (which thrusteth forth the pellet), and the aire without,—that is to say, the exhalation would goe out of the concavitie, and the aire without doth resist the same; but in the end, the exhalation within being of a greater force, and getting the victorie, breaketh forth and teareth in pieces his said enemie. And then the mouth of the peece being, as it were, in the middest of the strife, doth alwaies suffer very much; and this is the cause that the peece, lacking his due thicknesse on the said place, or for some other unknowne fault, doth there easily breake."

4. *The length of the gun should be duly proportioned to the charge.*—It had been supposed that the longer the gun the greater would be its range, but Tartaglia in the 11th, 12th, and 13th Colloquies, points out that though the long culvering of these days had a greater range than the shorter cannon, it required a correspondingly greater charge—that of the culvering being $\frac{4}{5}$ths of the weight of the shot, and that of the cannon only $\frac{2}{3}$ds; and further reasons, that for any given charge there is one length only which can give the maximum range, as if too short, part of the powder will be expelled before ignition, and so much power be lost; and if too long, the ball would be in the gun after the total ignition of the powder, and be checked in its progress by friction against the bore—the proper limit of length being that which will place the ball exactly at the mouth at the moment when all the powder shall be on fire, and the windie exhalation be at its maximum, "for on that instant all the expulsive vertue of the powder begins to worke on the pellet in the chiefe of his furie or force, and after that vertue expulsive hath wrought on the pellet, the said pellet, finding nothing to let or resist his range (*except the aire*), will flie more farther than if the concavitie of the peece had beene more longer or more shorter." Notwithstanding the partial imperfection of the reasoning, this was a curious approximation to the truth, as regards the exact proportion of the charge "for giving the maximum velocity" to the length

of the gun; and though Tartaglia did not treat of the more general question of the inexpediency of increasing both charge and length beyond a certain point, he gave the explanation of the fact when he stated that the air resists the more, the more violent the action of the expulsive exhalation. Had he known the law of that resistance, he would have probably perfected the explanation by showing that ultimately the resistance would become so great as to require enormous strength in the gun to resist the concussion.

Robins (1742) explains the relation of the length of the bore to the charge and velocity communicated to the ball, by construction thus:—"Let AB represent the axis of the piece; draw AC perpendicular to it, and to the asymptotes AB and AC describe any hyperbola LEF, and draw BF parallel to AC; find out now the point D where the rectangle ADEG is equal to the hyperbolic area DEFB, then will AD represent that height of the charge which communicates the greatest velocity to the shot; whence AD being to AB as 1 to 2·71828, as appears by the table of logarithms, from the height of the line AD thus determined, and the diameter of the bore, the quantity of powder contained in the charge is easily known.

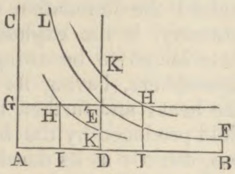

Fig. 5.

"If, instead of this charge, any other fitting the cylinder to the height AI be used, draw IH parallel to AC, and through the point H, to the same asymptotes AC and AB, describe the hyperbola HK; then the greatest velocity will be to the velocity communicated by this charge AI in the subduplicate proportion of the rectangle AE to the same rectangle diminished by the trilinear space HKE." This explanation depends upon the proposition relative to the determination of the velocity of the ball with a given charge to be subsequently referred to, but Robins' reasoning is here anticipated in order to place the result in opposition to that of Tartaglia.

Hutton (1812). In his tracts published in this year, Hutton details the experiments in gunnery carried on by himself and Major Blomfield, Royal Artillery (afterwards General Lord Blomfield), and other able artillery officers, for several years in the Warren, now arsenal of Woolwich. Some of these had been previously published in 1786 in a quarto volume of tracts, and a previous set, made in 1775, in the *Philosophical Transactions* for 1778—Dr Hutton having been awarded the annual gold medal of the Royal Society for his paper containing the results of the experiments, and the deductions drawn from them.

Some of these experiments were directed to the determination of the relation between the charge of powder, the length of the bore, and the resulting velocity. The experiments were made with five guns of the same calibre, being intended to discharge a ball of 16 oz. weight, but of lengths varying from 30·3 inches to 82·3; the lengths of the bores varying from 28·53 to 80·80 inches, gun No. 5 being intended to be reduced in length by cutting off successive portions after a certain number of rounds of practice, so as to test the effect, on the velocity, of a variation in the length of the bore. The deductions are thus stated by Dr Hutton:—

"1*st*. The law determined by the previous experiments between the charge and the velocity of ball is again confirmed—namely, that the velocity is directly as the square root of the weight of powder, as far as to about the charge of 8 oz. (half the weight of the ball used); and so it would continue for all charges were the guns of an indefinite length. But as the length of the charge is increased, and bears a more considerable proportion to the length of the bore, the velocity falls the more short of that proportion.

"2*d*. That the velocity of the ball increases with the charge, to a certain point, which is peculiar to each gun *where it is greatest;* and that by further increasing the charge, the velocity gradually diminishes, till the bore is quite full of powder. That this charge for the greatest velocity is greater as the gun is longer, but not greater, however, in so high a proportion as the length of the gun is; so that the part of the bore filled with powder bears a less proportion to the whole in the long guns than it does in the shorter ones; the part of the whole which is filled being, indeed, nearly in the subduplicate ratio of the length of the empty part.

"3*d*. It appears that the velocity continually increases as the gun is longer, though the increase in velocity is but very small in respect to the increase in length, the velocity being in a ratio somewhat less than that of the square roots of the length of the bore, but somewhat greater than that of the cube roots of the length, and is, indeed, nearly in the middle ratio between the two.

"4*th*. It appears from the ranges determined by these experiments that the range increases in a much less ratio than the velocity, and, indeed, is nearly as the square root of the velocity, the gun and elevation being the same. And when this is compared with the property of the velocity and length of gun in the foregoing paragraph, it appears that we gain extremely little in the range by a great increase in the gun, the charge being the same. And indeed, the range is nearly as the 5th root of the length of the bore; which is so small an increase as to amount only to about $\frac{1}{7}$th part more range for a double length of gun."

The comparison of these results of experiments made at a time of vastly advanced knowledge, with the statements of Tartaglia, must, notwithstanding some of their imperfections, justify a very high estimate of the position which he would have held amongst writers on gunnery had he lived after the discoveries of Galileo and Newton.

In 1638 Galileo printed his Dialogues on Motion. In these he pointed out the general laws observed by nature in the production, resolution, and composition of motion, and was the first who described the action and effects of gravity on falling bodies. On these principles he determined that the flight of a cannon-shot, or any other projectile, would be in the curve of a parabola, except in as far as it was diverted from that track by the resistance of the air. He has also proposed the means of examining the inequalities which thence arise, and of discovering what sensible effects that resistance would produce in the motion of a bullet at a given distance from the piece.

Though Galileo had thus shown that, independently of the resistance of the air, all projectiles would, in their flight, describe the curve of a parabola; yet those who came after him seem never to have imagined that it was necessary to consider how far the operations of gunnery were affected by that resistance. The subsequent writers indeed boldly asserted, without making the experiment, that no considerable variation could arise from the resistance of the air in the flight of shells or cannon-shot. In this persuasion they supported themselves chiefly by considering the extreme rarity of the air compared with those dense and ponderous bodies; and at last it became an almost generally established maxim, that the flight of these bodies was nearly in the curve of a parabola.

In 1674, Mr Anderson, before mentioned, published his treatise on the Nature and Effects of the Gun; in which he proceeds on the principles of Galileo, and strenuously asserts that the flight of bullets is in the curve of a parabola; undertaking to answer all objections which could be brought to the contrary. The same thing was also undertaken by Mr Blondel, in a treatise published at Paris in 1683, where, after long discussion, the author concludes that the variations from the resistance of the air are so slight as scarcely to merit notice. The same subject is treated of in the *Philosophical Transactions* (No. 216, p. 68) by Dr Halley; and he also, swayed by the great disproportion between the density of the air and that of iron or lead, thinks it reasonable to believe that the resistance of the air to large metal shot is scarcely discernible; although in small and light shot he owns that it must be accounted for.

But though this hypothesis went on smoothly in speculation, yet Anderson, who made a great number of trials, found it impossible to support it without some new modification. For, though it does not appear that he ever examined the comparative ranges of either cannon or musket shot when fired with their usual velocities, yet his experiments on the ranges of shells thrown with small velocities, in comparison of those above mentioned, convinced him that their whole track was not parabolical. But, instead of drawing the proper inference from this, and concluding that the resistance of the air was of considerable efficacy, he framed a new hypothesis, which was, that the shell or bullet, at its first discharge, flew to a certain distance in a right line, from the end of which line only it began to describe a parabola. And this right line, which he calls the line of the impulse of the fire, be supposes to be the same in all elevations. Thus, by assigning a proper length to this line of impulse, it was always in his power to reconcile any two shots made at different angles, let them differ as widely as we may please to suppose. But this he could not have done with three shots; nor, indeed, does he ever tell us the result of his experiments when three ranges were tried at one time.

When Sir Isaac Newton's *Principia* was published, he particularly considered the resistance of the air to projectiles which move with small velocities; but, as he never had an opportunity of making experiments on those which move with such prodigious swiftness as shots and shells, he did not imagine that a difference in velocity could make such differences in the resistance as are now found to take place. Sir Isaac found, that in small velocities the resistance was increased in the duplicate proportion of the swiftness with which the body moved; that is, a body moving with twice the velocity of another of equal magnitude, would meet with four times as much resistance as the first; with thrice the velocity, it would meet with nine times the resistance; and so on. This principle itself is now found to be defective with regard to military projectiles; though, if it had been properly attended to, the resistance of the air might have been reckoned much more considerable than was commonly imagined. So far, however, were those who treated this subject scientifically from giving a proper allowance for the resistance of the atmosphere, that their theories differed most egregiously from the truth. Huygens alone seems to have attended to this principle. In the year 1690 he published a treatise on Gravity, in which he gave an account of some experiments tending to prove that the track of all projectiles moving with very swift motions was widely different from that of a parabola. All the rest of the learned acquiesced in the justness of Galileo's doctrine, and erroneous calculations concerning the ranges of cannon were accordingly given. Nor was any notice taken of these errors till the year 1716. At that time Ressons, a French officer of artillery, distinguished by the number of sieges at which he had served, by his high military rank, and by his abilities in his profession, presented a memoir to the Royal Academy, importing that, "although it was agreed that theory joined with practice did constitute the perfection of every art, yet experience had taught him that theory was of very little service in the use of mortars; that the works of Blondel had justly enough described the several parabolic lines, according to the different degrees of the elevation of the piece; but that practice had convinced him there was no known theory for the effect of gunpowder; for, having endeavoured, with the greatest precision, to point a mortar agreeably to these calculations, he had never been able to establish any solid foundation upon them."

From the history of the academy, it does not appear that the sentiments of Ressons were at any time controverted, or any reason offered for the failure of the theory of projectiles when applied to use. Nothing further, indeed, was done till the time of Benjamin Robins, who, in 1742, published a work entitled *New Principles of Gunnery*, in which he has treated particularly, not only of the resistance of the atmosphere, but of almost everything else relating to the flight of military projectiles, and, indeed, advanced the theory of gunnery much nearer perfection than it had ever before attained.

The first thing considered by Mr Robins, and which is indeed the foundation of all other particulars relative to gunnery, is the explosive force of gunpowder, which he determined to be owing to an elastic fluid similar to our atmosphere, having its elastic force greatly increased by the heat; and further, that the elasticity or pressure of the fluid produced by the firing of gunpowder is, *cæteris paribus*, directly as its density.

"As different kinds of gunpowder produce different quantities of this fluid in proportion to their different degrees of goodness, before any definite determination of this kind can take place, it is necessary to ascertain the particular species of powder that is proposed to be used: hence Mr Robins determined, in all his experiments, to make use of government powder, as consisting of a certain and invariable proportion of materials, and therefore preferable to such kinds as were made according to the fancy of private persons.

"This being settled, we must further premise these two principles,—1. That the elasticity of this fluid increases by heat and diminishes by cold, in the same manner as that of the air. 2. That the density of this fluid, and, consequently, its weight, is the same with the weight of an equal bulk of air, having the same elasticity and the same temperature."

By exploding powder in a receiver connected with a mercurial gauge, Robins determined that an ounce of powder produced, on explosion, nearly 575 cubic inches of gaseous fluid possessing the same elasticity as common air; and, making allowance for the increase of elasticity due to the heat of the receiver and of the red-hot iron used for igniting the powder, that the gas, when reduced to the actual temperature, would have filled 460 cubic inches. Now, to determine the ratio of the bulk of the gunpowder to the bulk of this fluid, remembering that 17 drams avoirdupois of gunpowder fill 2 inches, the proportion $16 : 17 :: 460 : 488\frac{3}{4}$ gave the number of cubic inches of an elastic fluid equal in density with the air produced from 2 cubic inches of powder; "whence the ratio of the respective bulks of the powder and of the fluid produced from it, is nearly as 1 to 244.

"If this fluid, instead of expanding when the powder was fired, had been confined in the same space which the powder filled before the explosion, then it would have had, in that confined state, a degree of elasticity 244 times greater than that of common air; and this independent of the great augmentation which this elasticity would receive from the action of the fire at that instant.

"Hence, then, we are certain, that any quantity of powder, fired in a confined space, which it adequately fills, exerts, at the instant of its explosion, against the sides of the vessel containing it, and the bodies it impels before it, a force at least 244 times greater than the elasticity of common air, or, which is the same thing, than the pressure of the atmosphere; and this without considering the great addition which this force will receive from the violent degree of heat with which it is affected at that time."

The augmentation of the elasticity of air by temperature to the extent of "the *extremest* degree of red-hot iron, Mr Robins investigated by heating to an incipient white heat a portion of a musket barrel six inches long, closed at one end and drawn out at the other conically, to an aperture of one-eighth of an inch in diameter. The aperture was first closed by a wire, and the conical end of the tube after being heated was plunged into water, and the whole left to cool to the ordinary temperature of the air, when, the wire being removed, the water rushed in to fill the space now left vacant by the again contracted air. By the average of three experiments he determined the weight of the water which entered the barrel, and knowing the quantity or weight of water which would fill the whole, the difference between the two was the weight of water which would fill the portion of the barrel occupied by the cooled air. The proportion between the space occupied by the air before expanded by heat, and the same air when expanded by an incipient white heat, was determined by these experiments to be as 194$\frac{1}{3}$ to 796.

"As air and this fluid appear to be equally affected by heat and cold, and consequently have their elasticities equally augmented by the addition of equal degrees of heat to each; if we suppose the heat with which the flame of fired powder is endowed to be the same with that of the extreme heat of red-hot iron, then the elasticity of the generated fluid will be greater at the time of the explosion than afterwards, when it is reduced to the temperature of the ambient air, in the ratio of 796 to 194$\frac{1}{3}$ nearly. It being allowed then (which surely is very reasonable) that the flame of gunpowder is not less hot than red-hot iron, and the elasticity of the air, and consequently of the fluid generated by the explosion, being augmented in the extremity of this heat, in the ratio of 194$\frac{1}{3}$ to 796, it follows, that if 244 be augmented in this ratio, the resulting number, which is 999$\frac{1}{3}$, will determine how many times the elasticity of the flame of fired powder exceeds the elasticity of common air—supposing it to be confined in the same space which the powder filled before it was fired. Hence then the absolute quantity of the pressure exerted by gunpowder at the moment of its explosion may be assigned; for, since the fluid then generated has an elasticity of 999$\frac{1}{3}$, or, in round numbers, 1000 times greater than that of the atmosphere; and since common air by its elasticity exerts a pressure on any given surface equal to the weight of the incumbent atmosphere with which it is in equilibrio, the pressure exerted by fired powder before it dilated itself is 1000 times greater than the pressure of the atmosphere; and, consequently, the quantity of this force, on a surface of an inch square, amounts to above six tons weight, which force, however, diminishes as the fluid dilates itself."

The method adopted by Robins for determining the elastic force of the gas produced by the ignition of gunpowder, when reduced to the ordinary temperature of the air, was independent of the actual nature of the gas, and therefore unaffected by the erroneous views then entertained respecting it. In fact, the weight of the gases, instead of being only three-tenths of the weight of the powder, is about six-tenths of that weight; and by the estimate of Gay Lussac, the proportion between the space occupied by the gases and by the powder would be nearly double that adopted by Robins. Gay Lussac obtained from 100 grammes of powder 50 litres of gas, and as the 100 grammes, of density 0·9, would have occupied one-ninth of a litre, the elastic force of the gas, when compressed in that space, would be $50 \times 9 = 450$: and Captain Boxer, reasoning upon the known composition of gunpowder and the theoretical results of its decomposition as a definite chemical compound, makes it 317$\frac{1}{2}$; but as experience has shown that these results are by no means confined to the theoretical products, it is probable that the determination of Gay Lussac is very near the truth. In like manner, the estimate of the temperature produced by the ignition of gunpowder has been variously stated, as well as the resulting elastic force: thus Gay Lussac assumes the temperature at 1000° Cent., or 1832 Fahr., and the resulting elastic pressure as 2137 atmospheres; Piobert assumed a temperature more than double that stated by Gay Lussac, and arrived at a pressure of 7500 atmosphere; but, as observed by Senderos (1852), it is impossible to determine with accuracy in this manner the impulsive force of the gases produced from the ignition of gunpowder, though, without doubt, it greatly exceeds that stated by Robins, as will be pointed out hereafter.

Having thus determined the force of the gunpowder, Mr Robins next proceeds to determine the velocity with which the ball is discharged, adopting in the solution of this problem, the two following principles, neither of which is strictly correct,—1. That the action of the powder on the bullet ceases as soon as the bullet leaves the piece. 2. That all the powder of the charge is fired and converted into elastic fluid before the bullet is sensibly removed from its place.

"The first of these," says Mr Robins, "will appear manifest when it is considered how suddenly the flame will extend itself on every side, by its own elasticity, when it is once got out of the mouth of the piece; for by this means its force will then be dissipated, and the bullet no longer sensibly affected by it.

"The second principle is indeed less obvious, being contrary to the general opinion of almost all writers on this subject. It might, however, be sufficient for the proof of this position, to observe the prodigious compression of the flame in the chamber of the piece. Those who attend to this circumstance, and to the easy passage of the flame through the intervals of the grains, may soon satisfy themselves that no one grain contained in that chamber can continue for any time uninflamed, when thus surrounded and pressed by such an active fire. However, not to rely on mere speculation in a matter of so much consequence, I considered that if part only of the powder is fired, and that successively; then, by laying a greater weight before the charge (suppose two or three bullets instead of one), a greater quantity of powder would necessarily be fired, since a heavier weight would be a longer time in passing through the barrel. Whence it should follow that two or three bullets would be impelled by a much greater force than one only. But the contrary to this appears by experiment; for, firing one, two, and three bullets laid contiguous to each other with the same charge respectively, I have found that their velocities were not much different from the reciprocal of their subduplicate quantities of matter; that is, if a given charge would communicate to one bullet a velocity of 1700 feet in a second, the same charge would communicate to two bullets a velocity of from 1250 to 1300 feet in a second, and to three bullets a velocity of from 1050 to 1110 feet in the same time. From hence it appears, that whether a piece is loaded with a greater or less weight of bullet, the action is nearly the same. The excess of the velocities of the two and three bullets above what they ought to have been by this rule (which are that of 1200 and 980 feet in a second), undoubtedly arises from the flame, which, escaping by the side of the first bullet, acts on the surface of the second and third. Now this excess has in many experiments been imperceptible, and the velocities have been reciprocally in the subduplicate ratios of the number of bullets, to sufficient exactness; and where this error has been greater, it has never arisen to an eighth part of the whole; but if the common opinion was true, that a small part only of the powder fires at first, and other parts of it successively as the bullet passes through the barrel, and that a considerable part of it is often blown out of the piece without firing at all, then the velocity which three bullets received from the explosion ought to have been much greater than we have found it to be."

"With respect to the grains of powder which are often blown out unfired, and which are always urged as a proof of the gradual firing of the charge, there may perhaps be some few grains in the best powder of such an heterogeneous composition as to be less susceptible of firing; which, I think, I have myself observed; and these, though they are surrounded by the flame, may be driven out unfired."

Such were the reasonings of Mr Robins; but however rapid the ignition of gunpowder, it is still progressive; and without doubt the ball moves before the whole impulse of the powder from its complete ignition has been received, and it is equally certain that some portion, however small, of the powder is generally thrown out unburnt. Were it not indeed for the movement of the ball before the full development of the elastic force of the gases, accidents from the bursting of guns would be frequent, as may be judged from the consequence of any impediment in the way of the movement of the ball, or from accidentally leaving it at a distance from the charge. Senderos observes—"The full force of gunpowder, with the intensity it possesses, is not used in fire-arms, but only a small part of it. It is undoubted that the transmission of any force requires time. The projectile opposes a resistance proportioned to its mass or inertia, and as soon as the force has become sufficient to overcome that resistance, the projectile begins to move, and allows the gases to expand into a larger space, thus losing density and caloric before they exert their full force on the gun."

"These postulates being allowed to be just, let AB, fig. 6, represent the axis of any piece of artillery; A the breech, and B the muzzle; DC the diameter of its bore, and DEGC a part of its cavity filled with powder. Suppose the ball that is to be impelled to lie with its hinder surface at the line GE; then the pressure exerted at the explosion on the circle of which GE is the diameter, or, which is the same thing, the pressure exerted in the direction FB on the surface of the ball is easily known from the known dimensions of that circle. Draw any line FH perpendicular to FB, and AI parallel to FH; and through the point H to the asymptotes IA and AB, describe the hyperbola KHNQ; then, if FH represents the force impelling the ball at the point F, the force impelling the ball at any other point, as at M, will be represented by the line MN, the ordinate to the hyperbola at that point. For when the fluid impelling the body along has dilated itself to M, its density will be then to its original density in the space DEGC reciprocally as the spaces through which it is extended—that is, as FA to MA, or as MN to FH; but it has been shown that the impelling force or elasticity of this fluid is directly as its density, therefore, if FH represents the force at the point F, MN will represent the like force at the point M.

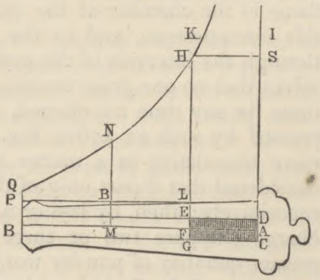

Fig. 6.

"Since the absolute quantity of the force impelling the ball at the point F is known, and the weight of the ball is also known, the proportion between the force with which the ball is impelled and its own gravity is known. In this proportion take FH to FL, and draw LP parallel to FB; then, MN the ordinate to the hyperbola in any point will be to its part MR, cut off by the line LP, as the impelling force of the powder in that point M to the gravity of the ball; and consequently the line LP will determine a line proportional to the uniform force of gravity in every point; whilst the hyperbola HNQ determines in like manner such ordinates as are proportional to the impelling force of the powder in every point; whence, by the 39th Prop. of lib. i. of Sir Isaac Newton's *Principia*, the areas FLPB and FHQB are in the duplicate proportion of the velocities which the ball would acquire when acted upon by its own gravity through the space FB, and when impelled through the same space by the force of the powder. But since the ratio of AF to AB and the ratio of FH to FL are known, the ratio of the area FLPB to the area FHQB is known; and thence its subduplicate. And since the line FB is given in magnitude, the velocity which a heavy body would acquire when impelled through this line by its own gravity is known; being no other than the velocity it would acquire by falling through a space equal to that line: find then another velocity to which this last-mentioned velocity bears the given ratio of the subduplicate of the area FLPB to the area FHQB; and this velocity thus found is the velocity the ball will acquire when impelled through the space FB by the action of the inflamed powder.

"Now, to give an example of this: Let us suppose AB, the length of the cylinder, to be 45 inches; its diameter DC, or rather the diameter of the ball, to be $\frac{3}{4}$ths of an inch; and AF, the extent of the powder, to be $2\frac{1}{8}$th inches; to determine the velocity which will be communicated to a leaden bullet by the explosion, supposing the bullet to be laid at first with its surface contiguous to the powder.

"By the theory we have laid down, it appears, that at the first instant of the explosion the flame will exert, on the bullet lying close to it, a force 1000 times greater than the pressure of the atmosphere. The medium pressure of the atmosphere is reckoned equal to a column of water 33 feet in height; whence, lead being to water as 11·345 to 1, this pressure will be equal to that of a column of lead 3·49 inches in height. Multiplying this by 1000, therefore, a column of lead 34,900 inches (upwards of half a mile) in height, would produce a pressure on the bullet equal to what is exerted by the powder in the first instant of the explosion; and the leaden ball being $\frac{3}{4}$ths of an inch in diameter, and consequently equal to a cylinder of lead of the same base half an inch in height, the pressure at first acting on it will be equal to 34,900 × 2, or 69,800 times its weight; whence FL to FH is as 1 to 69,800; and FB to FA as $45 - 2\frac{5}{8}$, or $42\frac{3}{8}$ to $2\frac{5}{8}$, that is, as 339 to 21; whence the rectangle FLPB is to the rectangle AFHS as 339 to 21 × 69,800, that is, as 1 to 4324. And from the known application of the logarithms to the mensuration of the hyperbolic spaces, it follows that the rectangle AFHS is to the area FHQB as ·43429, &c., is to the tabular logarithm of $\frac{AB}{AF}$; that is, of $\frac{360}{21}$, which is 1·2340579: whence the ratio of the rectangle FLPB to the hyperbolic area FHQB is compounded of the ratios of 1 to 4324—and of ·43429, &c., to 1·2340579; which together make up the ratio of 1 to 12263, the subduplicate of which is the ratio of 1 to 110·7; and in this ratio is the velocity which the bullet would acquire by gravity in falling through a space equal to FB, to the velocity the bullet will acquire from the action of the powder impelling it through FB. But the space FB being $42\frac{3}{8}$ inches, the velocity a heavy body will acquire in falling through such a space is known to be what would carry it nearly at the rate of 15·07 feet in a second; whence the velocity to which this has the ratio of 1 to 110·7 is a velocity which would carry the ball at the rate of 1668 feet in one second. And this is the velocity which, according to the theory, the bullet in the present circumstances would acquire from the action of the powder during the time of its dilatation.

"Now this velocity being once computed for one case, is easily applied to any other; for if the cavity DEGC left behind the bullet be only in part filled with powder, then the line HF, and consequently the area FHQB, will be diminished in the proportion of the whole cavity to the part filled. If the diameter of the bore be varied, the lengths AB and AF remaining the same, then the quantity of powder and the surface of the bullet which it acts on will be varied in the duplicate proportion of the diameter, but the weight of the bullet will vary in the triplicate proportion of the diameter; wherefore the line FH, which is directly as the absolute impelling force of the powder, and reciprocally as the gravity of the bullet, will change in the reciprocal proportion of the diameter of the bullet. If AF, the height of the cavity left behind the bullet, be increased or diminished, the rectangle of the hyperbola, and consequently the area corresponding to ordinates in any given ratio, will be increased or diminished in the same proportion. From all which it follows, that the area FHQB, which is in the duplicate proportion of the velocity of the impelled body, will be directly as the logarithm$\frac{AB}{AF}$ (where AB represents the length of the barrel, and AF the length of the cavity left behind the bullet); also directly as the part of that cavity filled with powder, and inversely as the diameter of the bore, or rather of the bullet; likewise directly as AF, the height of the cavity left behind the bullet. Consequently the velocity being computed as above, for a bullet of a determined diameter, placed in a piece of a given length, and impelled by a given quantity of powder, occupying a given cavity behind that bullet; it follows, that by means of these ratios, the velocity of any other bullet may be thence deduced; the necessary circumstances of its position, quantity of powder, &c., being given. Where note, that in the instance of this supposition, we have supposed the diameter of the ball to be $\frac{3}{4}$ths of an inch; whence the diameter of the bore will be something more, and the quantity of powder contained in the space DEGC will amount exactly to twelve pennyweights, a small wad of tow included.

"In order to compare the velocities communicated to bullets by the explosion, with the velocities resulting from the theory by computation, it is necessary that the actual velocities with which bullets move should be discovered. The only methods hitherto practised for this purpose, have been either by observing the time of the flight of a shot through a given space, or by measuring the range of a shot at a given elevation; and thence computing, on the parabolic hypothesis, what degree of velocity would produce this range. The first method labours under this insurmountable difficulty, that the velocities of these bodies are often so swift, and consequently the time observed is so short, that an imperceptible error in that time may occasion an error in the velocity thus found of 200, 300, 400, 500, or 600 feet, in a second. The other method is so fallacious, by reason of the resistance of the atmosphere (to which inequality the first is also liable), that the velocities thus assigned may not perhaps be the tenth part of the actual velocities sought.

"The simplest method of determining this velocity is by means of the instrument (the *Ballistic Pendulum*), represented in fig. 7, where ABCD represents the body of the machine composed of the three poles B, C, D, spreading at bottom, and joining together at the top A; being the same with what is vulgarly used in lifting and weighing very heavy bodies, and is called by workmen the triangles. On two of these poles, towards their tops, are screwed on the sockets R, S; and on these sockets the pendulum EFGHIK is hung by means of its cross-piece EF, which becomes its axis of suspension, and on which it must be made to vibrate with great freedom. The body of this pendulum is made of iron, having a broad part at bottom, and its lower part is covered with a thick piece of wood GKIH, which is fastened to the iron by screws. Something lower than the bottom of the pendulum there is a brace OP, joining the two poles from which the pendulum is suspended; and to this brace there is fastened a contrivance MNU, made with two edges of steel, bearing on each other in the line UN, something in the manner of a drawing-pen; the strength with which these edges press on each other being diminished or increased at pleasure by means of a screw Z going through the upper piece. There is fastened to the bottom of the pendulum a narrow ribbon LN, which passes between these steel edges, and which afterwards, by means of an opening cut in the lower piece of steel, hangs loosely down, as at W.

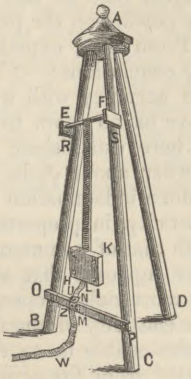

Fig. 7.

"With this apparatus, if the weight of the pendulum be known, and likewise the respective distances of its centre of gravity and of its centre of oscillation from its axis of suspension, it will thence be known what motion will be communicated to this pendulum by the percussion of a body of a known weight moving with a known degree of celerity, and striking it in a given point; that is, if the pendulum be supposed at rest before the percussion, it will be known what vibration it ought to make in consequence of such a determined blow; and, on the contrary, if the pendulum, being at rest, is struck by a body of a known weight, and the vibration which the pendulum makes after the blow is known, the velocity of the striking body may from thence be determined. Hence, then, if a bullet of a known weight strikes the pendulum, and the vibration which the pendulum makes in consequence of the stroke be ascertained, the velocity with which the ball moved is thence to be known.

"Now the extent of the vibration made by the pendulum after the blow, may be measured to great accuracy by the ribbon LN. For let the pressure of the edges UN on the ribbon be so regulated by the screw Z, that the motion of the ribbon between them may be free and easy, though with some minute resistance; then, settling the pendulum at rest, let the part LN between the pendulum and the edges be drawn strait, but not strained, and fix a pin in that part of the ribbon which is then contiguous to the edges: let now a ball impinge on the pendulum; then the pendulum swinging back will draw out the ribbon to the just extent of its vibration, which will consequently be determined by the interval on the ribbon between the edges UN and the place of the pin.

"The weight of the whole pendulum, wood and all, was 56 pounds 3 ounces; its centre of gravity was 52 inches distant from its axis of suspension, and 200 of its small swings were performed in the time of 253 seconds; whence its centre of oscillation is 62$\frac{2}{3}$d inches distant from that axis. The centre of the piece of wood GKIH is distant from the same axis 66 inches. In the compound ratio of 66 to 62$\frac{2}{3}$d, and 66 to 52, take the quantity of matter of the pendulum to a fourth quantity, which will be 42 lbs. $\frac{1}{2}$ oz. Now geometers well know, that if the blow be struck on the centre of the piece of wood GKIH, the pendulum will resist to the stroke in the same manner as if this last quantity of matter only (42 lbs. $\frac{1}{2}$ oz.) was concentrated in that point, and the rest of the pendulum was taken away: whence, supposing the weight of the bullet impinging in that point to be the $\frac{1}{12}$th of a pound, or the $\frac{1}{505}$th of this quantity of matter nearly, the velocity of the point of oscillation after the stroke will, by the laws observed in the congress of such bodies as rebound not from each other, be the $\frac{1}{505}$th of the velocity the bullet moved with before the stroke; whence the velocity of this point of oscillation after the stroke being ascertained, that multiplied by 505 will give the velocity with which the ball impinged.

"But the velocity of the point of oscillation after the stroke is easily deduced from the chord of the arch through which it ascends by the blow; for it is a well-known proposition, that all pendulous bodies ascend to the same height by their vibratory motion as they would do if they were projected directly upwards from their lowest point, with the same velocity they have in that point; wherefore, if the versed sine of the ascending arch be found (which is easily determined from the chord and radius being given), this versed sine is the perpendicular height to which a body projected upwards with the velocity of the point of oscillation would arise; and consequently what that velocity is, can be easily computed by the common theory of falling bodies.

"For instance, the chord of the arch, described by the ascent of the pendulum after the stroke measured on the ribbon, has been sometimes 17$\frac{1}{4}$th inches; the distance of the ribbon from the axis of suspension is 71$\frac{1}{8}$th inches; whence reducing 17$\frac{1}{4}$th in the ratio of 71$\frac{1}{8}$th to 66, the resulting number, which is nearly 16 inches, will be the chord of the arch through which the centre of the board GKIH ascended after the stroke; now the versed sine of the arch, whose chord is 16 inches, and its radius 66, is 1·93939; and the velocity which would carry a body to this height, or, which is the same thing, the velocity which a body would acquire by descending through this space, is nearly that of 3$\frac{1}{4}$th feet in 1^s.

"To determine then the velocity with which the bullet impinged on the centre of the wood, when the chord of the arch described by the ascent of the pendulum, in consequence of the blow, was 17$\frac{1}{4}$th inches measured on the ribbon, no more is necessary than to multiply 3$\frac{1}{4}$th by 505, and the resulting number, 1641, will be the feet which the bullet would describe in 1^s, if it moved with the velocity it had at the moment of its percussion; for the velocity of the point of the pendulum on which the bullet struck, we have just now determined to be that of 3$\frac{1}{4}$th feet in 1^s; and we have before shown that this is the $\frac{1}{505}$th of the velocity of the bullet. If then a bullet weighing $\frac{1}{12}$th of a pound strikes the pendulum in the centre of the wood GKIH, and the ribbon be drawn out 17$\frac{1}{4}$th inches by the blow, the velocity of the bullet is that of 1641 feet in 1^s. And since the length the ribbon is drawn is always nearly the chord of the arch described by the ascent (it being placed so as to differ insensibly from those chords which most frequently occur), and these chords are known to be in the proportion of the velocities of the pendulum acquired from the stroke; it follows that the proportion between the lengths of ribbon drawn out at different times will be the same with that of the velocities of the impinging bullets; and consequently, by the proportion of these lengths of ribbon to 17$\frac{1}{4}$th, the proportion of the velocity with which the bullets impinge, to the known velocity of 1641 feet in 1^s, will be determined. Hence then is shown in general how the velocities of bullets of all kinds may be found out by means of this instrument."

Mr Robins then gave several precautionary rules for securing precision in the experiments, and guarding against accidents, amongst which were the two following:—

"The weight of the pendulum and the thickness of the wood necessary to prevent the bullets from being shivered by striking directly on the iron, must be in some measure proportioned to the size of the bullets which are used. A pendulum of the weight here described will do very well for all bullets under three or four ounces, if the thickness of the board be increased to seven or eight inches for the heaviest bullets. Beech is the toughest and properest wood for this purpose.

"The powder used in these experiments should be exactly weighed; and that no part of it be scattered in the barrel, the piece must be charged with a ladle, in the same manner as is practised with cannon; the wad should be of tow, of the same weight each time, and no more than is just necessary to confine the powder in its proper place; the length of the cavity left behind the ball should be determined each time with exactness; for the increasing or diminishing that space will vary the velocity of the shot, although the bullet and quantity of powder be not changed. The distance of the mouth of the piece from the pendulum ought to be such, that the impulse of the flame may not act on the pendulum; this will be prevented in a common barrel charged with half an ounce of powder, if it be at the distance of 16 or 18 feet: in larger charges the impulse is sensible farther off; I have found it to extend to above 25 feet; however, between 25 and 18 feet is the distance I have usually chosen."

With this instrument, or others similar to it, Mr Robins made a great number of experiments on barrels of different lengths, and with different charges of powder. He has given us the results of sixty-one of these; and having compared the actual velocities with the computed ones, his theory appears to have come as near the truth as could well be expected. In seven of the experiments there was a perfect coincidence; the charges of powder being 6 to 12 pennyweights, the barrels 45, 24·312 and 7·06 inches in length. The diameter of the first (marked A) was $\frac{3}{4}$ths of an inch; of the second (B) was the same; and of D, ·83 of an inch. In the first of these experiments, another barrel (C) was used, whose length was 12·375 inches, and the diameter of its bore $\frac{3}{4}$ inch. In fourteen more of the experiments, the difference between the length of the chord of the pendulum's arch shown by the theory and the actual experiment, was $\frac{1}{10}$th of an inch over or under. This showed an error in the theory, varying, according to the different lengths of the chord, from $\frac{1}{171}$th to $\frac{1}{47}$th of the whole; the charges of powder were the same as in the last. In sixteen other experiments the error was $\frac{2}{10}$ths of an inch, varying from $\frac{1}{85}$th to $\frac{1}{15}$th of the whole; the charges of powder were 6, 8, 9, or 12 pennyweights. In seven other experiments the error was $\frac{3}{10}$ths of an inch, varying from $\frac{1}{62}$d to $\frac{1}{23}$d of the whole; the charges of powder 6 or 12 pennyweights. In eight experiments the difference was $\frac{4}{10}$ths of an inch, indicating an error of from $\frac{1}{42}$d to $\frac{1}{23}$d of the whole; the charges being 6, 9, 12, and 24 pennyweights of powder. In three experiments the error was $\frac{5}{10}$ths, varying from $\frac{1}{58}$th to $\frac{1}{12}$th of the whole; the charges 8 and 12 pennyweights of powder. In two experiments the error was $\frac{6}{10}$ths, in one case amounting to something less than $\frac{1}{32}$d, in the other to $\frac{1}{22}$d of the whole; the charges 12 and 36 pennyweights of powder. By one experiment the error was $\frac{7}{10}$ths, and by another $\frac{8}{10}$ths; the first amounting to $\frac{1}{10}$th nearly, the latter to almost $\frac{1}{9}$th of the whole; the charges of powder 6 or 12 pennyweights. The last error, however, Mr Robins ascribes to the wind. The two remaining experiments varied from theory by 1·3 inches, somewhat more than $\frac{1}{9}$th of the whole; the charges of powder were 12 pennyweights in each; and Mr Robins ascribes the error to the dampness of the powder. In another case he ascribes an error of $\frac{6}{10}$ths to the blast of the powder on the pendulum.

From these experiments Mr Robins deduces the following conclusions:—"The variety of these experiments, and the accuracy with which they correspond to the theory, leave us no room to doubt of its certainty. This theory, as here established, supposes that, in the firing of gunpowder, about $\frac{3}{10}$ths of its substance is converted by the sudden inflammation into a permanently elastic fluid, whose elasticity, in proportion to its heat and density, is the same with that of common air in the like circumstances: it farther supposes that all the force exerted by gunpowder in its most violent operations is no more than the action of the elasticity of the fluid thus generated; and these principles enable us to determine the velocities of bullets impelled from fire-arms of all kinds, and are fully sufficient for all purposes where the force of gunpowder is to be estimated.

"From this theory many deductions may be made of the greatest consequence to the practical part of gunnery.

From hence the thickness of a piece, which will enable it to confine, without bursting, any given charge of powder, is easily determined, since the effort of the powder is known; and from it we are taught the necessity of leaving the same space behind the bullet, when we would, by the same quantity of powder, communicate to it an equal degree of velocity; since, on the principles already laid down, it follows that the same powder has a greater or less degree of elasticity, according to the different spaces it occupies. The method which I have always practised for this purpose has been by marking the rammer; and this is a maxim which ought not to be dispensed with when cannon are fired at an elevation, particularly in those called by the French *batteries à ricochet.*

"From the continued action of the powder, and its manner of expanding described in this theory, and the length and weight of the piece, one of the most essential circumstances in the well directing of artillery may be easily ascertained. All practitioners are agreed that no shot can be depended on, unless the piece be placed on a solid platform; for if the platform shakes with the first impulse of the powder, it is impossible but the piece must also shake, which will alter its direction, and render the shot uncertain. To prevent this accident, the platform is usually made extremely firm to a considerable depth backwards; so that the piece is not only well supported in the beginning of its motion, but likewise through a great part of its recoil. However, it is sufficiently obvious that when the bullet is separated from the piece, it can be no longer affected by the trembling of the piece or platform; and, by a very easy computation, it will be found that the bullet will be out of the piece before the latter hath recoiled half an inch.

"If the whole substance of the powder was converted into an elastic fluid at the instant of the explosion, then, from the known elasticity of this fluid assigned by our theory, and its known density, we could easily determine the velocity with which it would begin to expand, and could thence trace out its future augmentations in its progress through the barrel: but as we have shown that the elastic fluid, in which the activity of the gunpowder consists, is only $\frac{3}{10}$ths of the substance of the powder, the remaining $\frac{7}{10}$ths will, in the explosion, be mixed with the elastic part, and will, by its weight, retard the activity of the explosion; and yet they will not be so completely united as to move with one common motion; but the unelastic part will be less accelerated than the rest, and some will not even be carried out of the barrel, as appears by the considerable quantity of unctuous matter which adheres to the inside of all fire-arms after they have been used."

Mr Robins then investigates the cause of these irregularities in the expansive motion of the fluid by experiments; but before referring to them, it is right to observe, as has been before stated, that in British gunpowder, consisting of 75 parts of nitre, 15 of charcoal, and 10 of sulphur, the potassium of the nitre and the sulphur are the only constituents which unite to form a solid residuum, the sulphate of potassium, and that their weight being about 39 lbs. per cent., the remaining 61 lbs., or $\frac{6}{10}$ths of the whole, form gaseous elastic products.

> "The experiments made use of for this purpose were of two kinds. The first was made by charging a barrel A with 12 pennyweights of powder, and a small wad of tow only; and then placing its mouth 19 inches from the centre of the pendulum. On firing it in this situation, the impulse of the flame made it ascend through an arch whose chord was 13·7 inches; whence, if the whole substance of the powder was supposed to strike against the pendulum, and each part to strike with the same velocity, that common velocity must have been at the rate of about 2650 feet in a second. But, as some part of the velocity of the flame was lost in passing through 19 inches of air, I made the remaining experiments in a manner not liable to this inconvenience.
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> "I fixed the barrel A on the pendulum, so that its axis might be both horizontal and also perpendicular to the plane HK; or, which is the same thing, that it might be in the plane of the pendulum's vibration; the height of the axis of the piece above the centre of the pendulum was 6 inches, and the weight of the piece, and of the iron that fastened it, &c., was 12½ lbs. The barrel in this situation being charged with 12 pennyweights of powder, without either ball or wad, only put together with the rammer; on the discharge the pendulum ascended through an arch whose chord was 10 inches, or, reduced to an equivalent blow in the centre of the pendulum, supposing the barrel away, it would be 14·4 inches nearly. The same experiment being repeated, the chord of the ascending arch was 10·1 inches, which, reduced to the centre, is 14·6 inches.
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> "To determine what difference of velocity there was in the different parts of the vapour, I loaded the piece again with 12 pennyweights of powder, and rammed it down with a wad of tow weighing 1 pennyweight. Now, I conceived that this wad, being very light, would presently acquire that velocity with which the elastic part of the fluid would expand itself when uncompressed; and I accordingly found that the chord of the ascending arch was by this means increased to 12 inches, or at the centre to 17·3; whence, as the medium of the other two experiments is 14·5, the pendulum ascended through an arch 2·8 inches longer, by the additional motion of 1 pennyweight of matter, moving with the velocity of the swiftest part of the vapour; and, consequently, the velocity with which this pennyweight of matter moved was that of about 7000 feet in a second."

Mr Robins here adduces some experiments to obviate a possible objection by showing that the confinement of the powder was not necessary to ensure its total ignition and the full development of its elastic force, and "that the push of the recoil, arising from the *expansion of the powder alone*, is found to be no greater when it impels a leaden bullet before it than when the same quantity is forced without any wad to confine it;" and then proceeds as follows:—

> "Again, that this velocity of 7000 feet in a second is not much beyond what the most active part of the flame acquires in expanding, is evinced from hence, that in some experiments a ball has been found to be discharged with a velocity of 2400 feet in a second, and yet it appeared not that the action of the powder was at all diminished on account of this immense celerity; consequently, the degree of swiftness with which, in this instance, the powder followed the ball without losing any part of its pressure, must have been much short of what the powder alone would have expanded with had the ball not been there.
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> "From these determinations may be deduced the force of petards, since their action depends entirely on the impulse of the flame; and it appears that a quantity of powder properly disposed in such a machine may produce as violent an effort as a bullet of twice its weight, moving with a velocity of 1400 or 1500 feet in a second."

However ingenious the researches of Mr Robins into this important element of gunnery—the velocity with which the gases produced by the ignition of gunpowder expand—they have not been admitted by some as satisfactorily solving the question; and yet Hutton, although, by a combination of experiment and calculation, he had deduced a velocity varying from 3000 to 5000 feet, after correcting one of the quantities in his formula, at first assumed too high, arrived at a conclusion very nearly the same as the experimental one of Robins. The determination, indeed, of the velocity of the elastic gases is attended with much difficulty, as is that (as before pointed out) of the initial force with which these gases act upon the projectile they are intended to propel. Robins considered this force to be about 1000 atmospheres; but Hutton found it to vary, according to the charge and the length of gun, from 1700 to 2300, and he therefore considers it as fairly represented by about 2000 atmospheres, and his results were confirmed by those of Dr Gregory, who made it 2250. Now, Hutton's formula for determining the ultimate velocity of the ball, and consequently of the gas then pressing against and urging it forward, is

$$V = 46{\cdot}7\sqrt{\frac{nhd^2}{p+w} \times \log.\frac{b}{a}} = 46{\cdot}7\,d\sqrt{\frac{nh}{p+w} \times \log.\frac{b}{a}};$$

where a represents the height or length of the charge, including cartridge, or of the space behind the ball, b the whole length of the gun-bore, h the length of the portion of the cylinder or bore which would be filled with the powder, d the diameter of the ball or of the bore, n the ratio of the first force of the fired powder to the pressure of the atmosphere as 1, w the weight of the ball, and p a quantity having some fixed relation to the weight of the charge; and if in this formula the weight of the ball be made 0, V becomes the value of the velocity of the expanding gas. But here enters a difficulty, as it is not easy to determine what proportion of the weight of the powder ought to be assumed for p, from the uncertainty of the actual condition of the gases and of the solid residuum, at the moment of decomposition of the powder. Supposing an equal density to exist throughout the bulk of the gases, and that the solid residuum is diffused equally through them, p should be, as Hutton at first assumed it, $\frac{1}{2}$ of the weight of the powder; but, as it is more probable that the rear portion of the gas is much more condensed than the front portion, and, consequently, that the centre of gravity of the whole gas has moved through a still less space, p must be taken less than $\frac{1}{2}$, and in this manner Hutton found that the velocity of the gases, when p was taken as $\frac{1}{3}$ of the weight of the powder, became between 7000 and 8000 feet per second; and when taken $\frac{1}{2}$, from 3000 to 5000—results sufficient in themselves to prove how impossible almost it must be to determine theoretically the velocity of the gases. In investigating the decomposition of gunpowder, there are two points to be taken into consideration—the velocity of ignition, and the velocity of combustion; or, in other words, the time required to burn each grain of powder, on the one hand, and the time necessary for communicating ignition, as the flame is conveyed by the expanding gases with great rapidity from one grain to another. Piobert has endeavoured to estimate the velocity of combustion independently of that of ignition by forming a kind of bar with a paste of powder, 1 foot 2 inches in length, and about $\frac{9}{10}$ths of an inch square, the bar being smeared with fine hog's lard, and placed vertically on a plate with water. This bar, weighing 330 grammes, was ignited at the top, and required 29·2 seconds for combustion, being at the rate of ·486 of an inch per second. By other experiments of the same author, powder inclosed and slightly compressed in a tube $\frac{3}{4}$ths of an inch in diameter and open at one end, burnt at the rate of ·3 of an inch per second, or, when strongly compressed, at the rate of ·4 to ·6 of an inch per second. From these statements it is evident that, however rapid the combustion of powder, it is not instantaneous; and that the great object is to facilitate the transmission of the flame through the powder so as to render the ignition of the whole as nearly simultaneous as possible. The process of granulating powder for this purpose was early introduced, as Luis Collado, before mentioned, expressly points out the greater force of powder when grained as compared to that of its meal; and Cyprian Lucar explains the mode of graining or "corning" the powder by passing it through sieves after having broken up the cake which had been first formed in the incorporating process. The size of the grain is an important element, and ought to be so arranged as to reduce the time of combustion to the minimum consistent with a due rapidity of ignition; and more particularly so as the denser the powder the greater quantity of gas must be produced at the same space, and the greater therefore the elastic force developed; whilst, as regards the *grain itself*, anything which increases its density must increase the velocity of ignition and diminish that of combustion, whilst the rapidity of combustion increases as the grains are more porous and less smooth. These observations sufficiently demonstrate that the combustion of the charge cannot be effected in less time than that required for the combustion of a grain; but in this respect it must be remembered that the combustion proceeds from the circumference to the centre, and therefore requires only half the time as compared with Piobert's experiments. If, then, each grain were $\frac{1}{10}$th of an inch in diameter, the complete combustion would be effected in $\frac{1}{10}$th of a second; and if $\frac{1}{20}$th, in $\frac{1}{20}$th of a second; but long before that time the quantity of gas evolved must have been sufficient to move the ball, its ultimate velocity depending on the time it remains in the bore, or, in other words, on the more complete combustion of the powder, as well as on the continuance of the action of the gases produced.

"In many of the experiments already recited the ball was not laid immediately contiguous to the powder, but at a small distance, amounting, at the utmost, only to $1\frac{1}{2}$ inch. In these cases the theory agreed very well with the experiments. But if a bullet is placed at a greater distance from the powder—suppose at 12, 18, or 24 inches—we cannot then apply to this ball the same principles which may be applied to those laid in contact, or nearly so, with the powder; for, when the surface of the fired powder is not confined by a heavy body, the flame dilates itself with a velocity far exceeding that which it can communicate to a bullet by its continued pressure; consequently, as, at the distance of 12, 18, or 24 inches, the powder will have acquired a considerable degree of this velocity of expansion, the first motion of the ball will not be produced by the continued pressure of the powder, but by the actual percussion of the flame; and it will therefore begin to move with a quantity of motion proportioned to the quantity of this flame, and the velocities of its respective parts.

"From hence, then, it follows, that the velocity of the bullet, laid at a considerable distance before the charge, ought to be greater than what would be communicated to it by the pressure of the powder acting in the manner already mentioned; and this deduction from our theory we have confirmed by manifold experience, by which we have found that a ball laid in the barrel A, with its hinder part $11\frac{1}{4}$ inches from its breech, and impelled by 12 pennyweights of powder, has acquired a velocity of about 1400 feet in a second; when, if it had been acted on by the pressure of the flame only, it would not have acquired a velocity of 1200 feet in a second. The same we have found to hold true in all other greater distances (and also in lesser, though not in the same degree), and in all quantities of powder; and we have likewise found, that these effects nearly correspond with what has been already laid down about the velocity of expansion and the elastic and unelastic parts of the flame.

"From hence, too, arises another consideration of great consequence in the practice of gunnery; which is, that no bullet should at any time be placed at a considerable distance from the charge, unless the piece is extremely well fortified; for a moderate charge of powder, when it has expanded itself through the vacant space, and reaches the ball, will, by the velocity each part has acquired, accumulate itself behind the ball, and thereby be condensed prodigously; whence, if the barrel be not extremely firm in that part, it must, by means of this reinforced elasticity, infallibly burst. The truth of this reasoning I have experienced in an exceeding good Tower musket, forged of very tough iron; for, charging it with 12 pennyweights of powder, and placing the ball 16 inches from the breech, on firing it the part of the barrel just behind the bullet was swelled out to double its diameter, like a blown bladder, and two large pieces of 2 inches long were burst out of it.

"Having seen that the entire motion of a bullet laid at a considerable distance from the charge is acquired by two different methods in which the powder acts on it, the first being the percussion of the parts of the flame with the velocity they had respectively acquired by expanding, the second the continued pressure of the flame through the remaining part of the barrel, I endeavoured to separate these different actions, and to retain that only which arose from the continued pressure of the flame. For this purpose I no longer placed the powder at the breech, from whence it would have full scope for its expansion; but I scattered it as uniformly as I could through the whole cavity left behind the bullet; imagining that by this means the progressive velocity of the flame in each part would be prevented by the expansion of the neighbouring parts: and I found, that the ball being laid 11$\frac{1}{4}$ inches from the breech, its velocity, instead of 1400 feet in a second, which it acquired in the last experiments, was now no more than 1100 feet in the second, which is 100 feet short of what, according to the theory, should arise from the continued pressure of the powder only.

"The reason of this deficiency was, doubtless, the intestine motion of the flame; for the ascension of the powder thus distributed through so much larger a space than it could fill, must have produced many reverberations and pulsations of the flame; and from these internal agitations of the fluid, its pressure on the containing surface will (as in the case of all other fluids) be considerably diminished; and in order to avoid this irregularity, in all other experiments I took care to have the powder closely confined in as small a space as possible, even when the bullet lay at some distance from it.

"With regard to the resistance of the air, which so remarkably affects all military projectiles, it is necessary to premise, that the greatest part of authors have established it as a certain rule, that while the same body moves in the same medium, it is always resisted in the duplicate proportion of its velocity; that is, if the resisted body move in one part of its track with three times the velocity with which it moved in some other part, then its resistance to the greater velocity will be nine times the resistance to the lesser. If the velocity in one place be four times greater than in another, the resistance of the fluid will be sixteen times greater in the first than in the second, &c. This rule, however, though pretty near the truth when the velocities are confined within certain limits, is excessively erroneous when applied to military projectiles, where such resistances often occur as could scarcely be effected, on the commonly received principles, even by a treble augmentation of its density.

"By means of the machine already described, I have it in my power to determine the velocity with which a ball moves in any part of its track, provided I can direct the piece in such a manner as to cause the bullet to impinge on the pendulum placed in that part; and therefore, charging a musket barrel three times successively with a leaden ball three-fourths of an inch in diameter, and about half its weight of powder, and taking such precaution in weighing of the powder and placing it, that I was assured, by many previous trials, that the velocity of the ball could not differ by twenty feet in a second from its medium quantity, I fired it against the pendulum placed at 25, 75, and 125 feet distance from the mouth of the piece respectively; and I found that it impinged against the pendulum, in the first case, with a velocity of 1670 feet in a second; in the second case, with a velocity of 1550 feet in a second, and in the third case, with a velocity of 1425 feet in a second; so that, in passing through fifty feet of air, the bullet lost a velocity of 120 or 125 feet in a second; and the time of its passing through that space being about $\frac{1}{32}$d or $\frac{1}{30}$th of a second, the medium quantity of resistance must, in these instances, have been about 120 times the weight of the ball, which (as the ball was nearly $\frac{1}{12}$th of a pound) amounts to about 10 lbs. avoirdupois.

"Now, if a computation be made according to the method laid down for compressed fluids in the 38th Proposition of Newton's *Principia*, supposing the weight of water to that of air as 850 to 1, it will be found that the resistance to a globe of three-fourths of an inch diameter, moving with a velocity of about 1600 feet in a second, will not, on these principles, amount to any more than 4$\frac{1}{2}$ lbs. avoirdupois; whence, as we know that the rules contained in that proposition are very accurate with regard to slow motions, we may hence conclude, that the resistance of the air in slow motions is less than that in swift motions, in the ratio of 4$\frac{1}{2}$ to 10; a proportion between that of one to two and one to three.

"Again, I charged the same piece a number of times with equal quantities of powder, and balls of the same weight, taking all possible care to give to every shot an equal velocity; and firing three times against the pendulum placed only 25 feet from the mouth of the piece, the medium of the velocities with which the ball impinged was nearly that of 1690 feet in a second: then removing the piece 175 feet from the pendulum, I found, taking the medium of five shots, that the velocity with which the ball impinged at this distance was 1300 feet in a second; whence the ball, in passing through 150 feet of air, lost a velocity of about 390 feet in a second: and the resistance computed from these numbers comes out something more than in the preceding instance, it amounting here to between 11 and 12 pounds avoirdupois; whence, according to these experiments, the resisting power of the air to swift motions is greater than to slow ones, in a ratio which approaches nearer to that of 3 to 1 than in the preceding experiments.

"Having thus examined the resistance to a velocity of 1700 feet in a second, I next examined the resistance to smaller velocities; and for this purpose I charged the same barrel with balls of the same diameter, but with less powder, and placing the pendulum at 25 feet distance from the piece, I fired against it five times with an equal charge each time; the medium velocity with which the ball impinged was that of 1180 feet in a second; then, removing the pendulum to the distance of 250 feet, the medium velocity of five shots, made at this distance, was that of 950 feet in a second; whence the ball, in passing through 225 feet of air, lost a velocity of 230 feet in a second; and as it passed through that interval in about $\frac{3}{14}$ths of a second, the resistance to the middle velocity will come out to be near 33$\frac{1}{2}$ times the gravity of the ball, or 2 lbs. 10 oz. avoirdupois. Now, the resistance to the same velocity, according to the laws observed in slower motions, amounts to $\frac{7}{11}$ths of the same quantity; whence, in a velocity of 1065 feet in a second, the resisting power of the air is augmented in no greater proportion than that of 7 to 11; whereas we have seen in the former experiments, that to still greater degrees of velocity the augmentation approached very near the ratio of 1 to 3.

"But farther, I fired three shot, of the same size and weight with those already mentioned, over a large piece of water; so that their dropping into the water being very discernible, both the distance and time of their flight might be accurately ascertained. Each shot was discharged with a velocity of 400 feet in a second; and I had satisfied myself, by many previous trials of the same charge with the pendulum, that I could rely on this velocity to ten feet in a second. The first shot flew 313 yards in 4$\frac{1}{4}$ seconds, the second flew 319 yards in 4 seconds, and the third 373 yards in 5$\frac{1}{4}$ seconds. According to the theory of resistance established for slow motions, the first shot ought to have spent no more than 3·2 seconds in its flight, the second 3·28, and the third 4 seconds; whence it is evident that every shot was retarded considerably more than it ought to have been had that theory taken place in its motion; consequently the resistance of the air is very sensibly increased, even in such a small velocity as that of 400 feet in a second.

"From the computations and experiments already mentioned, it plainly appears that a leaden ball of $\frac{3}{4}$ths of an inch diameter, and weighing nearly 1$\frac{1}{3}$ ounce avoirdupois, if it be fired from a barrel of forty-five inches in length, with half its weight of powder, will issue from that piece with a velocity which, if it were uniformly continued, would carry it near 1700 feet in a second. If, instead of the leaden ball, an iron one, of an equal diameter, was placed in the same situation in the same piece, and was impelled by an equal quantity of powder, the velocity of such an iron bullet would be to that of a leaden one reciprocally in the subduplicate ratio of the specific gravities of lead and iron; and supposing that ratio to be as three to two, and computing on the principles already laid down, it will appear, that an iron bullet of 24 lbs. weight, shot from a piece of ten feet in length, with 16 lbs. of powder, will acquire from the explosion a velocity which, if uniformly continued, would carry it nearly 1650 feet in a second.

"This is the velocity which, according to our theory, a cannon ball of 24 lbs. weight is discharged with when it is impelled by a full charge of powder; but if, instead of a quantity of powder weighing two-thirds of the ball, we suppose the charge to be only half the weight of it, then its velocity will on the same principles be no more than 1490 feet in a second. The same would be the velocities of every lesser bullet fired with the same proportions of powder, if the lengths of all pieces were constantly in the same ratio with the diameters of their bore; and although, according to the usual dimensions of the smaller pieces of artillery, this proportion does not always hold, yet the difference is not great enough to occasion a very great variation from the velocities here assigned, as will be obvious to any one who shall make a computation thereon. But in these determinations we suppose the windage to be no more than is just sufficient for putting down the bullet easily: whereas, in real service, either through negligence or unskilfulness, it often happens that the diameter of the bore so much exceeds the diameter of the bullet, that great part of the inflamed fluid escapes by its side; whence the velocity of the shot in this case may be considerably less than what we have assigned. However, this perhaps may be compensated by the greater heat which in all probability attends the firing of these large quantities of powder.

"It has been already shown, that the resistance of the air on the surface of a bullet of three-fourths of an inch diameter, moving with a velocity of 1670 feet in a second, amounted to about ten pounds. It hath also been shown, that an iron bullet weighing twenty-four pounds, if fired with sixteen pounds of powder (which is usually esteemed its proper battering charge), acquires a velocity of about 1650 feet in a second, scarcely differing from the other; whence, as the surface of this last bullet is more than fifty-four times greater than the surface of a bullet of three-fourths of an inch diameter, and their velocities are nearly the same, it follows, that the resistance on the larger bullet will amount to more than 540 pounds, which is near twenty-three times its own weight.

"Now, the prodigious resistance of the air to a bullet of twenty-four pounds weight, such as we have here established it, sufficiently shows how erroneous must that hypothesis be, which neglects, as inconsiderable, a force amounting to more than twenty times the weight of the moving body?" We now proceed to state the postulates which contain the principles of the modern art of gunnery as found on the parabolic hypothesis. They are as follow:—

"1. If the resistance of the air be so small that the motion of a projected body is in the curve of a parabola, then the axis of that parabola will be perpendicular to the horizon, and consequently the part of the curve in which the body ascends will be equal and similar to that in which it descends.

"2. If the parabola in which the body moves be terminated on a horizontal plane, then the vertex of the parabola will be equally distant from its two extremities.

"3. Also the moving body will fall on that horizontal plane in the same angle, and with the same velocity with which it was first projected.

"4. If a body be projected in different angles but with the same velocity, then its greatest horizontal range will be when it is projected in an angle of 45° with the horizon.

"5. If the velocity with which the body is projected be known, then this greatest horizontal range may be thus found. Compute, according to the common theory of gravity, what space the projected body ought to fall through to acquire the velocity with which it is projected; then twice that space will be the greatest horizontal range, or the horizontal range when the body is projected in an angle of 45° with the horizon.

"6. The horizontal ranges of a body, when projected with the same velocity at different angles, will be between themselves as the sines of twice the angle in which the line of projection is inclined to the horizon.

"7. If a body is projected in the same angle with the horizon, but with different velocities, the horizontal ranges will be in the duplicate proportion of those velocities."

These postulates, which contain the principles of the parabolic theory of gunnery, would, if applied without reference to the resistance of the air, lead to great errors in practice; "for it has been already shown, that a musket-ball of three-fourths of an inch in diameter, fired with half its weight of powder, from a piece 45 inches long, moves with a velocity of near 1700 feet in a second. Now, if this ball flew in the curve of a parabola, its horizontal range at 45° would be found by the fifth postulate to be about seventeen miles. But all the practical writers assure us that this range is really short of half a mile. Diego Ufano assigns to an arquebuss, four feet in length, and carrying a leaden ball of 1½ oz. weight (which is very near our dimensions), a horizontal range of 797 common paces, when it is elevated between 40 and 50 degrees, and charged with a quantity of fine powder equal in weight to the ball. Mersennus also tells us, that he found the horizontal range of an arquebuss at 45° to be less than 400 fathoms, or 800 yards; whence, as either of these ranges is short of half an English mile, it follows, that a musket-shot, when fired with a reasonable charge of powder at the elevation of 45°, flies not one thirty-fourth part of the distance it ought to do if it moved in a parabola. Nor is this great contraction of the horizontal range to be wondered at, when it is considered that the resistance of this bullet when it first issues from the piece amounts to 120 times its gravity, as has been here experimentally demonstrated: or in the case of an iron bullet of 24 lbs. weight which, fired from a piece of the common dimensions, with its greatest allotment of powder, has a velocity of 1650 feet in a second, as already shown, if the horizontal range of the shot at 45° be computed on the parabolic hypothesis by the fifth postulate, it will come out to be about sixteen miles, which is between five and six times its real quantity; for the practical writers all agree in making it less than three miles."

In a similar manner, Robins pointed out that even with very moderate velocities the path of flight materially differs from a parabola, and that the highest point of flight is much nearer the place where the projectile falls to the ground than to that from whence it was at first discharged,—the descending curve being shorter and more inclined to the horizon than the ascending, as may be seen even in the figures of Tartaglia, cuts 1, 2, 3, 4; but it is not, at the present day, necessary to urge farther that the parabolic theory, though the necessary basis of theoretic gunnery, cannot of itself be applied in practice except when the initial velocities are less than 200 or 300 feet per second, when the resistance of the air becomes comparatively very small.

Mr Robins also first pointed out the fact, that from certain deviating forces which act upon the ball, it does not pursue that simple curved path which would be the result of the combined action of gravity and of the ordinary resistance of the air, both of which forces, acting in a vertical plane, have no tendency to produce lateral deflection, or to cause the ball to pursue a path of double curvature, or, as he expresses it, "to move on the surface of a cylinder the axis of which is perpendicular to the horizon." Didion thus states the causes of deviation:—"They are," he says, "of two kinds, namely, those which act on the projectile whilst still in the bore of the gun, so as to modify its direction and initial velocity, and which also produce a movement of rotation, as first observed by Robins, which becomes the cause of other deviations in the projectile; and, secondly, those which act upon the projectile during the whole time of its flight. The first deflect the projectile from the direction of the axis of the gun in proportion to the distance; the others may be considered accelerating forces, variable as each discharge, and even during the flight of a projectile, being distinct from gravity, which is constant, and from the resistance of the air, which is tangential to the trajectory of the projectile,—these two latter forces producing by their action what may be called the normal trajectory. Amongst the causes of deviation, some act in a permanent manner and produce effects which may be anticipated beforehand."

Deviation from the ball striking against the interior of the bore.—Solid balls, as well as hollow projectiles made of cast-iron, have always a diameter somewhat less than that of the bore of the gun for which they are intended. In consequence of this, the elastic gases escaping above the ball, which rests on the lower surface of the bore, press it down, producing much friction and a rotatory motion in the ball, whilst the gases pressing it behind produce a movement of translation. This pressure in bronze guns soon produces a depression or hollow, and the ball in consequence rises at an angle a little more elevated than the axis of the piece; and should the gun be short enough, this would be the final direction of the ball on leaving the gun; but, in general, such is not the case, and the ball will strike the upper part of the bore and be deflected downwards, when the result will be a depression of the true line of direction; or should it rebound again, an elevation—an effect which must increase as the gun becomes more worn. This deviation would be one merely in a vertical direction, were there not other causes tending to combine a lateral deviation with it, such, for example, as irregularities in the form and density of the projectile, as well as differences in its position as respects the charge, by which it happens that the resultant of the action of the gases is not exactly in the vertical plane, and the direction of the ball on leaving the gun diverges a little from that plane. The vertical deviation, though not always, is generally in elevation. From French experiments, it appears that with guns this deviation on an average amounts to $0^\circ\ 3\frac{1}{2}'$, and in howitzers to $0^\circ\ 10\frac{1}{2}'$—one-quarter of the shots from guns having an elevation of more than $8\frac{1}{2}'$, and about one-quarter a depression below the axis of $1\frac{1}{2}'$; whilst in howitzers one-fourth of the shells were elevated more than $15\frac{1}{2}'$, and one-fourth $5\frac{1}{2}'$ above the axis—the remaining half, as also in the guns, falling between these extreme numbers. In a horizontal direction, half of the shots deviated from the vertical plane passing through the axis more than $4\frac{1}{2}'$, either to the right or left, the others diverging less.

Robins and Lombard both determined experimentally the fact of deviation; the latter by placing a board screen marked by a horizontal and vertical line, at a short distance from the gun, and the intersection of the lines corresponding to the axis prolonged—the deviations of the ball when piercing the screen being thus at once exhibited; and Robins—who may be considered the author of experimental gunnery—by paper screens, as well as by board targets. The arrangement of screens which Mr Robins deemed the best he thus describes :—

"The apparatus was as follows. Two screens were set up in the larger walk in the Charter-house garden; the first of them at 250 feet distance from the wall, which was to serve for a third screen; and the second 200 feet from the same wall. At 50 feet before the first screen, or at 300 feet from the wall, there was placed a large block weighing about 200 lbs. weight, and having, fixed into it, an iron bar with a socket at its extremity, in which the piece was to be laid. The piece itself was of a common length, and bored for an ounce ball. It was each time loaded with a ball of 17 to the pound, so that the windage was extremely small, and with a quarter of an ounce of good powder. The screens were made of the thinnest tissue paper; and the resistance they gave to the bullet (and consequently their probability of deflecting it) was so small, that a bullet lighting one time near the extremity of one of the screens, left a fine thin fragment of it towards the edge entire, which was so very weak that it was difficult to handle it without breaking. These things thus prepared, five shots were made with the piece rested in the notch above mentioned; and the horizontal distances between the first shot, which was taken as a standard, and the four succeeding ones, both on the first and second screen, and on the wall, measured in inches, were as follows :—

	First Screen.	Second Screen.	Wall.
1 to 2	1·75 R.	3·15 R.	16·7 R.
3	10 L.	15·6 L.	69·25 L.
4	1·25 L.	4·5 L.	15·0 L.
5	2·15 L.	5·1 L.	19·0 L.

"Here the letters R and L denote that the shot in question went either to the right or left of the first.

"If the position of the socket in which the piece was placed be supposed fixed, then the horizontal distances measured above on the first and second screen, and on the wall, ought to be in proportion to the distances of the first screen, the second screen, and the wall, from the socket. But by only looking over these numbers, it appears that none of them are in that proportion; the horizontal distance of the first and third, for instance, on the wall being above nine inches more than it should be by this analogy.

"If, without supposing the invariable position of the socket, we examine the comparative horizontal distances according to the third method described above, we shall in this case discover divarications still more extraordinary; for by the numbers set down it appears that the horizontal distances of the second and third shot on the two screens, and on the wall, are as under :—

First Screen.	Second Screen.	Wall.
11·75	18·75	83·95

Here, if, according to the rule given above, the distance on the first screen be taken from the distances on the other two, the remainder will be 7 and 72·2; and these numbers, if each shot kept to a vertical plane, ought to be in the proportion of 1 to 5; that being the proportion of the distances of the second screen, and of the wall, from the first: but the last number 72·2 exceeds what it ought to be by this analogy by 37·2; so that between them there is a deviation from the vertical plane of above 37 inches, and this too in a transit of little more than 80 yards.

"But farther, to show that these irregularities do not depend on any accidental circumstance of the balls fitting or not fitting the piece, there were five shots more made with the same quantity of powder as before, but with smaller bullets, which ran much looser in the piece. And the horizontal distances being measured in inches from the trace of the first bullet to each of the succeeding ones, the numbers were as under :—

	First Screen.	Second Screen.	Wall.
1 to 2	15·6 R.	31·1 R.	94·0 R.
3	6·4 L.	12·75 L.	23·0 L.
4	4·7 R.	8·5 R.	15·5 R.
5	12·6 R.	24·0 R.	63·5 R.

Here, again, on the supposed fixed position of the piece, the horizontal distance on the wall between the first and third will be found about 15 inches less than it should be if each kept to a vertical plane; and like irregularities, though smaller, occur in every other experiment. And if they are examined according to the third method set down above, and the horizontal distances of the third and fourth, for instance are compared, those on the first and second screen, and on the wall, appear to be thus :

First Screen.	Second Screen.	Wall.
11·1	21·25	38·5

"And if the horizontal distance on the first screen be taken from the other two, the remainders will be 10·15 and 27·4; where the least of them, instead of being five times the first, as it ought to be, is 23·35 short of it; so that here is a deviation of more than 23 inches.

"From all these experiments, the deflection in question seems to be incontestibly evinced. But to give some farther light to this subject, I took a barrel of the same bore with that hitherto used, and bent it at about three or four inches from its muzzle to the left, the bend making an angle of three or four degrees with the axis of the piece. This piece thus bent was fired with a loose ball, and the same quantity of powder hitherto used, the screens of the last experiment being still continued. It was natural to expect, that if this piece was pointed by the general direction of its axis, the ball would be canted to the left of that direction by the bend near its mouth. But as the bullet, in passing through that bent part, would, as I conceived, be forced to roll upon the right-hand side of the barrel, and thereby its left side would turn up against the air, and would increase the resistance on that side, I predicted to the company then present, that if the axis on which the bullet whirled did not shift its position after it was separated from the piece, then, notwithstanding the bend of the piece to the left, the bullet itself might be expected to incurvate towards the right; and this, upon trial, did most remarkably happen. For one of the bullets fired from this bent piece passed through the first screen about $1\frac{1}{2}$ inch distant from the trace of one of the shots fired from the straight piece in the last set of experiments. On the second screen, the traces of the same bullets were about 3 inches distant; the bullet from the crooked piece passing on both screens to the left of the other; but comparing the places of these bullets on the wall, it appeared that the bullet from the crooked piece, though it diverged from the track on the two screens, had now crossed that track, and was deflected considerably to the right of it; so that it was obvious, that though the bullet from the crooked piece might first be canted to the left, and had diverged from the track of the other bullet with which it was compared, yet by degrees it deviated again to the right, and a little beyond the second screen crossed that track from which it before diverged, and on the wall was deflected 14 inches, as I remember, on the contrary side.

By this arrangement of several parallel screens it became evident that the ball did not always pursue the simple direction of the deflection it had received on leaving the bore, but from a cause acting during the flight was again deflected, sometimes, as in the curious experiment of the bent barrel, in an opposite direction to that of the original deflection. With his usual acumen Mr Robins assigned this effect to its true cause.

"The reality of this doubly curvated track being thus demonstrated, it may perhaps be asked, What can be the cause of a motion so different from what has been hitherto supposed? And to this I answer, that the deflection in question must be owing to some power acting obliquely to the progressive motion of the body; which power can be no other than the resistance of the air. If it be further asked, how the resistance of the air can ever come to be oblique to the progressive motion of the body, I farther reply, that it may sometimes arise from inequalities in the resisted surface, but that its general cause is doubtless a whirling motion acquired by the bullet about its axis; for by this motion of rotation, combined with the progressive motion, each part of the bullet's surface will strike the air very differently from what it would do if there was no such whirl; and the obliquity of the action of the air arising from this cause will be greater, as the rotatory motion of the bullet is greater in proportion to its progressive one.

"This whirling motion undoubtedly arises from the friction of the bullet against the sides of the piece; and as the rotatory motion will in some part of its revolution conspire with the progressive one, and in another part be equally opposed to it, the resistance of the air on the fore part of the bullet will be hereby affected, and will be increased in that part where the whirling motion conspires with the progressive one, and diminished where it is opposed to it; and by this means the whole effort of the resistance, instead of being opposite to the direction of the body, will become oblique thereto, and will produce those effects already mentioned. If it was possible to predict the position of the axis round which the bullet should whirl, and if that axis was unchangeable during the whole flight of the bullet, then the aberration of the bullet by this oblique force would be in a given direction, and the incurvation produced thereby would regularly extend the same way from one end of its track to the other. For instance, if the axis of the whirl was perpendicular to the horizon, then the incurvation would be to the right or left. If that axis was horizontal, and perpendicular to the direction of the bullet, then the incurvation would be upwards or downwards. But as the first position of this axis is uncertain, and as it may perpetually shift in the course of the bullet's flight, the deviation of the bullet is not necessarily either in one certain direction, or tending to the same side in one part of its track more than it does in another, but more usually is continually changing the tendency of its deflection, as the axis round which it whirls must frequently shift its position to the progressive motion by many inevitable accidents.

"That a bullet generally acquires such a rotatory motion as here described, is, I think, demonstrable; however, to leave no room for doubt or dispute, I confirmed it, as well as some other parts of my theory, by the following experiments:—

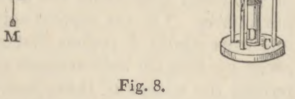

Fig. 8.

"I caused the machine to be made, represented fig. 8, BCDE is a brass barrel, moveable on its axis, and so adjusted by means of friction-wheels, not represented in the figure, as to have no friction worth attending to. The frame in which this barrel is fixed is so placed that its axis may be perpendicular to the horizon. The axis itself is continued above the upper plate of the frame, and has fastened on it a light hollow cone, AFG. From the lower part of this cone there is extended a long arm of wood, GH, which is very thin, and cut feather-edged. At its extremity there is a contrivance for fixing on the body whose resistance is to be investigated (as here the globe P); and to prevent the arm GH from swaying out of its horizontal position by the weight of the annexed body P, there is a brace, AH, of fine wire, fastened to the top of the cone which supports the end of the arm.

"Round the barrel BCDE there is wound a fine silk line, the turns of which appear in the figure; and after this line has taken a sufficient number of turns, it is conducted nearly in a horizontal direction to the pulley L, over which it is passed, and then a proper weight M is hung to its extremity. If this weight be left at liberty, it is obvious that it will descend by its own gravity, and will, by its descent, turn round the barrel BCDE, together with the arm GH, and the body P fastened to it. And whilst the resistance on the arm GH and on the body P is less than the weight M, that weight will accelerate its motion: and thereby the motion of GH and P will increase, and consequently their resistance will increase, till at last this resistance and the weight M become nearly equal to each other. The motion with which M descends, and with which P revolves, will not then sensibly differ from an equable one. Whence it is not difficult to conceive, that, by proper observations made with this machine, the resistance of the body P may be determined. The most natural method of proceeding in this investigation is as follows: Let the machine first have acquired its equable motion, which it will usually do in about five or six turns from the beginning; and then let it be observed, by counting a number of turns, what time is taken up by one revolution of the body P; then taking off the body P and the weight M, let it be examined what smaller weight will make the arm GH revolve in the same time as when P was fixed to it; this smaller weight being taken from M, the remainder is obviously equal in effort to the resistance of the revolving body P; and this remainder being reduced in the ratio of the length of the arm to the semidiameter of the barrel, will then become equal to the absolute quantity of the resistance. And as the time of one revolution is known, and consequently the velocity of the revolving body, there is hereby discovered the absolute quantity of the resistance to the given body P moving with a given degree of celerity.

"Here, to avoid all objections, I have generally chosen, when the body P was removed, to fix in its stead a thin piece of lead of the same weight, placed horizontally; so that the weight which was to turn round the arm GH, without the body P, did also carry round this piece of lead. But mathematicians will easily allow that there was no necessity for this precaution. The diameter of the barrel BCDE, and of the silk string wound round it, was 2·06 inches. The length of the arm GH, measured from the axis to the surface of the globe P, was 49·5 inches. The body P, the globe made use of, was of pasteboard; its surface very neatly coated with marbled paper. It was not much distant from the size of a 12-lb. shot, being in diameter 4·5 inches, so that the radius of the circle described by the centre of the globe was 51·75 inches. When this globe was fixed at the end of the arm, and a weight of half a pound was hung at the end of the string at M, it was examined how soon the motion of the descending weight M, and of the revolving body P, would become equable as to sense. With this view, three revolutions being suffered to elapse, it was found that the next 10 were performed in $27\frac{3}{4}^{s}$, 20 in less than 55^{s}, and 80 in $82\frac{1}{2}^{s}$; so that the first 10 were performed in $27\frac{3}{4}^{s}$, the second in $27\frac{1}{4}^{s}$, and the third in $27\frac{1}{2}^{s}$.

"These experiments sufficiently evince, that even with half a pound, the smallest weight made use of, the motion of the machine was sufficiently equable after the first three revolutions.

"The globe above mentioned being now fixed at the end of the arm, there was hung on at M a weight of $3\frac{1}{4}$ lbs.; and ten revolutions being suffered to elapse, the succeeding 20 were performed in $21\frac{1}{2}^{s}$. Then the globe being taken off, and a thin plate of lead, equal to it in weight, placed in its room; it was found, that instead of $3\frac{1}{4}$ lb. a weight of one pound would make it revolve in less time than it did before, performing now 20 revolutions after 10 were elapsed in the space of 19^{s}.

"Hence then it follows, that from the $3\frac{1}{4}$ lbs. first hung on, there is less than 1 lb. to be deducted for the resistance on the arm; and consequently the resistance on the globe itself is not less than the effort of $2\frac{1}{4}$ lbs. in the situation M: and it appearing from the former measures, that the radius of the barrel is nearly $\frac{1}{50}$th of the radius of the circle described by the centre of the globe, it follows, that the absolute resistance of the globe, when it revolves 20 times in $21\frac{1}{2}^{s}$ (about 25 feet in a second), is not less than the 50th part of two pounds and a quarter, or of 36 ounces; and this being considerably more than half an ounce, and the globe nearly the size of a 12-lb. shot, it irrefragably confirms a proposition I had formerly laid down from theory, that the resistance of the air to a 12-lbs. iron shot, moving with a velocity of 25 feet in a second, is not less than half an ounce.

"The rest of the experiments were made in order to confirm another proposition, namely, that the resistance of the air within certain limits is nearly in the duplicate proportion of the velocity of the resisted body. To investigate this point, there were successively hung on at M, weights in the proportion of the numbers 1, 4, 9, 16; and letting 10 revolutions first elapse, the following observations were made on the rest. With $\frac{1}{2}$ lb. the globe went 20 turns in $54\frac{1}{2}^s$, with 2 lbs. it went 20 turns in $27\frac{1}{4}^s$, with $4\frac{1}{2}$ lbs. it went 30 turns in $27\frac{1}{2}^s$, and with 8 lbs. it went 40 turns in $27\frac{1}{2}^s$. Hence it appears, that to resistances proportioned to the numbers 1, 4, 9, 16, there correspond velocities of the resisted body in the proportion of the numbers 1, 2, 3, 4: which proves, with great nicety, the proposition above mentioned.

"With regard to the rotatory motion, the first experiment was to evince, that the whirling motion of a ball combining with its progressive motion would produce such an oblique resistance and deflective power as already mentioned. For this purpose a wooden ball of $4\frac{1}{2}$ inches diameter was suspended by a double string about eight or nine feet long. Now, by turning round the ball, and twisting the double string, the ball when left to itself would have a revolving motion given it from the untwisting of the string again. And if, when the string was twisted, the ball was drawn to a considerable distance from the perpendicular, and there let go, it would at first, before it had acquired its revolving motion, vibrate steadily enough in the same vertical plane in which it first began to move; but when, by the untwisting of the string, it had acquired a sufficient degree of its whirling motion, it constantly deflected to the right or left of its first track, and sometimes proceeded so far as to have its direction at right angles to that in which it began its motion; and this deviation was not produced by the string itself, but appeared to be entirely owing to the resistance being greater on the one part of the leading surface of the globe than the other. For the deviation continued when the string was totally untwisted, and even during the time that the string, by the motion the globe had received, was twisting the contrary way. And it was always easy to predict, before the ball was let go, which way it would deflect, only by considering on which side the whirl would be combined with the progressive motion; for on that side always the deflective power acted, as the resistance was greater here than on the side where the whirl and progressive motion were opposed to one another."

Mr Robins also applied the whirling machine to the experimental illustration of the great difference of resistance offered by the air to the passage of bodies of equal surfaces, and even meeting the air at the same angle of obliquity, but of different forms; the difference being so great, "that though in one of them the resistance is less than that of a perpendicular surface meeting the same quantity of air, yet in another it shall be considerably greater."

"To make out this proposition, I made use of the machine already described; and having prepared a pasteboard pyramid, whose base was 4 inches square, and whose planes made angles of 45° with the plane of its base, and also a parallelogram 4 inches in breadth, and $5\frac{7}{8}$ in length, which was equal to the surface of the pyramid, the globe P was taken off from the machine, and the pyramid was first fixed on; and 2 lb. being hung at M, and the pyramid so fitted as to move with its vertex forwards, it performed twenty revolutions after the first ten were elapsed in 35^s. Then the pyramid being turned so that its base, which was a plane of 4 inches square, went foremost, it now performed twenty revolutions with the same weight in $38\frac{1}{4}^s$. After this, taking off the pyramid, and fixing on the parallelogram with its longer side perpendicular to the arm, and placing its surface in an angle of 45° with the horizon by a quadrant, the parallelogram, with the same weight, performed twenty revolutions in $43\frac{1}{2}^s$.

"Now here this parallelogram and the surface of the pyramid are equal to each other, and each of them met the air in an angle of 45°; and yet one of them made twenty revolutions in 35^s, whilst the other took up $43\frac{1}{2}^s$. And at the same time it appears that a flat surface, such as the base of a pyramid, which meets the same quantity of air perpendicularly, makes twenty revolutions in $38\frac{1}{4}^s$, which is the medium between the other two.

"But to give another and still more simple proof of this principle, there was taken a parallelogram 4 inches broad and $8\frac{1}{4}$th long. This being fixed at the end of the arm, with its long side perpendicular thereto, and being placed in an angle of 45° with the horizon, there was a weight hung on at M of $3\frac{1}{2}$ lbs. with which the parallelogram made twenty revolutions in $40\frac{3}{4}^s$. But after this, the position of the parallelogram was shifted, and it was placed with its shorter side perpendicular to the arm, though its surface was still inclined to an angle of 45° with the horizon; and now, instead of going slower, as might have been expected from the greater extent of part of its surface from the axis of the machine, it went round much faster; for in this last situation it made twenty revolutions in $35\frac{3}{4}^s$, so that there were 5^s difference in the time of twenty revolutions; and this from no other change of circumstance than as the larger or shorter side of the oblique plane was perpendicular to the line of its direction."

In the seventy-third volume of the *Philosophical Transactions*, several experiments on this subject, but upon a somewhat larger scale, as the arms of this modification of the whirling machine were about 6 feet long, are related by Lovell Edgeworth, Esq. They confirm the accuracy of Mr Robins' statements.

These are the principal experiments made by Mr Robins in confirmation of his theory, and which not only far exceed everything that had been previously done, but point out the only method by which the art of gunnery may be still further improved. It must be observed, however, that in this art it is impossible we should ever arrive at absolute perfection; that is, it can never be expected that a gunner, by any method of calculation whatever, can be enabled to point his guns in such a manner that the shot shall hit the mark if placed anywhere within its range. Aberration which can by no means be either foreseen or prevented, will take place from a great number of different causes. A variation in the density of the atmosphere, in the dampness of the powder, or in the figure of the shot, will cause variations in the range of the bullet, which cannot by any means be reduced to rules, and consequently must render the event of each shot very precarious. The resistance of the atmosphere simply considered, without any of those anomalies arising from its density at different times, is a problem which, notwithstanding the labours of Mr Robins and others, has not been completely solved; and, indeed, if we consider the matter in a physical light, we shall find that without some other data than those which are yet obtained, an exact solution of it is impossible. Professor Robinson, for example, the original writer of this article, proceeded at this point to investigate another difficult and obscure point connected with the resistance of the air to bodies passing with great velocity through it.

An objection has been made to the mathematical philosophy, to which in many cases it is most certainly liable, that it considers the *resistance* of matter more than its capacity of giving motion to other matter. Hence, if in any case matter acts both as a resisting and a moving power, and the mathematician overlooks its effort towards motion, founding his demonstrations only upon its property of resisting, these demonstrations will certainly be false. It is to an error of this kind that we are to attribute the great differences already noticed between the calculations of Sir Isaac Newton, with regard to the resisting force of fluids, and what actually takes place upon trial. These calculations were made upon the supposition that the fluid through which a body moved could do nothing else but resist it; yet it is certain that the air (the fluid with which we have to do at present) proves a source of *motion*, as well as resistance, to all bodies which move in it.

To understand this matter fully, let ABC represent a crooked tube made of any solid matter, and *a*, *b*, two pistons which exactly fill the cavity. If the space between these pistons be full of air, it is plain they cannot come into contact with each other, on account of the elasticity of the included air, but will remain at some certain distance, as represented in the figure. If the piston *b* be drawn up, the air which presses in the direction C*b* acts as a resisting power, and the piston will not be drawn up with such ease as if the whole was *in vacuo.* But though the column of air pressing in the direction C*b* acts as a resisting power on the piston *b*, the column pressing in the direction A*a* will act as a moving power upon the piston *a*. It is therefore plain, that if *b* be moved upwards till it comes to the place marked *d*, the other will descend to that marked *c*. Now, if we suppose the piston *a* to be removed, it is plain that when *b* is pulled upwards to *d*, the air descending through the leg A*a*CB will press on the under side of the piston *b*, as strongly as it would have done upon the upper side of the piston *a*, had it been present. Therefore, though the air passing down through the leg CB resists the motion of the piston *b* when drawn upwards, the air pressing down through the leg AB forwards it as much; and accordingly the piston *b* may be drawn up or pushed down at pleasure, and with very little trouble. But if the orifice at A be stopped, so that the air can only exert its resisting power on the piston *b*, it will require a considerable degree of strength to move the piston from *b* to *d*.

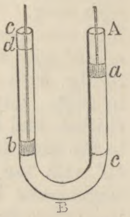

Fig. 10.

If now we suppose the tube to be entirely removed (which indeed answers no other purpose than to render the action of the air more evident), it is plain that if the piston be moved either up or down, or in any other direction we can imagine, the air will press as much upon the back part of it as it resists it on the fore part; and, consequently, a ball moving through the air with any degree of velocity, ought to be as much accelerated by the action of the air behind, as it is retarded by the action of that before. Here then it is natural to ask, if the air accelerates a moving body as much as it retards it, how comes it to make any resistance at all? Yet certain it is that this fluid does resist, and that very considerably. To this it may be answered, that the air is always kept in some certain state or constitution by another power which rules all its motions, and it is this power undoubtedly which gives the resistance. It is not to our purpose at present to inquire what that power is, but we see that the air is often in very different states; one day, for instance, its parts are violently agitated by a storm, and another perhaps they are comparatively at rest in a calm. In the first case, nobody hesitates to own that the storm is occasioned by some cause or other, which violently resists any other power that would prevent the agitation of the air. In a calm the case is the same; for it would require the same exertion of power to excite a tempest in a calm day as to allay a tempest in a stormy one. Now it is evident that all projectiles, by their motion, agitate the atmosphere in an unnatural manner, and consequently are resisted by that power, whatever it is, which tends to restore the equilibrium, or bring back the atmosphere to its former state.

If no other power besides that above mentioned acted upon projectiles, it is probable that all resistance to their motion would be in the duplicate proportion of their velocities; and accordingly, as long as their velocity is small, we find that generally it is so. But when the velocity comes to be exceedingly great, other sources of resistance arise. One of these is a subtraction of part of the moving power, which, though not properly a *resistance*, or opposing another power to it, is an equivalent thereto. This subtraction arises from the following cause:—The air, as we have already observed, presses upon the hinder part of the moving body by its gravity, as much as it resists the forepart of it by the same property. Nevertheless the velocity with which the air presses upon any body by means of its gravity is limited; and it is possible that a body may change its place with so great velocity that the air has not time to rush in upon the back part of it in order to assist its progressive motion. When this happens to be the case, there is in the first place a deficiency of the moving power equivalent to fifteen pounds on every square inch of surface, at the same time that there is a positive resistance of as much more on the fore part, owing to the gravity of the atmosphere, which must be overcome before the body can move forward.

This deficiency of moving power, and increase of resistance, do not only take place when the body moves with a very great degree of velocity, but in all motions whatsoever. It is not in all cases perceptible, because the velocity with which the body moves frequently bears but a very small proportion to the velocity with which the air presses in behind it. Thus, supposing the velocity with which the air rushes into a vacuum to be 1200 feet in a second, if a body moves with a velocity of 40 or 50 feet in a second, the force with which the air presses on the back part is but $\frac{1}{25}$th at the utmost less than that which resists on the fore part of it, which will not be perceptible; but if, as in the case of bullets, the velocity of the projectile comes to have a considerable proportion to the velocity wherewith the air rushes in behind it, then a very perceptible and otherwise unaccountable resistance is observed, as we have seen in the experiments already related by Mr Robins. Thus, if the air presses in with a velocity of 1200 feet in a second, and if the body changes its place with a velocity of 600 feet in the same time, there is a resistance of fifteen pounds on the fore part, and a pressure of only $7\frac{1}{2}$ on the back part. The resistance therefore not only overcomes the moving power of the air by $7\frac{1}{2}$ pounds, but there is a deficiency of other $7\frac{1}{2}$ pounds owing to the want of half the pressure of the atmosphere on the back part, and thus the whole loss of the moving power is equivalent to 15 pounds; and hence the exceeding great increase of resistance observed by Mr Robins beyond what it ought to be according to the common computations. The velocity with which the air rushes into a vacuum is therefore a desideratum in gunnery. Mr Robins supposes that it is the same with the velocity of sound; and that when a bullet moves with a velocity greater than that of 1200 feet in a second, it leaves a perfect vacuum behind it. Hence he accounts for the great increase of resistance to bullets moving with such velocities; but as he does not take notice of the loss of the air's moving power, the anomalies of all lesser velocities are inexplicable on his principles. Nay, he even tells us that Sir Isaac Newton's rule for computing resistances may be applied in all velocities less than 1100 or 1200 feet in a second, though this is expressly contradicted by his own experiments already mentioned.

Though for these reasons it is evident how great difficulties must occur in attempting to calculate the resistance of the air to military projectiles, we have not yet even discovered all the sources of resistance to these bodies when moving with immense velocities. Another power by which they are opposed, and which at last becomes greater than any of those hitherto mentioned, is the air's elasticity. This, however, will not begin to show itself in the way of resistance till the velocity of the moving body becomes considerably greater than that by which the air presses into a vacuum. Having therefore first ascertained this velocity, which we shall suppose to be 1200 feet in a second, it is plain that if a body moves with a velocity of 1800 feet in a second, it must compress the air before it; because the fluid has neither time to expand itself in order to fill the vacuum left behind the moving body, nor to rush in by its gravity. This compression it will resist by its elastic power, which thus becomes a new source of resistance, increasing, without any limit, in proportion to the velocity of the moving body. If now we suppose the moving body to set out with a velocity of 2400 feet in a second, it is plain that there is not only a vacuum left behind the body, but the air before it is compressed into half its natural space. The loss of motion in the projectile therefore is now very considerable. It first loses 15 pounds on every square inch of surface on account of the deficiency of the moving power of the air behind it, then it loses 15 pounds more on account of the resistance of the air before it; again, it loses 15 pounds on account of the elasticity of the compressed air; and lastly, it loses another 15 pounds on account of the vacuum behind, which takes off the weight of the atmosphere, that would have been equivalent to one-half of the elasticity of the air before it. The whole resistance therefore upon every square inch of surface moving with this velocity is 60 pounds, besides that which arises from the power tending to preserve the general state of the atmosphere, and which increases in the duplicate proportion of the velocity, as already mentioned. If the body is supposed to move with a velocity of 4800 feet in a second, the resistance from the elasticity of the air will then be quadrupled, or amount to 60 pounds on the square inch of surface, which, added to the other causes, will produce a resistance of 105 pounds upon the square inch; and thus the resistance from the elasticity of the air would go on continually increasing, till at last the motion of the projectile would be as effectually stopped as if it were fired against a wall. This obstacle, therefore, we are to consider as really *insuperable* by any art whatsoever, and therefore it is not advisable to use larger charges of powder than what will project the shot with a velocity of 1200 feet in a second. To this velocity the elasticity of the air will not make great resistance, if indeed it makes any at all; for though Mr Robins has conjectured that air rushes into a vacuum with the velocity of sound, or between 1100 and 1200 feet in a second, yet we have no decisive proof of the truth of this supposition. At this velocity, indeed, according to Mr Robins, a very sudden increase of resistance takes place; but this is denied by Mr Glenie, in his *History of Gunnery* (p. 48, 50), who supposes that the resistance proceeds gradually; and, indeed, it seems to be pretty obvious that the resistance cannot very *suddenly* increase, if the velocity be only increased in a small degree. Yet it is certain that the swiftest motions with which cannon-balls can be projected are very soon reduced to the standard; for Mr Robins informs us, that "a 24-pound shot, when discharged with a velocity of 2000 feet in a second, will be reduced to that of 1200 feet in a second in a flight of little more than 500 yards."

In the seventy-first volume of the *Philosophical Transactions*, Count Rumford has proposed as new a method of determining the velocities of bullets, by measuring the force of the recoil of the piece. As in all cases action and reaction are supposed to be equal to one another, it appears that the momentum of a gun, or the force of its recoil backwards, must always be equivalent to the force of discharge in the opposite direction; that is, the velocity with which the gun recoils, multiplied into its weight, is equal to the velocity of the bullet multiplied into its weight; for every particle of matter, whether solid or fluid, that issues out of the mouth of a piece, must be impelled by the action of some power, which power must *react* with equal force against the bottom of the bore. Even the fine elastic invisible fluid which is generated from the powder in its inflammation cannot put itself in motion without at the same time reacting against the gun. Thus we see pieces, when they are fired with powder alone, recoil as well as when their charges are made to impel a weight of shot, though the recoil is not in the same degree in both cases. It is easy to determine the velocity of the recoil in any given case, by suspending the gun in an horizontal position by two pendulous rods, and measuring the arc of its ascent by means of a ribbon, as in the Ballistic Pendulum; and this will give the momentum of the gun, its weight being known, and consequently the momentum of its charge. But in order to determine the velocity of the bullet from the momentum of the recoil, it will be necessary to know how much the weight and velocity of the elastic fluid contribute towards it.

That part of the recoil which arises from the expansion of the fluid is always very nearly the same as stated by Robins, whether the powder is fired alone, or whether the charge is made to impel one or more bullets, as has been determined by a great variety of experiments. If, therefore, a gun, suspended according to the method prescribed, is fired with any given charge of powder, but without any bullet or wad, and the recoil is observed, and if the same piece is afterwards fired with the same quantity of powder, and a bullet of a known weight, the excess of the velocity of the recoil in the latter case, over that in the former, will be proportional to the velocity of the bullet; for the difference of these velocities, multiplied into the weight of the gun, will be equal to the weight of the bullet multiplied into its velocity. Thus, if W is put equal to the weight of the gun; U = the velocity of the bullet when fired with a given charge of powder without any bullet; V = the velocity of the recoil when the same charge is made to impel a bullet; B = the weight of the bullet, and v = its velocity; it will be $v = \frac{(V - U)\,W}{B}$.

To determine how far this theory agreed with practice, an experiment was made with a charge of 165 grains of powder, without any bullet, which produced a recoil of 5·5 inches; and in another, the recoil was 5·6 inches, the mean of which is 5·55 inches, answering to a velocity of 1·1358 feet in a second. In five experiments with the same charge of powder, and a bullet weighing 580 grains, the mean was 14·6 inches; and the velocity of the recoil answering to the length just mentioned, is 2·9880 feet in a second; consequently V − U, or 2·9880 − 1·1358, is equal to 1·8522 feet in a second. But as the velocities of recoil are known to be as the chords of the arcs through which the barrel ascends, it is not necessary, in order to determine the velocity of the bullet, to compute the velocities V and U; but the quantity V − U, or the difference of the velocities of the recoil when the given charge is fired with and without a bullet, may be computed from the value of the difference of the chords by one operation. Thus the velocity answering to the chord 9·05 is that of 1·8522 feet in a second, which is just equal to V − U, as was before found.

In this experiment the weight of the barrel with its carriage was just $47\frac{1}{4}$ lbs., to which $\frac{3}{4}$ths of a pound were to be added on account of the weight of the rods by which it was suspended; thus making W = 48 lbs., or 336,000 grains. The weight of the bullet was 580 grains; whence B is to W as 580 to 336,000—that is, as 1 to 579·31 very nearly. The value of V − U, answering to the experiments before mentioned, was found to be 1·8522; consequently the velocity of the bullet = v was 1·8522 × 579·31 = 1073 feet, which differs only by 10 from 1083, the velocity found by the pendulum.

The velocities of the bullets may be found from the recoil by a still more simple method. For the velocities of the recoil being as the chords measured upon the ribbon, if c is put equal to the chord of the recoil expressed in English inches, when the piece is fired with powder only, and C = the chord when the same piece is charged with a bullet; then C − c will be as V − U; and consequently as $\frac{(V - U)\,W}{B}$, which measures the velocity of the bullet, the ratio of W to B remaining the same. If, therefore, we suppose a case in which C − c is equal to one inch, and the velocity of the bullet is computed from that chord, the velocity in any other case, wherein $C - c$ is greater or less than one inch, will be found by multiplying the difference of the chords C and c by the velocity answering to the difference of one inch. The length of the parallel rods by which the piece was suspended being 64 inches, the velocity of the recoil, $= C - c = 1$ inch measured upon the ribbon, is 0·204655 parts of a foot in one second, which in this case is also the value of $V - U$; the velocity of the bullet, or v, is therefore 0·204655 × 579·31 = 118·55 feet in a second. Hence the velocity of the bullet may in all cases be found by multiplying the difference of the chords C and c by 118·55, the weight of the barrel, the length of the rods by which it is suspended, and the weight of the bullet, remaining the same; and this whatever the charge of powder made use of may be, and however it may differ in strength and goodness.

The exactness of this second method will appear from the following experiments. On firing the piece with 145 grains of powder and a bullet, the mean of three sets of experiments was 13·25, 13·15, and 13·2; and with the same charge of powder without a bullet, the recoil was 4·5, 4·3, or 4·4. $C - c$, therefore, was 13·2 − 4·4 = 8·8 inches; and the velocity of the bullets, = 8·8 × 118·35 = 1045 feet in a second; the velocities by the pendulum coming out 1040 feet in the same space of time.

In the far greater number of experiments to determine the comparative accuracy of the two methods, a surprising agreement was found between the last-mentioned one and that by the pendulum; but in some few the differences were very remarkable. Thus, in two where the recoil was 12·92 and 13·28, the velocity, by computation from the chords, is 1030 feet per second; but in computing by the pendulum it amounted only to 900; in these, however, some inaccuracy was suspected in the experiment with the pendulum, and the computation from the recoil was most to be depended upon. In another experiment, the velocity by the recoil exceeded that by the pendulum by no less than 346 feet; the former showing 2109, and the latter only 1763 feet in a second.

These differences Count Rumford partly ascribed to the possibility of error in measuring the arc of ascent of the pendulum in his experiments, as the bullet was very light, consisting of a leaden casing over a plaster of Paris nucleus, and the movement of the pendulum very small in consequence; an error, therefore, of $\frac{1}{10}$th of an inch, if made in one of the experiments, being sufficient to account for 120 feet in a second of the difference in the velocity. The resistance also of the air in the passage of the ball from the barrel to the pendulum, distant 12 feet, was another supposed cause of the difference, as Count Rumford assumed, that in this passage, performed in the $\frac{1}{192}$d part of a second, the ball lost 335 feet of its velocity, and therefore struck the pendulum with a corresponding diminished force; but even after allowing for these causes of irregularity between the results of the two methods, he still found large differences, and was led to discover and admit that they were the consequence of the fracture of his balls by the concussion of firing. Indeed, Count Rumford afterwards observes,—

> "As allowance has been made for the resistance of the air in these cases, it may be expected that the same should be done in all other cases; but it will probably appear, upon inquiry, that the diminution of the velocities of the bullets on that account was so inconsiderable, that it might safely be neglected: thus, for instance, in the experiments with an ounce of powder, when the velocity of the bullet was more than 1750 feet in a second, the diminution turns out no more than 25 or 30 feet in a second, though we suppose the full resistance to have begun so near as two feet from the mouth of the piece; and in all cases where the velocity was less, the effect of the resistance was less in a much greater proportion; and even in this instance there is reason to think that the diminution of the velocity, as we have determined it, is too great; for the flame of gunpowder expands with such amazing rapidity, that it is scarcely to be supposed but that it follows the bullet, and continues to act upon it more than two feet, or even four feet, from the gun; and when the velocity of the bullet is less, its action upon it must be sensible at a still greater distance."

And hence it must be admitted that these experiments did not permit of a satisfactory comparison of the two methods of determining the recoil.

As Mr Robins considered that the whole of the powder of the charge is ignited before the ball *begins* to move, and that the gas proceeding from it is instantaneously produced, he came to the conclusion that the velocities of balls of the same size, though of different weights, would be reciprocally as the square roots of the weights; but Count Rumford proved that the ignition, even of the powder, was not instantaneous; and though Dr Hutton's experiments found this law to hold good, he considered this agreement to be the result of compensating circumstances, and states his own opinion that the correct law is nearly the reciprocal sub-triplicate ratio. Count Rumford also pointed out that Robins' estimate of the force of gunpowder—1000 to 1, as regards the pressure of the atmosphere—was too low, his own experiments making it 1308 to 1, an estimate still further raised by Hutton, as has been before stated, to 2000 to 1 or even 2230 to 1.

At this part of the subject it is necessary to point out the extraordinary importance of the labours of Robins, who was assuredly the pioneer of modern gunnery, and with whom commenced, as Sir Howard Douglas justly observes, a new era in the theory of gunnery. This success was due to the introduction of experimental proof; and simple as the means adopted were, they cannot be too highly prized for their efficiency. Didion quotes from the *Histoire de l'Academie des Sciences de Paris* (1707), a passage respecting the younger Cassini, which shows that he had adopted before Robins a practical application of the principle of "measuring the velocity of a projectile by that which it impresses upon a larger mass against, or into, which it is fired"—though with the object rather of testing the influence of the wad and of the disposition of the charge, than of measuring the velocity. Cassini's machine is described as a piece of wood armed at one end by a thick plate of cast-iron which was to resist the balls fired against it from the same musket, always placed at the same distance. The piece of wood was moveable so as to yield more or less to the shock, the extent of movement being marked or measured by the machine.

This simple plan was better fitted for measuring comparative than absolute results, and can scarcely, as suggested by Didion, have influenced Robins in his invention of the ballistic pendulum, first used in 1740, and the object of which was to measure the velocity of musket balls and the resistance of the air. To enlarge the sphere of inquiry, Dr Hutton, professor of mathematics at the Royal Military Academy, was subsequently authorized by the Master-General of the Ordnance to carry on several series of experiments, from 1775 to 1791, conjointly with Major (afterwards Sir Thomas) Blomefield, with a pendulum formed of pieces of wood clamped by iron, and weighing first 657 lbs. and then 2300 lbs., being intended to receive balls of 1 lb., 3 lbs., and 6 lbs. weight; and under the same authority, other series were undertaken in 1811, and from 1815 to 1818, the latter being entrusted to Dr Gregory, who had become professor of mathematics, and was associated with General Miller and Colonel Griffith—the weight of the pendulum being 7000 lbs., and the ball fired against it 12 lbs. These experiments deserve especial notice, not merely from their great importance, as determining essential elements in gunnery, but also from the evidence they afford of the active scientific spirit of some of the artillery officers of those days, and the example they set before the officers of the present. Nor were these experiments allowed to be carried on without turning them to account as a means of instruction—Dr Hutton carrying with him to the practice-ground his students of the first class of the gentlemen cadets. His words are—"On this occasion I took out with me, and employed the first class of gentlemen cadets belonging to the Royal Military Academy, namely, Messieurs Bartlett, Rowley, De Butts, Bryce, Wm. Fenwick, Pilkington, Edridge, and Watkins, who have gone through the science of fluxions, and have applied it to several important considerations in natural philosophy. These gentlemen I have voluntarily offered and undertaken to introduce to the practice of these interesting experiments, with the application of the theory of them, which they have before studied under my care. For though it be not my academy duty, I am desirous of doing this for their benefit, and as much as possible to assist the eager and diligent studies of so learned and amiable a class of young gentlemen, who, as well as the whole body of students now in the upper academy, form the best set of young men I ever knew in my life; nay, I did not think it even possible in any state of society in this country, for such a number of gentlemen to exist together in the constant daily habits of so much regularity and good manners, their behaviour being indeed perfectly exemplary; and I have no hesitation in predicting the great honour and future services which will doubtless be rendered to the state by such eminent instances of virtue and abilities;" and he added in a note, dated 1812, "At this distance of time, and long before, the world has had the satisfaction to find, that this prediction has been most amply and accurately fulfilled in every instance,"—a truth which will be admitted by all who still remember many of these names.

These remarkable words of a man who had raised himself, not only by talents of a very high order, but by unblemished character, to a position of great respectability and of high responsibility, deserve attention at this moment, when it is proposed to remodel the institution of which Dr Hutton was the distinguished professor of mathematics. By associating with him the gentlemen he has named, he took the first step towards the formation of a *Class of Application;* and this is really what should be done with the academy. Years ago a *practical* class was formed as supplementary to what is called the *theoretical* class; but such distinctions are not only erroneous but injurious, as theory and practice cannot be safely separated at any time, or at any period of a professional course. The gunner may, indeed, be taught much which is required from him practically; but the officer must be taught theoretically, and with him the subsequent training ought not to be merely practice, but the application of theory to practice. It is to men instructed at the Royal Military Academy in the highest branches of dynamics that we should look for the future improvement of our means of offensive and defensive warfare; and it is to be hoped, therefore, that the absurd distinctions between "theoretical" and "practical" classes will be abandoned; that the principle of "*application*" will be the characteristic of the reformed academy or college; and that its professors will be again associated with the officers of artillery in carrying on further experiments for the improvement both of the science and of the art of gunnery.

It has been already stated that Benjamin Thomson, Esq. (afterwards Count Rumford), furnished a paper to the Royal Society in 1781 containing various experiments made partly for the determination of the most advantageous situation for the vent in fire-arms, and partly to measure the initial velocity of bullets when discharged from them. In these experiments he merely employed, as Robins had done, a musket barrel; but in determining the velocity he used the recoil of the barrel itself, as well as the motion of the pendulum against which the ball was impelled. The former method Mr Thomson called "a new method;" but it had been previously pointed out by Robins, who also appears to have suggested the idea of applying it in the "eprouvette," for testing the comparative force of different samples of gunpowder, again proposed by Thompson, and subsequently so beautifully carried into effect by Hutton, who, in 1783, commenced his experiments with five brass one-pounders, cast expressly for the purpose, suspending the guns by a framework, and by additional weights, bringing them all up, including the weight of the suspending frame, to one weight —917 lbs. The weight of the ballistic pendulum was 559 lbs., and distance between the gun and ballistic pendulums was 35½ feet, the axis of the gun being point-blank, or horizontal. The first set of experiments was designed for the purpose of testing "the comparative strength of the different barrels of powder, by firing several charges of it, without balls or wads." So that in this case the gun pendulum became an eprouvette. It was found that the pendulum was considerably affected by the explosion of the powder, and in consequence a paper screen was afterwards interposed between the gun and ballistic pendulums. The recoils were found to be in a higher proportion than the charges of powder, as will be seen from the following statement of the results of four experiments:—

	Oz. of Powder.	Recoil in inches.	Proportions.	Second Prop.	Third do.
1.	2	4·5	2·40		
2.	4	10·8	2·29	·954	·99
3.	8	24·7	2·16	·944	
4.	16	53·3			

So that the first proportions, as ratios between the recoils, all exceed that of the charges as 1 to 2, approximating, however, to it with the increase of charge; and that the ratios between the successive ratios of recoil are nearly equal as shown in the 5th column. Dr Hutton then carried on several series of experiments for determining the velocities of the ball, both by the recoil of the gun and the vibration of the ballistic pendulum; and in his account of the experiments of 1786, he gives the following tabular view of the results, the velocities being given in feet per second:—

Comparison of the Velocities by the Gun and Pendulum.

Gun, No.	Charge, 2 oz.			Charge, 4 oz.		
	Velocity by		Dif.	Velocity by		Dif.
	Gun.	Pendulum.		Gun.	Pendulum.	
1	830	780	50	1135	1100	35
2	863	835	28	1203	1180	23
3	919	920	– 1	1294	1300	– 6
4	929	970	– 41	1317	1370	– 53
Gun, No.	Charge, 8 oz.			Charge, 16 oz.		
1	1445	1430	15	1345	1377	– 32
2	1521	1580	– 59	1485	1656	–171
3	1631	1790	–159	1680	1998	–318
4	1669	1940	– 271	1730	2106	–376

So that it appears that here, also, as in the experiments of Count Rumford, the recoil by the gun gave frequently a result very much in deficit of that given by the pendulum. The guns were those previously mentioned, all of the same calibre but of different lengths, the balls weighing a little more than 1 lb., and being all reduced by calculation, as regards the results, to a uniform size.

Dr Hutton concluded, from these results, that the velocities, determined from the two different ways, do not agree together, and that the method of determining the velocity of the ball from the recoil of the gun is not generally true; and, consequently, that the effect of the inflamed gunpowder on the recoil of the gun is not exactly the same when it is fired without a ball as when it is fired with a ball. The difference also does not appear to be regular, neither in different guns with the same charge, nor with different charges with the same gun. That with small charges the velocity by the gun is greatest; that the velocity by the pendulum continues to gain upon that by the recoil as the charges increase, and ultimately exceeds it more and more, as the charge of powder is increased.

Experiments in 1788 and 1789 were made with brass 3-pounders—one short and the other very long—so as to observe the effect both of length of gun and of weight of powder; the charges being 4 oz. and 16 oz. The weight of the pendulum was 1426 lbs. Amongst other results it was ascertained, that firing with 16 oz. of powder, or $\frac{1}{3}$ the weight of the ball, the long gun gave an initial velocity to its ball of 584 feet per second, and the short gun a velocity of 1371 feet per second; so that the velocity by the long gun exceeds that by the short by between the 6th and 7th part of the latter; the lengths of the guns being 40 inches and $69\frac{1}{4}$ inches.

In 1789 experiments were also made with a long 6-pounder, and in 1791 these were resumed with a new pendulum weighing 1630 lbs.; the weight of the gun being 1370 lbs., and the weight of the gun with its framework for suspension 1618 lbs. Afterwards a medium 6-pounder and a light 6-pounder were also used with successive pendulums weighing 1861 lbs. and 2119 lbs.; so that it may be said, without hesitation, that Dr Hutton's general experiments were by far the most important which had ever been made.

The velocities of the ball as discharged by the long gun, after some slight corrections made with a view of reducing the numbers to something like a regular series, but not such as to materially affect their absolute values, are as follows :—

Distance between gun and pendulum.	Dif.	Charge, 3 lbs.		Charge, 2 lbs.		Charge, $1\frac{1}{2}$ lb.		Charge, 1 lb.	
		Velocity.	Dif.	Velocity.	Dif.	Velocity.	Dif.	Velocity.	Dif.
30	85	1813	65	1676	58	1506	52	1306	47
115	85	1748	62	1618	56	1454	50	1259	45
200	85	1686	59	1562	54	1404	48	1214	43
285		1627		1508		1356		1171	

A table which shows that, with equal increments in the distance from the pendulum, there is a gradual diminution in the loss of velocity corresponding to the mean velocity at the middle of that increment; thus, when the mean velocity is 1780, the loss of velocity per second is 65 feet; when 1656, 59; when 1590, 56; when 1480, 52; when 1380, 48; when 1282, 47; when 1190, 43,—all agreeing very well in the corresponding decrease of the effect of the resistance of the air on the velocity of the ball, except the two means 1380 and 1282, which are too near each other in their results.

The velocities gained by the ball fired from the medium 6-pounder, at 30 feet distance, were—for 2 lbs. of powder, 1585 feet; $1\frac{1}{2}$ lb., 1460; 1 lb., 1260; $\frac{1}{2}$ lb., 877. The velocities gained by the ball fired from the light 6-pounder, at 30 feet distance, were—for 3 lbs. of powder, 1624; 2 lbs., 1558; $1\frac{1}{2}$ lb., 1440; and, by calculation, Dr Hutton determined that a 6-lb. ball, moving with the velocity of 1200 feet per second, was resisted by a force equal to 115 lbs.; and when moving with a velocity of 1600 feet per second, with a force of nearly 222 lbs.,—results of great importance.

In France, similar experiments had been made at Metz, in 1839 and 1840, with the French 24, 12, and 8-pounders, and their howitzer of 22 c., or $8\frac{1}{2}$ inches. For these experiments, however, a considerable change had been effected in the instrument, as shown in fig. 10. Instead of a mass of wood, requiring frequent renewal, as in the English pendulum, a more permanent receiver was substituted, which, being filled with some material moderately penetrable, can be used without limitation.

The ballistic pendulum, then (fig. 10), consists of a conical vase of cast-iron, A, called the ballistic receiver, and suspended by four rods, B B, B′ B′, to an axis, C, 16 feet above it. The two rods, B B, embrace the front, and B′ B′ the rear of the receiver; and further, the two rods on the same side of the receiver approximate together at the top, so as to be connected with the one end of the axis, whilst the two on the other side are connected with the other end. The rods are bound together by four cross pieces, D, D,′ E, E′, and by three ties, F, F′, C, which render the whole system rigid. The ties, which unite together the rods below, are seen in H, K, and K′, the whole being secured by a screw-bolt, L, below, and another, M, above; the bolt, L, carrying a moveable weight formed of discs of lead, N, and kept in position on the bolt by the springs, O. This weight, the position and magnitude of which can be changed, serves either to depress (if necessary) the centres of gravity and oscillation of the receiver, and to render its axis horizontal. The axis, C, is of iron, and is shaped at its extremities, P, into knife-edges, slightly curved, and resting on the steel plates or bearers, Q, Q, the upper surface of which is formed into two planes, meeting in a curve of double the radius of that which forms the bearing of the knife-edges. The bearers, Q, Q, rest on cast-iron plates, R, R, which are firmly fixed upon two piles or piers of masonry. The receiver, SSS, is shaped within as a truncated cone, the bottom of which

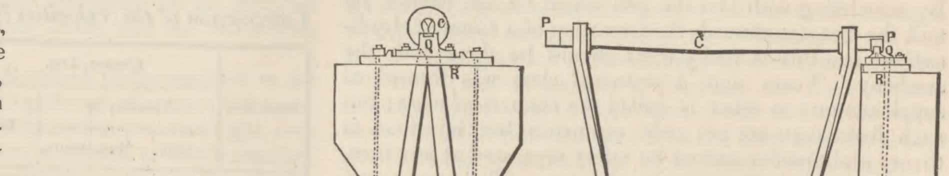

Fig. 10.

is rounded off, and it is sufficiently long to prevent the projectile from passing entirely through the sand with which it is filled; it is formed of cast-iron, and strongly bound by hoops of forged iron. The front is covered with a thin sheet of lead to prevent the sand from being shaken out, and this sheet is marked by a horizontal and by a vertical line, the intersection corresponding to its axis; and the actual position of the shot when entering the receiver can be therefore readily determined by reference to these lines.

It will be readily supposed that this ingenious contrivance would not be effectual at the long distances required for firing to determine the resistance of the air, as the ball would frequently strike the exterior rim of the receiver instead of penetrating within it. On account of this practical defect another pendulum, fig. 11, has been contrived.

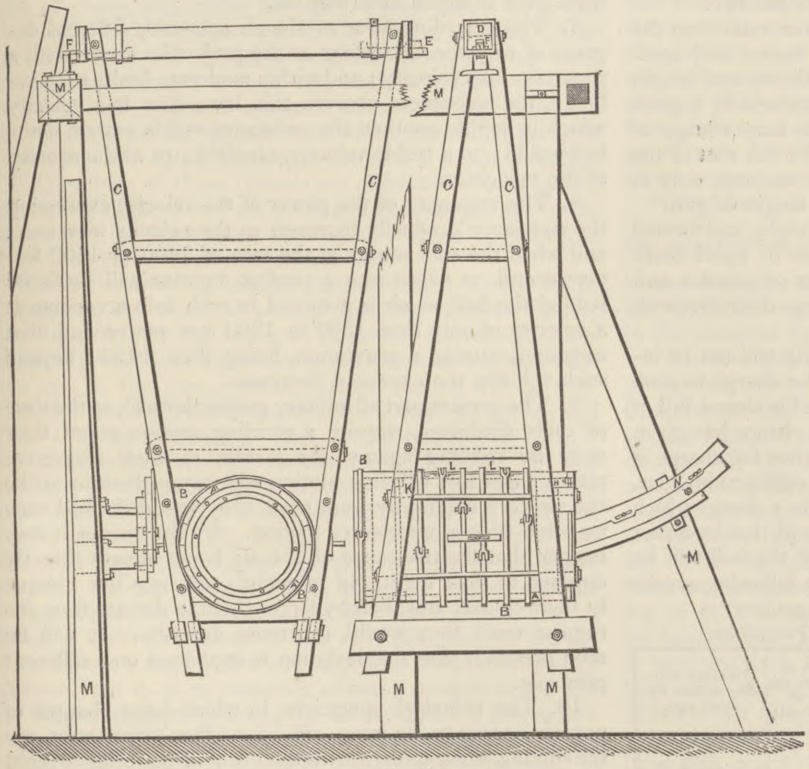

Fig. 11.

This is composed of an external hollow wooden cylinder, 7½ feet long and 5 feet in external diameter, strongly bound by iron hoops, B, and connected by four wooden suspending rods with a wooden axis, D, in which are firmly fixed knife-edges, F. The receiver, AA, within is made of double plate-iron, and its interior diameter is 4 feet 4½ inches. The bottom, H, is closed solidly with wood; and in front, at K, is an advanced bottom formed of ¾th-inch board, the interval between the two, a length of 4¾ feet, being filled with sand, introduced by openings from above, subsequently closed by the iron doors, L, L. The whole receiver, when filled with sand, weighed 14,000 lbs., the sand itself weighing more than the one half. Sir H. Douglas mentions that the Chevalier d'Antoni carried on similar experiments at Turin in 1761, though with a different kind of machine; and that Major Mordecai, of the United States artillery, made experiments, under the authority of the government of that country, with an apparatus constructed on the French principle—the suspended gun being either a 24 or a 32-pounder, weighing, with the suspending apparatus, 10,500 lbs., and the receiver pendulum 9358 lbs.; so that it may be now said with some degree of vexation, though with truth, that the only school of artillery without the means of carrying on ballistic experiments, namely, the gun pendulum and the receiver pendulum, is that of England, the country of Robins and Hutton. It is surely time that we should awaken from this sleep, and cease to be satisfied with the results obtained, or the honours acquired by these illustrious men.

In respect to velocities below 300 feet per second, it was found difficult to test them by the ordinary form of ballistic pendulum, as the balls dropped from it without penetrating. This defect might have been avoided by arrangements similar to those of the receiver form of pendulum; but in the meantime Robins' whirling machine was applied to this object. Robins' own experiments have already been alluded to. In 1763 were published experiments made in France by Borda, with a machine similar in principle to that of Robins, though differently arranged (fig. 12). In this, a horizontal axis, AB, carries a small cylinder, round which winds a cord, at the extremity of which is a weight, E, which gives motion to the fly. A thin rod, PGK, wedge-shaped, forms the two arms of the fly—two equal surfaces, P and K, being adapted to their extremities, the centre of which is about 4 feet from the axis of rotation. On the string two marks, distinctly visible, are fixed, and by the aid of a half-seconds pendulum the interval of time between the passage of these marks was measured to a ¼th of a second; and the number of turns corresponding to this length on the cord being known, it was easy to compute the velocity of rotation, and, consequently, the absolute velocity of the centres of the resisting surfaces themselves—care having been taken that the velocity had become uniform at the fifth turn, or just at the passage of the first mark—and the moving weight, therefore, exactly counterbalancing the resistance of the air during the 22 turns corresponding to the interval between the two marks; the proportions between the radii of the cylinder and of the fly being taken into account. By employing different weights, the resistances corresponding to different velocities are obtained.

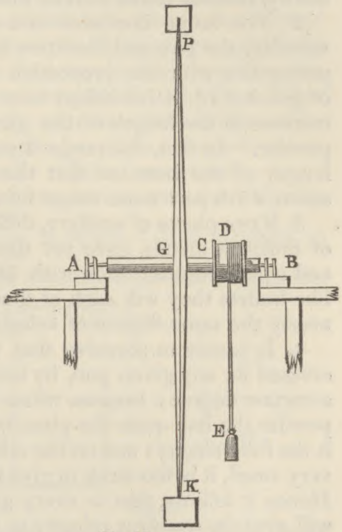

Fig. 12.

Hutton made very extensive experiments with the apparatus of Robins; and in like manner M. Thibault, of the French Marine, has made experiments (1826) with one similar to that of Borda.

II.—APPLIED GUNNERY.

A consideration of what has been said respecting the experiments of Robins, Hutton, and many others, must have been sufficient to convince every one that the application of the theory of gunnery, or of any theory of the motion of bodies in a fluid, to the practical purposes of war, so essentially depends on the knowledge of elements very difficult of determination—such as the initial expansive force of the gases produced by the combustion of gunpowder, and the complicated resisting force of the air—that it has been found absolutely necessary to determine these elements, or the proximate results depending on them, such as the velocity of the projectile, by direct experiments. The following deductions have been made from experiments, and may therefore be considered as principles of the science:—

1. Two pieces of the same bore, but of different lengths, being fired with the same charge of powder, the longer will impel the bullet with a greater velocity than the shorter; but the increase in velocity is very small in comparison to the increase in length—the velocities being in a ratio somewhat less than that of the square roots of the length of the bore, but greater than that of the cube roots of the same, nearly, indeed, in the middle ratio between the two.

2. The range increases in a much lower ratio than the velocity, the gun and elevation being the same; and comparing this with the proportion of the velocity and length of gun in (1.), it is evident how little is gained by a great increase in the length of the gun with the same charge of powder. In fact, the range is nearly as the 5th root of the length of the bore, so that the increase amounts only to about a 7th part more range for a double length of gun.

3. If two pieces of artillery, different in weight, and formed of different metals, have yet their cylinders of equal bores and equal lengths; then with like charges of powder and like bullets they will each of them discharge their shot with nearly the same degree of velocity.

4. It is easy to perceive that the velocity will not be increased for any given gun, by increasing the charge beyond a certain degree; because when the barrel is almost full of powder the ball quits the piece before the charge has given it the full velocity; and on the other hand when the charge is very small, it is too weak to give the ball a sufficient impulse. Hence it follows, that in every gun there is a charge which will give the greatest velocity to the ball, and that by either increasing or diminishing it, the motion of the ball will be diminished. Dr Hutton further gives the following results of his theoretical and experimental investigations:—

Table of Charges for the greater Velocities.

Length of bore in calibres.	Length of charge in calibres.	Proportion of length of bore to length of charge.	Weight of powder in 100 parts of weight of ball.	Greatest velocity of ball by each gun.
2	0·63	3·171	12	810
4	1·20	3·333	23	1122
6	1·72	3·488	33	1348
8	2·20	3·636	42	1529
10	2·64	3·788	50	1681
12	3·05	3·934	58	1813
14	3·43	4·082	65	1929
16	3·78	4·233	71	2033
18	4·11	4·380	78	2127
20	4·42	4·525	84	2213
22	4·71	4·671	90	2292
24	4·99	4·810	95	2366
26	5·25	4·952	100	2434
28	5·50	5·091	105	2498
30	5·73	5·235	109	2558
32	5·96	5·369	113	2614
34	6·17	5·510	117	2668
36	6·37	5·651	121	2719
38	6·56	5·793	125	2767
40	6·75	5·926	128	2813
42	6·93	6·061	132	2857
44	7·10	6·197	135	2899
46	7·27	6·328	138	2939
48	7·43	6·460	141	2978
50	7·58	6·596	143	3015
52	7·72	6·736	146	3051
54	7·86	6·870	149	3085
56	8·00	7·000	152	3118
58	8·13	7·134	155	3150
60	8·26	7·264	157	3181

Now, then, in the 32-pounder of 56 cwt., the bore of which is about 17 calibres in length, the charge would occupy somewhat less than $\frac{1}{4}$th of the length of the bore, and would weigh nearly $\frac{3}{4}$ths of the weight of the ball, the extreme velocity being about 2080 feet per second.

5. The resistance of the air acts upon projectiles in a twofold manner; for it opposes their motion, and thus continually diminishes their velocity; and diverts them from the regular track they would otherwise follow, under certain conditions of the form and motion of the projectiles, which will be hereafter discussed.

6. That action of the air by which it retards the motion of projectiles, though formerly neglected by writers on artillery, is yet, in many instances, of an immense force; and hence the motion of these resisted bodies is totally different from what it would otherwise be.

7. This retarding force of the air acts with different degrees of violence, according as the projectile moves with a greater or less velocity; and within moderate limits as to velocity, the resistances observe this law—that to a velocity which is double another, the resistance within certain limits is fourfold; to a treble velocity, ninefold; or as the squares of the velocities.

8. The exponent of the power of the velocity expressing the resistance gradually increases as the velocity increases; and when the shot moves at the rate of 1400 or 1500 feet per second, at which rate a perfect vacuum will be found behind the ball, as air is assumed to rush into a vacuum at a velocity of only from 1200 to 1300 feet per second, that exponent attains a maximum, being then 2·125; beyond such velocity the exponent decreases.

9. The greater part of military projectiles will, at the time of their discharge, acquire a whirling motion round their axis, by rubbing against the insides of their respective pieces; and this whirling motion will cause them to strike the air very differently from what they would do had they no other than a progressive motion. By this means it may happen that the resistance of the air is not always directly opposed to their flight, but frequently acts in a line oblique to their course, and thereby forces them to deviate from the regular track they would otherwise describe. It will be seen presently that the deviation is explained on a different principle.

10. The principal operations in which large charges of powder appear to be more efficacious than small ones, are the ruining of parapets, the dismounting of batteries covered by stout merlons, or battering in breach; for in all these cases, if the object be but little removed from the piece, every increase of velocity will increase the penetration of the bullet.

11. Whatever operations are to be performed by artillery, the least charges of powder with which they can be effected are always to be preferred.

12. Hence the proper charge of any piece of artillery is not always that allotment of powder which will communicate the greatest velocity to the bullet; nor is it to be determined by an invariable proportion of its weight to the weight of the ball; but, on the contrary, it is such a quantity of powder as will produce the fitting velocity for the purpose in hand; and, instead of bearing always a fixed ratio to the weight of the ball, it must be different according to the different business which is to be performed.

13. Robins, following out these rules, states that no field-piece ought at any time to be loaded with more than $\frac{1}{6}$th, or, at the utmost, $\frac{1}{5}$th of the weight of its bullet in powder, nor should the charge of any battering piece exceed $\frac{1}{3}$d of the weight of its bullet; but these proportions are not adhered to strictly in modern practice, *light* field-pieces being, however, fired with so small a charge as $\frac{1}{4}$th.

14. If balls have equal weights but different diameters, and move with equal velocities, the resistance varies nearly

with the surfaces or with the squares of the diameters, increasing a little above that proportion when the diameters are considerable. Hence, if the velocities are also different, the resistance is proportional to the surface and to the square of the velocity; or r representing the semi-diameter of the shot, and v the velocity, the resistance varies with $r^2 v^2$.

15. If balls have equal diameters and different weights or densities, the resistances vary directly as the squares of the velocities, and inversely as the weights; or, w representing the weight, the resistance varies with $\frac{v^2}{w}$.

Great irregularities in the motion of bullets are, as we have seen, owing to the whirling motion on their axis, acquired by the friction against the sides of the piece. The best method hitherto known of preventing these is by the use of pieces with *rifled barrels.* These pieces have the insides of their cylinders cut with a number of spiral channels; so that it is in reality a female screw, varying from the common screws only in this, that its threads or rifles are less deflected, and approach more to a right line; it being usual for the threads with which the rifled barrel is indented, to take little more than one turn in its whole length. The numbers of these threads are different in each barrel, according to the fire of the piece and the fancy of the workman; and in like manner the depth to which they are cut is not regulated by any invariable rule.

From the whirling motion communicated by the rifles, it happens, that when the piece is fired, the indented zone of the bullet follows the sweep of the rifles, and thereby, besides its progressive motion, acquires a circular motion round the axis of the piece; which circular motion will be continued to the bullet after its separation from the piece; and thus a bullet discharged from a rifle barrel will revolve round an axis coincident with the line of its flight. By this rotation on its axis, the aberration of the bullet, which proves so prejudicial to all operations in gunnery, is almost totally prevented. The reason of this may be easily understood from considering the slow motion of an arrow through the air. For example, if a bent arrow, with its wings not placed in some degree in a spiral position, so as to make it revolve round its axis as it flies through the air, were shot at a mark with a true direction, it would constantly deviate from it, in consequence of being pressed to one side by the convex part opposing the air obliquely. Let us now suppose this deflection in a flight of 100 yards to be equal to ten yards. Now if the same bent arrow were made to revolve round its axis once every two yards of its flight, its greatest deviation would take place when it had proceeded only one yard, or made half a revolution; since at the end of the next half revolution it would again return to the same direction it had at first; the convex side of the arrow having been once in opposite positions. In this manner it would proceed during the whole course of its flight, constantly returning to the true path at the end of every two yards; and when it reached the mark, the greatest deflection to either side that could happen would be equal to what it makes in proceeding one yard, equal to $\frac{1}{100}$th part of the former, or 3·6 inches—a very small deflection when compared with the former one. In the same manner, a cannon-ball which revolves not round its axis, deviates greatly from the true path, on account of the inequalities on its surface; which, although small, cause great deviations by reason of the resistance of the air, at the same time that the ball acquires a motion round its axis in some uncertain direction occasioned by the friction against its sides. But by the motion acquired from the rifles, the error is perpetually corrected in the manner just now described; and accordingly such pieces are much more to be depended on, and will do execution at a much greater distance than the other.

16. *Deviations.*—It has been shown that Robins pointed out the deviations which are occasioned in the course of projectiles by a rotation in them, produced by any accidental cause, on an axis not coincident with the line of flight; and in the last two paragraphs reference has been made to the artificial means adopted by rifling, or grooving, the bores of the barrel of muskets, to give to the projectile an initial rotatory movement round an axis coincident with the line of flight, and thereby to avoid such extraneous cause of deflection. Robins made many experiments with rifles, to show that the accuracy of fire at great distances thus obtained is their principal advantage, and that they have not an advantage over the unrifled barrel as regards either extent of range or penetrative power; the increased force supposed to have been gained by more completely shutting in, as it were, the elastic gases, and thus avoiding the loss by windage, being counterbalanced by the great friction of the ball in its passage through the bore. Robins also suggested the use of an ovoid, or egg-shaped ball; but in this respect the indications of Newton as to the form of the solid body which, in passing through a fluid, would experience less resistance than a body of equal magnitude and of any other form, have gradually led to the adoption of the modern elongated balls. Sir Howard Douglas has given a very clear view of the subject, and his remarks will be here quoted:—

"The body is a solid of revolution, and the differential equation is $y = c\,\frac{dz^4}{dy^3\,dx}$, in which c is a constant, y is any ordinate, and dx, dy, dz, are elementary portions, EF, ED, DF, respectively, in the sectional figure.

"The two ends A and B of the solid are both plane surfaces, as DF $= dz$ is greater than EF or ED—dx, dy, and therefore the numerator of the fraction must always be greater than the denominator, and y cannot become 0, or coincide with H. That the minimum of resistance should be obtained from an elongated shot of this, or any form approximating to it, it is necessary that the axis AB should always be kept in the direction of the trajectory, an object which is accomplished by producing a rotatory motion round that axis, the ball being discharged from a rifled bore. Were it not that such a rotation were produced, the axis would perpetually deviate from the direction of the path and even turn over."

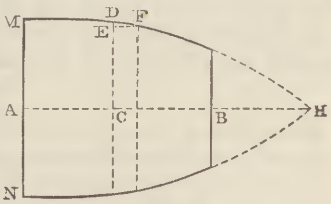

Fig. 13.

The advantages of this form of shot are, that when rotatory on their longitudinal axis, and moving with their smaller extremities in front, they experience less resistance from the air than spherical projectiles of the same diameter. To this form alone are to be referred the long range, with the great momentum and penetrating power of the projectiles for rifle muskets, which have been recently introduced into British and foreign military services. Sir Howard Douglas describes also the cylindro-conical and cylindro-conoidal balls used in the iron-rifled guns, invented in 1846 by Major Cavalli of the Sardinian artillery, and Baron Wahrendorff, a Swedish noble. The entire lengths of these projectiles were—of the cylindro-conical $16\frac{3}{4}$ inches, and of the cylindro-conoidal $14\frac{3}{4}$ inches, their greatest diameter being $6\frac{1}{2}$ inches. They were made to act upon the grooves of the bore by two projections, one on each side, making each an angle with the axis of the shot of 7° 8′. If hollow, the weight was about 62 lbs., and if solid about $101\frac{1}{2}$ lbs.,—the hollow projectiles being burst on the principle of a percussion shell. These guns are loaded at the breech. The difficulty of forming a convenient and efficient rifled cannon has indeed been so great, that it may be considered to remain as yet an unsolved problem in the ordinary way; but Mr Lancaster has adopted a different principle, and patented an ingenious invention for causing a shot to rotate on its axis throughout the range, by firing it from a cannon having an elliptical bore of small excentricity. The 68-pounder gun has been bored up to the elliptic section, and the shell, as shown in Plate II., fig. 18, adopted—the transverse section of the shell being elliptical. It is well known that several of Lancaster's guns were in operation during the last remarkable campaign, though no official account of the result of their practice has yet been published; but that at Shoebury-Ness is considered on the whole satisfactory, both as to extent of range and precision in firing, more especially at the longer ranges, since the 68-pounder, one of the best guns in the service, maintains an equality in short and medium ranges. The major axis of the ellipse of the bore does not continue parallel to one fixed line, but makes a revolution of about $\frac{1}{4}$th of the periphery in its length, and the elliptic shot, following necessarily the course of this helix, is caused to rotate on its long axis. Much precision is required in putting the ball into the gun, but this is attained by a very simple machine lately adopted by Mr Lancaster for the purpose, and which does away with any chance of mistake.

Turning again from these modes of correcting irregular rotation, by inducing a regular one in the direction of the line of the trajectory, to the consideration of the deviations produced by any irregular rotation, it may be first premised, that not only vertical but also lateral deflections must be the result of such rotations. Irregular rotations may be produced, as suggested by Robins, by a rolling motion in the bore; or this may be the result of unequal density in the different portions of the ball, causing the centres of gravity and of figure not to coincide. Thus, for example,

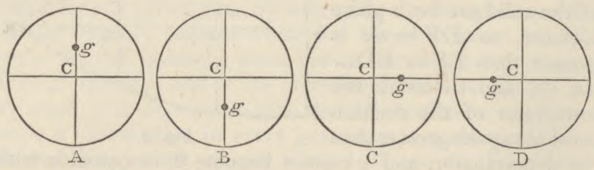

Fig. 14.

if the centre of gravity, g, be above the centre of figure, C, in A of the four circular sections, the resultant of the projecting forces will cause the front of the shot to turn from below upwards; if below, as in B, from above downwards; if to the right, as in C, from the left to the right; and if to the left, as in D, from the right to the left. In all these cases the deflection will be in the direction of the rotation, namely, it will be upwards in A, producing an increase of range, downwards in B, or diminishing the range, to the right in C, and to the left in D.

These theoretical deductions have been fully confirmed by experiments, both in England and France.

At the instance of Sir Howard Douglas, experiments were made both by the navy on board the "Excellent" gunnery ship, and by the ordnance at Shoebury Ness, with a view to ascertain not only the nature of these deflections, but also the practicability of making a useful application of the principle of eccentric projectiles as a means of increasing the range:—

Excellent, *July* 18, 1850.—With a 32-pounder gun of 56 cwt.—the quantity of metal removed from one side of the shot being 1 lb.

	Charge 8 lbs. Elevation 2° $7\frac{1}{2}'$.		Charge 10 lbs. Elevation 3° 30′.	
Position of centre of gravity with respect to centre of shot.	Range in yards.	Deflection in yards.	Rango in yards.	Deflection in yards.
On the right, ...	1032	6 right	1474	20 right
On the left,............	1163	7 left	1479	$24\frac{2}{3}$ left
Upwards, ...	1433	7 R. $3\frac{1}{2}$ L.	1991	20 R. 6 L.
Downwards, ...	980	5 R. 3 L.	1499	2 R. $6\frac{1}{2}$ L.
Inwards, ...	1150	$4\frac{1}{2}$ right	1608	$5\frac{1}{2}$ R.
Outwards, ...	1097	$4\frac{2}{3}$ right	1428	9 R.
Concentric, ...	1160	4 R. 3 L.	1624	1 R.

In these the deflections are also given in yards, being the mean of all the rounds under similar circumstances; hence, of course, where some were deflected to the right and others to the left, the mean of each set is given. It will be observed that with the lesser charge and elevation a difference of 453 yards is produced in the range by shifting the centre of gravity from above to below the centre of figure, and with the higher charge and elevation, a difference of 492 yards. The lateral deflections, however, are by no means so considerable, amounting in the one case to $6+7=13$ yards, and in the other to $20+24\frac{2}{3}=44\frac{2}{3}$ yards. With an 8 inch-gun, 9 feet long, and weighing 65 cwt., the quantity of metal removed from one side of the shot being 5 lbs. 5 oz., the difference between the ranges, according as the centre of gravity was placed above or below the centre of figure, was 189 yards when fired with a charge of 10 lbs., and elevation of 2° 30′, and 378 with the same charge and an elevation of 5°. With a 32-pounder, charge 8 lbs., and elevation 12°, 1 lb. of metal being removed from one side, the difference 938 yards; and with another 8-inch gun, the quantity of metal removed from one side being 3 lbs., the charge 10 lbs., and elevation 10°, the difference was 1132 yards. The experiments of Shoebury Ness were similar in their results,—the eccentric hollow shot in those of 1851 giving an increase of range, as compared with concentric shot, varying, according to the absolute range and elevation, from 145 yards in a range of 1700 yards, and an elevation of 4°, to 559 in a range of 2465 yards, and 8° of elevation; 621 in a range of 3184 yards, and 12° of elevation; 749 in a range of 3709 yards, and 16° of elevation; 939 in 4137 yards, and 20° of elevation; 706 in 4605 yards, and 24° of elevation; 916 in 4650 yards, and 28° of elevation; and 670 in 4866 yards, and 32° of elevation—the ranges stated being those of the concentric shot, and the range of the eccentric being obtained by adding to the other the differences here stated—the highest range being that of the eccentric shot with 28° of elevation, which amounted to 5566 yards, or about $3\frac{1}{6}$ miles. The lateral deflections in the long ranges were very great—the extreme to the left being 361 yards, and the extreme to the right 255 yards; but it is remarkable that some of the deflections of the concentric shot were quite equal, and some even exceeded those of the eccentric shot.

Captain Boxer, in his Treatise on Artillery, gives more copious details of the practice at Shoebury Ness, but the above extracts are sufficient for the present purpose. Similar experiments were made at Metz in 1839, with common and eccentric shells of 11 inches diameter, and the results are given by Didion in the following table:—

Nature of gun.	Weight of charge in lbs.	Weight of shell in lbs.	Range in Yards.		
			With common shell.	Eccentric centre of gravity.	
				Below.	Above.
...	...	$58\frac{3}{4}$	$774\frac{1}{3}$	...	...
Siege......	3 lb. 5 oz.	66	...	$566\frac{1}{2}$	1039
...	...	$61\frac{1}{2}$	...	$599\frac{1}{3}$	$1029\frac{1}{3}$
...	...	$58\frac{3}{4}$	$950\frac{1}{3}$	...	...
Coast.....	3 lb. 5 oz.	66	...	$778\frac{2}{3}$	1272
...	...	$61\frac{1}{2}$	...	$799\frac{1}{2}$	$1103\frac{1}{2}$
...	...	$58\frac{3}{4}$	$1279\frac{2}{3}$	...	...
Coast.....	6 lb. 10 oz.	66	...	$1172\frac{1}{3}$	1703
...	...	$61\frac{1}{2}$	...	$1221\frac{2}{3}$	1444

All these experiments lead to the same conclusions, that when applied in such cases as the above on accurate principles for the express purpose of obtaining an increase of range, the eccentric shot, and more especially shells, may be sometimes used with advantage, but that, as a general rule, the great practical difficulties of ensuring certainty in their use in the field must negative their application;

and that, on the contrary, the surest way of obtaining correct practice is to take care that the shot and shell shall be correctly concentric, and thus extraneous causes of rotation and of uncertain deflections be avoided as much as possible, the direction of that deflection being always the same as that of the rotation of the front of the ball.

It has been already observed that Robins was the first to attribute the usual deviation from the true path of a projectile, to the disturbing influence of the movement of rotation which in general accompanies the movement of translation. Robins and Lombard considered that this deflection was principally the result of the friction of the surface of the ball against the layer of air of unequal density adjacent to it. Poisson investigated the effect of this rotation, in combination with a movement of translation, considering every point of the surface as subjected to a resistance; one portion of which is normal, being the resistance of the fluid or air, properly so called, and the other tangential, being due to friction. When the bullet is perfectly spherical and homogeneous, and on leaving the bore rotates round one of its diameters, the rotatory motion continues during the whole flight in the same direction and round the same axis which remains constantly parallel to itself. The velocity of rotation diminishes in the inverse ratio of the product of the diameter by the density of the ball, but by an extremely small quantity. The deviation, either vertically or laterally, so far as it is due to simple friction, must necessarily be in an opposite direction to that of rotation, as regards the anterior hemisphere; but as this theoretical deduction is opposed to the results of experience, Didion states that the friction arising from rotation does not account either for the direction or amount of deflection. Didion explains the deflection in this way,—assuming the axis of rotation to be vertical, and the moving of the anterior hemisphere from right to left, he says that all the points situated on the right hemisphere move by rotation in the same direction as the centre of gravity moves by translation; whilst those on the left hemisphere move in an opposite direction to that of the centre of gravity, and hence, that the first have a greater velocity in respect to the air than the last, and as the displacement of the air is consequently less easy, the density of the fluid and the pressure resulting from it, are greater on the right than on the left hemisphere.

This explanation appears to imply that the rotation is supposed to add to the normal resistance, whereas the force exercised at any point of the surface, as a result of rotation, can only be tangential. Captain Boxer's explanation, which indeed is also that of Professor Magnus, appears, therefore, to be the correct one, in which he deduces the increased resistance of the air on the right hemisphere as a result of friction;—for example, the air meeting the front of the ball, tends to rush past it both to the right and left, but, pressing with great force against the ball, it is resisted in its passage on the right by the friction consequent on rotation, which is here opposed to the motion of the air, whilst it is assisted in its passage to the left by the friction, the motion being then in the same direction. Of course, the amount of deflection must depend both on the velocity of translation and the velocity of rotation; and hence, when the former becomes 0—the centre of gravity continuing at rest, and the pressure on the anterior and posterior hemispheres being then the same—there can be no deflecting effect produced by rotation. In all these explanations, however, it appears to have been overlooked that, supposing a ball to acquire a motion of rotation within the bore by friction, such friction is only a fraction of the pressure exerted upon the ball in its passage, and, consequently, that the ball must receive a primary impulse of deflection the moment the centre of gravity of the ball leaves the muzzle of the gun. To remedy these evils by rifling of any description, it is necessary that the projectile should be caused to rotate either on the greater or less axis of inertia, as these are the only axes which can remain permanent in space, and that this axis should be coincident with the line of flight. It is very difficult to ensure an exact coincidence of the centre of gravity with the axis of figure corresponding apparently with one or other of these axes; and hence it is that the centre of gravity, moving spirally round the axis on its passage through the rifled bore, receives a certain deflecting influence corresponding to the direction of the spiral groove as it leaves the muzzle—such deflection, however, being necessarily constant as to direction. The experiments of Robins and Hutton had, as before explained, for their object to determine the two most important elements of gunnery, namely, the velocity of the ball on leaving the gun, and the resistance to its progress afforded by the air. Professor Robinson basing his investigation on the deductions made from these experiments, such as that the velocities communicated to balls of the same weight being nearly as the square roots of the weights of the charges; with shot of different weights, fired with the same quantity of powder, the velocities are reciprocally as the square roots of the weights, and when the weights of shot and powder are both different, the velocities are directly as the square roots of the powder, and inversely as the weights of the shot nearly,—proceeds to the important question of determining the ranges, the velocities being known, and lays down as preliminaries the following rules of Robins, the second of which, as has been shown, cannot be admitted; for although an exact duplicate ratio does not represent the ratio of increase in high velocities, there is no such sudden increase as supposed by Robins above the velocity of 1100 feet per second.

1. "Till the velocity of the projectile surpasses that of 1100 feet in a second, the resistance may be reckoned to be in the duplicate proportion of the velocity, and its mean quantity may be reckoned about half an ounce avoirdupois on a 12-pound shot, moving with a velocity of about 25 or 26 feet in a second.

2. "If the velocity be greater than that of 1100 or 1200 feet in a second, then the absolute quantity of the resistance in these greater velocities will be near three times as great as it should be by a comparison with the smaller velocities. Hence, then, it appears, that if a projectile begins to move with a velocity less than that of 1100 feet in 1″, its whole motion may be supposed to be considered on the hypothesis of a resistance in the duplicate ratio of the velocity. And if it begins to move with a velocity greater than this last mentioned, yet if the first part of its motion, till its velocity be reduced to near 1100 feet in 1″, be considered separately from the remaining part in which the velocity is less than 1100 feet in 1″, it is evident that both parts may be truly assigned on the same hypothesis; only the absolute quantity of the resistance is three times greater in the first part than in the last. Wherefore, if the motion of a projectile, on the hypothesis of a resistance in the duplicate ratio of the velocity, be truly and generally assigned, the actual motions of resisted bodies may be thereby determined, notwithstanding the increased resistances in the great velocities. And, to avoid the division of the motion into two, I shall show how to compute the whole at one operation, with little more trouble than if no such increased resistance took place.

"To avoid frequent circumlocutions, the distance to which any projectile would range in a vacuum on the horizontal plane at 45° of elevation, I shall call the potential random of that projectile; the distance to which the projectile would range *in vacuo* on the horizontal plane at any angle different from 45°, I shall call the potential range of the projectile at that angle; and the distance to which a projectile really ranges, I shall call its actual range.

"If the velocity with which a projectile begins to move is known, its potential random and its potential range at any given angle are easily determined from the common theory of projectiles; or, more generally, if either its original velocity, its potential random, or its potential range, at a given angle, are known, the other two are easily found out.

"To facilitate the computation of resisted bodies, it is necessary, in the consideration of each resisted body, to assign a certain quantity, which I shall denominate F, adapted to the resistance of that particular projectile. To find this quantity F to any projectile given, we may proceed thus:—First find, from the principles already delivered, with what velocity the projectile must move, so that its resistance may be equal to its gravity. Then the height from whence a body must descend in a vacuum to acquire this velocity is the magnitude of F sought. But the most concise way of finding this quantity F to any shell or bullet is this: If it be of solid iron, multiply its diameter measured in inches by 300; the product will be the magnitude of F expressed in yards. If, instead of a solid iron bullet, it is a shell or a bullet of some other substance; then, as the specific gravity of iron is to the specific gravity of the shell or bullet given, so is the F corresponding to an iron bullet of the same diameter to the proper F for the shell or bullet given. The quantity F being thus assigned, the necessary computation of these resisted motions may be dispatched by the three following propositions, always remembering that these propositions proceed on the hypothesis of the resistance being in the duplicate proportion of the velocity of the resisted body. How to apply this principle, when the velocity is so great as to have its resistance augmented beyond this rate, shall be shown in a corollary to be annexed to the first proposition.

Actual ranges expressed in F.	Corresponding potential ranges expressed in F.	Actual ranges expressed in F.	Corresponding potential ranges expressed in F.	Actual ranges expressed in F.	Corresponding potential ranges expressed in F.	Actual ranges expressed in F.	Corresponding potential ranges expressed in F.	Actual ranges express ed in F.	Corresponding potential ranges expressed in F.	Actual ranges expressed in F.	Corresponding potential ranges expressed in F.
0·01	0·0100	0·65	0·8170	1·55	2·7890	2·45	6·6435	3·35	14·4195	4·2	29·2792
0·02	0·0201	0·7	0·8964	1·6	2·9413	2·5	6·9460	3·4	15·0377	4·25	30·5202
0·04	0·0405	0·75	0·9787	1·65	3·0994	2·55	7·2605	3·45	15·6814	4·3	31·8138
0·06	0·0612	0·8	1·0638	1·7	3·2635	2·6	7·5875	3·5	16·3517	4·35	33·1625
0·08	0·0822	0·85	1·1521	1·75	3·4338	2·65	7·9276	3·55	17·0497	4·4	34·5686
0·1	0·1034	0·9	1·2436	1·8	3·6107	2·7	8·2813	3·6	17·7768	4·45	36·0346
0·12	0·1249	0·95	1·3383	1·85	3·7944	2·75	8·6492	3·65	18·5341	4·5	37·5632
0·14	0·1468	1·0	1·4366	1·9	3·9851	2·8	9·0319	3.7	19·3229	4·55	39·1571
0·15	0·1578	1·05	1·5384	1·95	4·1833	2·85	9·4000	3·75	20·1446	4·6	40·8193
0·2	0·2140	1·1	1·6439	2·	4·3890	2·9	9·8442	3·8	21·0006	4·65	42·4527
0·25	0·2722	1·15	1·7534	2·05	4·6028	2·95	10·2752	3·85	21·8925	4·7	44·3605
0·3	0·3324	1·2	1·8669	2·1	4·8249	3·0	10·7237	3·9	22·8218	4·75	46·2460
0·35	0·3947	1·25	1·9845	2·15	5·0557	3·05	11·1904	3·95	23·7901	4·8	48·2127
0·4	0·4591	1·3	2·1066	2·2	5·2955	3·1	11·6761	4·0	24·7991	4·85	50·2641
0·45	0·5258	1·35	2·2332	2·25	5·5446	3·15	12·1816	4·05	25·8506	4·9	52·4040
0·5	0·5949	1·4	2·3646	2·3	5·8036	3·2	12·7078	4·1	26·9465	4·95	54·6363
0·55	0·6664	1·45	2·5008	2·35	6·0728	3·25	13·2556	4·15	28·0887	5·0	56·9653
0·6	0·7404	1·5	2·6422	2·4	6·3526	3·3	13·8258				

"Prop. I.—Given the actual range of a given shell or bullet at any small angle not exceeding 8° or 10°; to determine its potential range, and consequently its potential random and original velocity.

"*Solution.* Let the actual range given be divided by the F corresponding to the given projectile, and find the quote in the first column of the preceding table: then the corresponding number in the second column multiplied into F will be the potential range sought: and thence, by the methods already explained, the potential random and the original velocity of the projectile is given.

"*Exam.* An 18-pounder, the diameter of whose shot is about 5 inches, when loaded with two pounds of powder, ranged at an elevation of 3° 30′ to the distance of 975 yards.

"The F corresponding to this bullet is 1500 yards, and the quote of the actual range by this number is ·65; corresponding to which, in the second column, is ·817; whence, ·817 F, or 1225 yards, is the potential range sought; and this, augmented in the ratio of the sine of twice the angle of elevation to the radius, gives 10,050 yards for the potential random: whence it will be found that the velocity of this projectile was that of 984 feet in a second.

"*Cor.* 1. If the converse of this proposition be desired; that is, if the potential range in a small angle be given, and thence the actual range be sought; this may be solved with the same facility by the same table: for if the given potential range be divided by its correspondent F, then opposite to the quote sought in the second column there will be found in the first column a number which, multiplied into F, will give the actual range required. And from hence it follows, that if the actual range be given at one angle, it may be found at every other angle not exceeding 8° or 10°.

"*Cor.* 2. If the actual range at a given small angle be given, and another actual range be given, to which the angle is sought; this will be determined by finding the potential ranges corresponding to the two given actual ranges; then the angle corresponding to one of those potential ranges being known, the angle corresponding to the other will be found by the common theory of projectiles.

"*Cor.* 3. If the potential random deduced from the actual range by this proposition exceeds 13,000 yards, then the original velocity of the projectile was so great as to be affected by the treble, or at least much greater, resistance described above; and consequently the real potential random will be greater than what is here determined. However, in this case, the true potential random may be thus nearly assigned. Take a fourth continued proportional to 13,000 yards, and the potential random found by this proposition, and the fourth proportional thus found may be assumed for the true potential random sought. In like manner, when the true potential random is given greater than 13,000 yards, we must take two mean proportionals between 13,000 and this random; and the first of these mean proportionals must be assumed instead of the random given, in every operation described in these propositions and their corollaries. And this method will nearly allow for the increased resistance in large velocities, the difference only amounting to a few minutes in the angle of direction of the projected body, which, provided that angle exceeds two or three degrees, is usually scarce worth attending to.

"Of this process take the following example:—A 24-pounder fired with 12 pounds of powder, when elevated at 7° 15′, ranged about 2500 yards. Here the F being near 1700 yards, the quote to be sought in the first column is 1·47, to which the number corresponding in the second column is 2·556; whence the potential range is near 4350 yards, and the potential random thence resulting 17,400. But this being more than 13,000, we must, to get the true potential random, take a fourth continued proportional to 13,000 and 17,400; and this fourth proportional, which is about 31,000 yards, is to be esteemed the true potential random sought; whence the velocity is nearly that of 1730 feet in a second.

"*Scholium.* This proposition is confined to small angles, not exceeding 8° or 10°. In all possible cases of practice, this approximation, thus limited, will not differ from the most rigorous solution by so much as what will often intervene from the variation of the density of the atmosphere in a few hours' time; so that the errors of the approximation are much short of other inevitable errors, which arise from the nature of this subject.

"Prop. II.—Given the actual range of a given shell or bullet at any angle not exceeding 45°; to determine its potential range at the same angle, and thence its potential random and original velocity.

"*Solution.* Diminish the F corresponding to the shell or bullet given in the proportion of the radius to the cosine of $\frac{4}{5}$ths of the angle of elevation. Then, by means of the preceding table, operate with this reduced F in the same manner as is prescribed in the solution of the last proposition, and the result will be the potential range sought; whence the potential random and the original velocity are easily determined.

"*Exam.* A mortar for sea-service, charged with thirty pounds of powder, has sometimes thrown its shell, of $12\frac{3}{4}$th inches diameter, and of 231 lbs. weight, to the distance of two miles, or 5450 yards. This at an elevation of 45°.

"The F to this shell, if it were solid, is 3825 yards; but as the shell is only $\frac{4}{5}$ths of a solid globe, the true F is no more than 3060 yards. This, diminished in the ratio of the radius to the cosine of $\frac{3}{4}$ths of the angle of elevation, becomes 2544. The quote of the potential range by this diminished F is 1·384; which, sought in the first column of the preceding table, gives 2·280 for the corresponding number in the second column; and this multiplied into the reduced F, produces 5800 yards for the potential range sought, which, as the angle of elevation was 45°, is also the potential random; and hence the original velocity of this shell appears to be that of about 748 feet in a second.

"*Cor.* The converse of this proposition, that is, the determination of the actual range from the potential range given, is easily deduced from hence by means of the quote of the potential range divided by the reduced F; for this quote, searched out in the second column, will give a corresponding number in the first column, which, multiplied into the reduced F, will be the actual range sought.

"Also, if the potential random of a projectile be given, or its actual range at a given angle of elevation; its actual range at any other angle of elevation, not greater than 45°, may hence be known. For the potential random will assign the potential range at any given angle; and thence, by the method of this corollary, the actual range may be found.

"*Exam.* A fit musket-bullet fired from a piece of the standard dimensions, with $\frac{1}{5}$th of its weight in good powder, acquires a velocity of near 900 feet in a second; that is, it has a potential random of near 8400 yards. If now the actual range of this bullet at 15° was sought, we must proceed thus:

"From the given potential random it follows, that the potential range at 15° is 4200 yards; the diameter of the bullet is $\frac{3}{4}$ths of an inch: and thence, as it is of lead, its proper F is 337·5 yards, which, reduced in the ratio of the radius to the cosine of $\frac{3}{4}$ths of 15°, becomes 331 yards. The quote of 4200 by this number is 12·7 nearly; which being sought in the second column, gives 3·2 nearly for the corresponding number in the first column; and this multiplied into 331 yards (the reduced F) makes 1059 yards for the actual range sought.

"*Exam.* 2. The same bullet, fired with its whole weight in powder, acquires a velocity of about 2100 feet in a second, to which there corresponds a potential random of about 45,700 yards. But this number greatly exceeding 13,000 yards, it must be reduced by the method described in the third corollary of the first proposition, when it becomes 19,700 yards. If now the actual range of this bullet at 15° be required, we shall from hence find that the potential range at 15° is 9850 yards; which, divided by the reduced F of the last example, gives for a quote 29·75; and thence following the steps prescribed above, the actual range of this bullet comes out 1396 yards, exceeding the former range by no more than 337 yards; whereas the difference between the two potential ranges is above ten miles. Of such prodigious efficacy is the resistance of the air, which for so long a time was treated as too insignificant a power to be attended to in laying down the theory of projectiles.

"*Schol.* I must here observe that as the density of the atmosphere perpetually varies, increasing and diminishing often by $\frac{1}{30}$th part, and sometimes more, in a few hours; for that reason I have not been over rigorous in forming these rules, but have considered them as sufficiently exact when the errors of the approximation do not exceed the inequalities which would take place by a change of $\frac{1}{30}$th part in the density of the atmosphere. With this restriction, the rules of this proposition may be safely applied in all possible cases of practice. That is to say, they will exhibit the true motions of all kinds of shells and cannon-shot, as far as 45° of elevation, and of all musket bullets fired with their largest customary charges, if not elevated more than 30°. Indeed, if experiments are made with extraordinary quantities of powder, producing potential randoms greatly surpassing the usual rate, then in large angles some farther modifications may be necessary. And though, as these cases are beyond the limits of all practice, it may be thought unnecessary to consider them; yet, to enable those who are so disposed to examine these uncommon cases, I shall here insert a proposition which will determine the actual motion of a projectile at 45°, how enormous soever its original velocity may be. But as this proposition will rather relate to speculative than practical cases, instead of supposing the actual range known, thence to assign the potential random, I shall now suppose the potential random given, and the actual range to be thence investigated.

"PROP. III.—Given the potential random of a given shell or bullet; to determine its actual range at 45°.

"*Solution.* Divide the given potential random by the F corresponding to the shell or bullet given, and call the quotient q, and let l be the difference between the tabular logarithms of 25 and of q, the logarithm of 10 being supposed unity; then the actual range sought is $3{\cdot}4\,F \mp 2lF - \frac{ll}{10}F$, where the double sign of $2lF$ is to be thus understood; that if q be less than 25 it must be $-2lF$; if it be greater, then it must be $+2lF$. In this solution q may be any number not less than 3, nor more than 2500.

"*Cor.* Computing in the manner here laid down, we shall find the relation between the potential randoms, and the actual range at 45°, within the limits of this proposition, to be as expressed in the following table:—

Potential Randoms.	Actual Range at 45°.	Potential Randoms.	Actual Range at 45°.
3 F	1·5 F	50 F	4·0 F
6 F	2·1 F	100 F	4·6 F
10 F	2·6 F	200 F	5·1 F
20 F	3·2 F	500 F	5·8 F
30 F	3·6 F	1000 F	6·4 F
40 F	3·8 F	2500 F	7·0 F.

"Whence it appears, that, when the potential random is increased from 3 F to 2500 F, the actual range is only increased from $1\frac{1}{2}$ F to 7 F; so that an increase of 2497 F in the potential random produces no greater an increase in the actual range than $5\frac{1}{2}$ F, which is not its $\frac{1}{400}$th part; and this will again be greatly diminished on account of the increased resistance which takes place in great velocities. So extraordinary are the effects of this resistance, which was once considered inconsiderable.

"That the justness of the approximation laid down in the second and third propositions may be easier examined, I shall conclude these computations by inserting a table of the actual ranges, at 45°, of a projectile which is resisted in the duplicate proportion of its velocity. This table is computed by methods different from those hitherto described, and is sufficiently exact to serve as a standard with which the result of our other rules may be compared. And since whatever errors occur in the application of the preceding propositions, they will be most sensible at 45° of elevation, it follows, that hereby the utmost limits of those errors may be assigned.

Potential Randoms.	Actual Range at 45°.	Potential Randoms.	Actual Range at 45°.
·1 F	·0963 F	6·5 F	2·169 F
·25 F	·2282 F	7·0 F	2·237 F
·5 F	·4203 F	7·5 F	2·300 F
·75 F	·5868 F	8·0 F	2·359 F
1·0 F	·7323 F	8·5 F	2·414 F
1·25 F	·860 F	9·0 F	2·467 F
1·5 F	·978 F	9·5 F	2·511 F
1·75 F	1·083 F	10·0 F	2·564 F
2·0 F	1·179 F	11·0 F	2·651 F
2·5 F	1·349 F	13·0 F	2·804 F
3·0 F	1·495 F	15·0 F	2·937 F
3·5 F	1·624 F	20·0 F	3·196 F
4·0 F	1·738 F	25·0 F	3·396 F
4·5 F	1·840 F	30·0 F	3·557 F
5·0 F	1·930 F	40·0 F	3·809 F
5·5 F	2·015 F	50·0 F	3·998 F.
6·0 F	2·097 F		

These remarkable tables and rules of Professor Robinson do not appear to have been noticed by foreign writers. Hutton makes use of them with some modification in the following manner. First, he determined the greatest terminal velocity which a ball would acquire in falling through the air as exhibited in this table:—

Weight of ball in lbs.	Diameter in inches.	Terminal velocity v in feet.	Height a due to v in feet.	Times of finding falling.
1	1·923	247	948	7·72
2	2·423	277	1193	8·66
3	2·773	297	1371	9·28
4	3·053	311	1503	9·72
6	3·494	333	1724	10·41
9	4·000	356	1970	11·12
12	4·403	374	2174	11·69
18	5·040	400	2488	12·50
24	5·546	419	2729	13·09
32	6·106	440	3010	13·75
36	6·350	449	3134	14·03
42	6·684	461	3304	14·50

And these form a table for determining the elevation which will give the greatest range, the initial velocity being given, and the size and nature of the shot known; which table, he states, is a modification of that of Professor Robinson, founded on an approximation of Sir Isaac Newton.

Table of Elevation, giving the greatest Range.

Initial velocity divided by terminal or v.	Elevation.	Range divided by a, or height due to terminal velocity.
0·6910	44° 0′	0·4110
0·9445	43 15	0·6148
1·1980	42 30	0·8176
1·4515	41 45	1·0210
1·7050	41 0	1·2244
1·9585	40 15	1·4278
2·2120	39 30	1·6312
2·4655	38 45	1·8346
2·7190	38 0	2·0379
2·9725	37 15	2·2413
3·2260	36 30	2·4447
3·4795	35 45	2·6481
3·7330	35 0	2·8515
3·9865	34 15	3·0549
4·2400	33 30	3·2583
4·4935	32 45	3·4616
4·7470	32 0	3.6650
5·0000	31 15	3·8684

To use these tables, divide the initial velocity by the terminal velocity peculiar to the ball, as given in the third column of the first table, and look for the quotient in the first column of the second table, against which, in the second column, is found the elevation which will give the greatest range; and in the third, a number which, being multiplied by a of the first table, gives the range nearly as exhibited by the following example:—

Let a 24-lb. ball be discharged with a velocity of 1640 feet per second. By the first table, the terminal velocity v of a 24-lb. ball is 419, and the altitude producing this terminal velocity, or a, 2729, hence $\frac{1640}{419}=3{\cdot}92$ nearly. Now opposite 3·9865 in the second table stands 34° 15′ as the angle which would give the greatest range, and the corresponding number in the third column, 3·0549, being multiplied by 2729 gives 8336 feet for the greatest range, being rather more than a mile and a half. As it is not customary nor ordinarily practicable to discharge guns at these elevations, these tables can seldom be applied in service; though in the recent campaign it might have been useful to consult them when guns either damaged, or otherwise useless for their ordinary practice, were discharged with great effect at high elevations by either sinking them partially in the earth or by suspending them.

Dr Hutton therefore computed the following table for shells—making allowance for the difference in the terminal velocity consequent on the difference between the specific gravity of the filled shell and the corresponding solid iron ball—to replace the first of the former tables:—

Table of Dimensions, &c., of Mortar Shells.

Diameter of mortar.	Diameter of shell.	Weight of shells empty.	Weight of shells filled.	Weight of equal solid.	Ratio of shell to solid.	Terminal velocity, or v.	Altitude a due to velocity.
in.	in.	lbs.	lbs.	lbs.		ft.	ft.
4·6	4·53	8·3	9	12¾	1·42	318	1580
5·8	5·72	16·7	18	25½	1·42	356	1980
8	7·90	43·8	47	67	1·42	420	2756
10	9·84	85·5	91½	130	1·42	468	3422
13	12·80	187·8	201	286	1·42	534	4430

Using this table, then, instead of the former, and assuming, in the case of a 13-inch shell, that it is projected with a velocity of 2000 feet per second, which is about a maximum, we find in the seventh column, opposite the 13-inch shell, 534; hence $\frac{2000}{534}=3{\cdot}746$; and opposite 3·7330 in the other table will be found 35° as the angle which gives the greatest range, and 2·8518 in the third column which, multiplied by 4430, the altitude opposite the 13-inch shell, gives 12,632 feet, or almost 2½ miles, for the greatest range. The French, however, fired shells at the siege of Cadiz a distance of more than 3 miles, the cavity of the shell being filled up with lead, and Hutton therefore investigated what would be the range of a 13-inch shell if so filled, and found that the range would be 16,005 feet, or 3 miles and 165 feet, the corresponding angle being 37° 20′. Such projectiles, however, were more formidable in appearance than in reality, as they seldom burst, and when they did the explosion was inconsiderable. Dr Hutton makes also another very important reference to the discoveries or reasonings of Professor Robinson, who first pointed out that "balls of equal density, discharged at the same elevation, with velocities proportional to the square roots of these diameters, will describe similar curves; because then the resistance will be in proportion to the momenta or quantities of motion,"—thus v being as $\surd d$, v^2 will be as d; consequently $d^2 v^2$ will be as d^3, but the resistance γ is nearly as $d^2 v^2$, d being the diameter and v the velocity, and hence γ is as d^3, or as the momentum which is as the magnitude of the mass, or as d^3. In this case, then, the horizontal velocity at the vertex, opposite the curve, will be proportional to the terminal velocity; and the ranges, heights, and all other similar lines will be proportional to d—a principle which may be of considerable use; for by means of a proper series of experiments on one ball, projected with different velocities and elevations, tables may be constructed by which may be ascertained the motions in all similar cases.

Dr Hutton gives the following table, deduced partly from theory and partly from experiment, which may be applied on the above principles:—

Table of the Motions of a 24-lb. Shot projected at 45° elevation.

Velocity per second.	Range in vacuo.	Range in the air.	Range corrected.	Height the ball rises to.
200	415	320	330	100
400	1658	1000	1019	300
600	3731	1391	1419	400
800	6632	1687	1719	464
1000	10362	1840	1878	515
1200	14922	1934	1978	561
1400	20310	2078	2129	606
1600	26528	2206	2264	650
1800	33574	2326	2391	694
2000	41450	2438	2510	738
2200	50155	2542	2622	778
2400	59688	2640	2726	816
2600	70050	2734	2823	852
2800	81241	2827	2916	887
3000	93262	2915	3002	922
3200	106111	2995	3086	996

Now, bearing in mind Professor Robinson's proposition if it be required to find the dimensions of the path described by a 12-lb. shot, discharged with a velocity of 1600 feet per second, and at an elevation of 45°. Here, as the curves are similar, and their corresponding lines proportional to the diameters of the shot, when discharged with velocities proportional to the square roots of the diameters, the velocity of a 24-lb. ball, corresponding to the 1600 feet of a 12-lb. ball, is first found in the table. Then, as the diameters of the two balls are 4·403, 5·546, the proportion will be $\sqrt{4{\cdot}403} : \sqrt{5{\cdot}546} :: 1600 : 1796$, the corresponding velocity of the 24-lb. ball, opposite to which in the table are the corresponding ranges and height, 2386 and 692; therefore, as 5·546 : 4·403 : : 2386 : 1894 yards the range, and 5·546 : 4·403 : : 692 : 549 yards the altitude. In like manner, the table may be used for determining the ranges of mortar shells; as, for example, a 13-inch shell, projected with the velocity of 2000 feet per second, at 45° elevation. First, the diameter of the shell being 12·8, the proportion is $\sqrt{12{\cdot}8} : \sqrt{5{\cdot}546} :: 2000 : 1317$; but as the weight of the shell, filled in the ordinary way, is less than that of a corresponding solid shot, this velocity must be reduced in the same manner as was done in page 132, with reference to a previous table; namely, as 178 : 149·4 : : 1317 : 1105, the corresponding velocity of the 24-pounder, to which in the table answers the range 1930; and finally, as 5·546 : 12·8 : : 1930 : 4455 yards, or about 2½ miles.

The difficulty of establishing fixed rules for the ranges of projectiles, an object of great practical importance, will be appreciated from what has been stated; a difficulty, indeed, due not only to the mathematical perplexity of the question as regards the determination of the trajectory of the projectile in a resisting medium like the air—a question which has exercised the ingenuity of the most profound mathematicians, including Euler, Borda, Poisson, Legendre, and many others—but also to the uncertainty of the law of the air's resistance in relation to the velocity of the projectile. By the experiments of Robins, Hutton, and others, with the ballistic pendulum, the velocity close to the gun's mouth, and at short distances from it up to about 250 feet, was determined, and thence the loss from the resistance of the air in passing through such small spaces deduced; but experiments have not as yet been multiplied sufficiently to express the terms of resistance in formulæ which will meet the circumstances of all projectiles. The resistances, too, at low velocities have been generally determined by the whirling machine, which does not strictly represent the circumstances of rectilineal motion; in the latter the resistances vary, with equal velocities, as the surfaces; whereas, in the circular motion, the co-efficient of resistance requires to be increased as the surfaces increase. From the present accuracy of fire of rifled muskets much knowledge might be acquired of the resistances to a small ball, by firing at a properly constructed pendulum, at different distances up to 800 yards; and though it cannot be expected that the precision of fire of larger projectiles will ever allow this distant use of the ballistic pendulum, still the comparison between the loss of velocity in great and small bodies might be founded on much better data than at present.[1]

TABLES OF ORDNANCE.

Length, Weight, &c. of Iron and Brass Mortars and of Carronades.

Nature of Ordnance.	Service.	Length.		Weight.	Calibre.	Diam. of shot or shell.	Charge.		When first cast.	Weight of Carriage.			
										Beds.		Block Trail.	
							Serv.	Proof.		Wood.	Iron.	Wood.	Iron.
		ft. in.	cals.	cwt.	in.	in.	lbs.	lbs.		cwt. qrs. lb.	cwt. qrs. lb.	cwt. qrs. lb.	cwt. qrs. lb.
13-in. Iron Mor.	S	4 $4\frac{13}{16}$	4·08	100	13	12·84	20	$20\frac{11}{16}$	1810	...	...	...	...
Do.	L	3 3·65	3·05	36	13	12·84	9	9	...	...	35 2 20	...	...
10-in. Iron Mor.	S	3 9·62	4·56	52	10	9·84	9½	9½	1790	...	...	...	...
Do.	L	2 7·53	3·15	18	10	9·84	4	4	1780	...	17 3 16	...	...
8-in. Do.	L	2 1·23	3·15	9	8	7·86	2	2	...	...	8 3 3	...	...
5½-in. Brass Mor.	L	1 3·1	2·5	1¼	5·62	5·595	0½	0½	...	1 0 10	...	...	...
$4\frac{2}{5}$-in. Do.	L	1 0·71	2·81	1	4·52	4·454	0¼	$0\frac{5}{16}$	...	0 3 5	...	...	...
68-pr. Carronade.	S	4 10·1	7·2	36½	8·05	7·86	5	13	1778	...	...	17 2 25	...
42-pr. Do.	S	4 1·12	7·2	22	6·79	6·765	3½	9	...	...	...	10 1 21	...
32-pr. Do.	S	3 8·873	7·2	17	6·25	6·177	$2\frac{1}{16}$	8	...	...	...	8 3 24	11 3 0
24-pr. Do.	S	3 4·75	7·2	13	5·68	5·595	2	6	1773	...	...	7 3 21	10 3 20
18-pr. Do.	S	3 1	7·2	10	5·16	5·099	1½	4	...	...	...	6 3 20	9 2 10
12-pr. Do.	S	2 6·36	6·7	6¾	4·52	4·454	1	3	...	...	...	6 1 10	8 1 2
6-pr. Do.	S	2 7·44	8·7	4¾	3·6	3·55	$0\frac{10}{16}$	1½	...	...	...	...	...

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[1] Several ingenious methods have indeed, from time to time, been proposed to measure the velocity by determining the time of the ball's transit through a definite space; thus, for example, the revolving machine of Grobert, which consists of two circular discs of card-board about 6½ feet in diameter, connected together by an axis 13 feet long, to which a rotatory motion is given by means of a band passing over a pulley on the centre of the axis, and connected with a proper combination of wheels to produce the necessary velocity of rotation. The two discs are divided into 360° each by radiating lines, and the axis being placed in the prolongation of the line of flight, the ball passes through both discs whilst rotating with a considerable and uniform velocity; and the angle between the two perforations, as shown by the lines, affords the means of determining the velocity, thus:—let φ be the angle, t the time of a revolution, $\frac{\varphi}{360}t$=the time of passing the distance d between the two discs, and the velocity $v=\frac{360\,d}{\varphi\,t}$. Now if t be $\frac{1}{10}$th of a second, or the machine revolves ten times in a second, and v be assumed=1200 feet, φ would be 39°. Don Tomas de Morla had previously proposed a wheel or cylinder, rotating on the top of a vertical axis, the ball being so discharged as to pass as nearly as possible through a diameter of the cylinder when the angle between the two opposite perforations afforded the means of determining the time of passage and the velocity; but neither of these methods are sufficiently exact for the purpose. Professor Wheatstone, some years ago, proposed the electro-magnetic cronograph to the artillery committee, but his proposition was not then favourably entertained, though it is now again under consideration. The mode in which it has been tried on the continent is as follows:—Two screens or targets of metallic wire twisted *continuously* into a net-work, which the ball cannot pass through without breaking, are set up, the wires being of course coated so as to prevent metallic contact between the parts of the net: each screen, by means of a connecting wire, forms part of the conducting circuit between a voltaic battery and an electro-magnet, which suspends a marker or pencil over a cylinder made to revolve uniformly with the necessary velocity. Now, when the ball passes through the first "target net" the circuit is broken, and the pencil instantly falls upon the cylinder, and makes a recording mark upon it. When the ball passes through the second "net" the connection of the second electro-magnet is in like manner broken, and by the fall of its pencil a similar mark, though on a different point, is made upon the cylinder. The time of revolution of the cylinder being known, the angle between these two marks, as in Grobert's and Morla's machines, determines the time of the ball's passage between the two targets, and hence the velocity of the ball. Though it is said this system has not as yet been perfectly successful, it may now be reasonably expected, from the increased knowledge of electro-magnetic phenomena, and the improvement of electro-magnetic apparatus, that it will be speedily rendered so.

Length, Weight, &c., of Iron and Brass Guns and Howitzers, and the Weights of their Carriages.

Nature of Ordnance.	Service. L., *Land*; S., *Sea*.	Lengths.			Weight.	Calibre.	Diameter of shot or shell.	Charge.		When first cast.	Weight of Carriages.						
		Feet & inches.		Calibres.				Serv.	Prf.		Garrison.			Travelling.		Ship Gun.	
											Sliding.	Common.	Iron.	Siege.	Field.	Common.	Sliding.
		ft.	in.	cals.	cwt.	in.	in.	lbs.	lbs.		cwt. qr. lb.	cwt. qr. lb.	cwt. qr. lb.	cwt. qr. lb.	cwt. qr. lb.	cwt. qr. lb.	cwt. qr. lb.
10-in. Iron Gun	L. & S.	10	6	12·0	112	10·0	9·85	16	25	...	...	...	...	...	...	...	...
	L. & S.	9	4	12·0	85	10·0	...	12	20	...	...	...	...	...	...	...	...
8-in. Iron. Gun	L. & S.	9	0	13·3	65	8·05	7·925	10	20	...	13 1 0	15 2 14	25 1 10	...	...	9 0 10	9 3 0
	S.	8	10	13·05	60	...	...	10	20	...	...	...	...	...	...	9 0 10	...
	S.	8	0	11·82	52	...	...	8	16	...	...	...	...	...	...	8 0 11	8 3 0
	L.	6	8·5	9·9	50	...	7·86	8	14	1828	11 2 8	...	...	27 0 13	...	...	...
68-pr. Iron Gun	L.	10	10	16·15	112	8·12	7·925	20	30	...	16 0 26	...	...	...	...	...	...
	S.	10	0	14·78	95	...	...	16	28	...	...	...	...	...	...	10 2 14	12 2 0
	S.	9	6	14·0	87	...	...	14	25	...	...	...	...	...	...	...	12 0 24
56-pr. Iron Gun	L.	11	0	17·6	98	7·65	7·48	16	28	...	18 2 22	...	...	...	...	...	...
	L.	10	0	16·0	87	...	...	14	25	...	18 2 22	...	...	...	...	...	...
42-pr. Iron Gun	L.	10	0	17·21	84	6·97	6·765	14	25	...	13 1 10	...	...	...	...	...	...
	L.	10	0	17·21	75	...	...	14	25	...	13 1 10	...	...	...	...	...	...
	L.	9	6	16·43	67	6·935	...	10½	23	...	...	16 3 13	26 1 4	...	...	...	...
32-pr. Iron Gun	L.	9	7	17·95	64	6·41	6·177	10	21½	1827	12 1 23	15 1 2	23 1 22	...	...	...	...
	L. & S.	9	6	17·78	56	...	...	10	21½	...	12 1 23	15 1 2	23 1 22	...	...	8 3 24	9 2 0
	L. & S.	9	0	17·0	46	6·35	...	6	12	...	12 1 23	15 1 2	23 1 22	...	...	8 3 24	9 2 0
	S.	8	0	14·96	48	6·41	...	8	21½	1810	...	...	...	...	...	7 3 0	...
	L. & S.	9	0	16·94	50	6·37	...	8	18	...	...	...	...	26 2 23	...	7 2 11	7 2 0
	S.	8	6	16·06	45	6·355	...	8	16	...	...	...	...	...	...	7 2 11	7 2 0
	L. & S.	8	0	15·11	42	...	...	6	14	...	...	..	...	20 0 10	...	6 1 1	...
	Priv.	8	0	15·11	41	...	...	6	12	..	...	...	...	...	...	...	...
	S.	7	6	14·17	40	...	...	6	12	...	...	...	...	...	...	6 0 4	...
	L. & S.	6	6	12·38	32	6·3	...	5	10	...	...	...	...	...	...	6 0 4	...
	S.	6	0	11·43	25	...	...	4	9	...	...	...	...	...	...	5 3 24	...
	S.	5	4	10·16	25	...	...	4	9	...	...	...	...	...	...	4 3 0	5 1 0
24-pr. Iron Gun	L.	9	6	19·57	50	5·823	5·611	8	18	...	10 0 18	13 2 23	21 2 20	26 2 23	...	...	...
	L.	9	0	18·54	48	...	...	8	18	...	10 0 18	13 2 23	21 2 20	...	...	...	...
	L.	6	6	13·4	33	...	...	6	12	...	10 0 18	13 2 23	21 2 20	...	...	...	...
18-pr. Iron Gun	L.	9	0	18·52	42	5·292	5·099	6	15	...	9 1 6	12 3 1	19 0 8	20 0 10	...	...	...
	L.	8	0	18·14	38	...	...	6	15	1790	...	...	...	20 0 10	...	...	...
	S.	7	0	16·24	22	5·17	...	3	7	...	...	...	...	...	...	...	4 3 21
	L. & S.	6	0	13·92	20	...	...	3	7	...	9 1 6	12 3 1	19 0 8	...	...	...	4 3 21
	L. & S.	5	6	12·76	15	...	...	2	5	...	9 1 6	12 3 1	19 0 8	...	...	...	3 0 18
12-pr. Iron Gun	L.	9	0	23·14	34	4·623	4·527	4	12	...	...	11 2 7	17 0 6	16 1 0	...	...	...
	L.	8	6	22·06	33	...	...	4	12	...	...	11 2 7	17 0 6	...	...	...	...
	L.	7	6	19·46	29	...	...	4	12	...	...	11 2 7	17 0 6	...	...	...	...
	L.	6	0	15·57	21	...	...	3	10	...	...	...	...	12 0 22	...	...	...
9-pr. Iron Gun	L.	8	6	24·28	28	4·2	4·099	3	9	...	...	10 1 3	15 1 2	...	...	...	...
	L.	7	6	21·42	26	...	...	3	9	...	...	10 1 3	15 1 2	...	...	...	...
	L.	7	0	20·0	25	...	...	3	9	...	...	10 1 3	15 1 2	...	...	...	...
	L.	5	6	15·71	17	...	...	2¼	8	...	...	...	...	11 2 6	...	...	...
6-pr. Iron Gun	Salute	7	6	24·53	21	3·668	3·567	2	6	...	...	9 0 20	14 3 9	...	...	...	...
	do.	7	0	22·9	20	...	...	2	6	...	...	9 0 20	14 3 9	...	...	...	...
	do.	6	0	19·62	17	...	...	2	6	...	...	9 0 20	14 3 9	...	...	...	...
12-pr. Brass	L.	6	6½	16·76	17½	4·625	4·527	4	5	1788	...	...	...	...	12 2 8	...	...
9-pr. do.	L.	5	11·4	17·0	13½	4·2	4·099	2½	3½	1806	...	...	...	...	12 1 8	...	...
6-pr. do.	L.	5	0	16·33	6	3·668	3·567	1½	2	1782	...	...	...	...	9 1 25	...	...
3-pr. do.	L.	4	0	16·4	3	2·913	2·815	0¾	1	1810	...	...	...	...	4 3 0	...	...
3-pr. do.	L.	3	0	12·3	2¼	2·91	...	0⅝	1	1812	...	...	...	...	4 1 8	...	...
10-in. Iron How.	L.	5	0	6·0	40	10·0	9·84	7	7	1825	...	16 0 0	25 1 5	31 2 10	...	...	...
8-in. do.	L.	4	0	6·0	20	8·0	7·86	4	4	...	12 2 0	14 0 0	18 1 18	24 0 13	...	...	...
5½-in. do.	L.	3	4¾	7·16	15½	5·68	5·595	2½	6	1800	...	...	15 1 24	11 2 23	...	...	...
32-pr. Brass How.	L.	5	3	10·0	17½	6·3	6·177	3	4	...	...	...	...	...	13 3 2	...	...
24-pr. do.	L.	4	8½	9·8	12½	5·72	5·595	2	2½	1820	...	...	...	...	12 2 3	...	...
12-pr. do.	L.	3	9·2	9·8	6½	4·58	4·454	1¼	1¼	1820	...	...	...	...	9 3 14	...	...
4⅖-in. do.	L.	1	10·6	5	2⅜	4·52	4·454	0½	1	...	...	...	...	...	5 1 2	...	...

CONSTRUCTION OF GUNS.

In reference to the preceding tables of guns, it is necessary to consider the very important questions connected with their construction. In the first place, it is evident that there should be some relation between the expansive forces of the gases developed by the ignition of the charge of gunpowder, and the tenacity of the metal cylinder or gun which has to resist them; and here again it is necessary to know whether the gases act simply by pressure or by shock. That the action of the gases at the first moment of their development is *analogous* to a shock, or percussive force, is the general belief at present; and indeed, when it is considered that all the particles of matter constituting the retaining tube or gun are in a state of rest, or in a passive condition, when, by the almost instantaneous development of the gases, they are suddenly exposed to the action of a repulsive force capable of impressing on the particles of the gases a velocity of 7000 feet per second, it can scarcely be doubted that they must be affected very much in the same way as they would have been if exposed to the action of a percussive force; though, of course, when once the shock had been transmitted through the solid substance, and the whole of its resisting forces had been called into action, the gases, if brought into a state of rest, would act by simple pressure. Tinmhermans charged a musket barrel with 1·2 oz. of powder, and then in successive discharges increased the resistance each time by adding 1, 2, 3, &c., balls, until the barrel burst, when it was found that whenever the resistance exceeded a certain limit all the barrels swelled out in a narrow annular space, forming a defined border somewhat in front of the end of the charge. Now, it seems certain that if the gases had acted by pressure only, the whole of the bounding cylinder of the bore behind the charge should have swollen out equally, and not have been restricted in the extension of the calibre to the space of a simple ring; from which it was inferred that the gases, acting by shock against the ball, were thrown back by its resistance against the narrow space described. In like manner, Tinmhermans reasons from Swedish experiments made in

1831, in which it appeared that iron guns in which the end of the bore was hemispherical, afforded much more resistance than those ending in a plane surface; that this was due to the difference in the shock consequent on the difference of form in the bodies exposed to the action of the fluids.

Admitting, however, as has been done, the analogy in the mode of action of an *almost instantaneously* developed repulsive force on the walls of the cylinder, which restrains the expansion of the gases which exercise that force, to that of a shock or percussion, the experiments cited do not appear sufficient to establish a perfect identity in such actions. Without doubt, in such a case, time is necessary to enable the resisting body to bring into play its tenacity, and it resists, therefore, at first by the simple cohesive force which binds its particles together, and in this consists the analogy between the action of gunpowder and a percussive force. In considering the first experiment, it must be remembered that at two positions of the bore the destructive action of the gunpowder may be considered greater than at any other—namely, at the section transverse to the axes and immediately in front of the bottom of the bore, as the gases are then acting in two directions perpendicular to each other, namely, against the bottom of the bore or in the direction of the axis, and against the walls of the bore or perpendicular to the axis, thus tending to drag apart the breech from the rest of the gun;—and again at a transverse section somewhat in front of the charge, as the friction of the ball tends in a minor degree to produce a similar effect, and still more so when several balls or other projectiles are used, so as to check the progressive motion of the mass, and to augment the dragging effect of the friction. In this latter case, as the expanding gases would be also checked in their progressive motion, an accumulation would for the instant take place immediately behind the balls, and thus produce an augmented pressure on the sectional ring corresponding to that position, the result being, as in the cited experiment, an annular or local expansion rather than a general one.

On the principle of pressure, however, it does not appear difficult to obtain a reasonable approximation to the required thickness of the containing tube, following the reasoning of Senderos. Let R be the radius of the exterior of a tube or gun barrel, r the radius of the interior, π the proportion between the diameter of a circle and the circumference; then the surface of pressure against the base of the tube acting to produce fracture, at the circumference $2\pi r$, will be the area of that circle, or πr^2. The surface of pressure, equal to the other, but acting longitudinally, will be a rectangle, one side of which is the diameter of the tube, or $2r$, and the other a portion of the length of the tube l, such as will make the two surfaces of pressure equal, or $\pi r^2 = 2rl$, and hence $l = \frac{\pi r}{2}$. Now, the surface of resistance in a direction perpendicular to the axis will be represented by the area of the annular space represented by $\pi\,(\mathrm{R}^2 - r^2)$, and the surface of resistance in a longitudinal direction, by the areas of the two surfaces, one at each end of the diameter corresponding to the two fractures along l, that is by $2l\,(\mathrm{R} - r)$. Now, comparing these two together, the resistances being proportional to the surfaces of fracture, they will be as $\pi\,(\mathrm{R}^2 - r^2) : 2l\,(\mathrm{R} - r)$; or substituting the value of l, as $(\mathrm{R}^2 - r^2) : r\,(\mathrm{R} - r)$, and making $\mathrm{R} - r = d$ as $d(\mathrm{R} + r) : dr = d\,(d + 2r) : dr = d + 2r : r$; which shows that the resistance to fracture in a transverse direction, or perpendicular to the axes, is always much greater than that in a longitudinal direction, being indeed four times as great when $d = 2r$, or one calibre—not, however, making the comparison with a transverse section close to the bottom of the bore, for the reasons before stated. The pressures and resistances may now be compared together, and for this comparison the tenacities of wrought iron and of the best bronze have been stated by Senderos as 4234 and 3872 atmospheres respectively, and the cohesive force of cast iron as 1358. According to the experiments of Navier, these numbers should be $4164\frac{1}{2}$, 2475, and 1307, and by others the cohesive strength of wrought and of cast iron have been stated at 4166 and 1266 atmospheres. With these data, equalizing the pressure tending to produce fracture in a longitudinal direction—that is, to force one half of the cylinder to separate from the other in two longitudinal fractures of the length l—to the force of cohesion resisting fracture, P representing the pressure and C the tenacity or cohesion—we have, as before explained, $2rl\,\mathrm{P} = 2l\,(\mathrm{R} - r)\,\mathrm{C}$, or $r\,\mathrm{P} = (\mathrm{R} - r)\,\mathrm{C}$, or $r\,\mathrm{P} = d\,\mathrm{C}$. But C in English cast iron is 1266 and $\mathrm{P} = 2230$; hence $r\,2230 = d\,1266$, or $d = \frac{2230}{1266} r = 1{\cdot}76\,r$, or about $\frac{7}{8}$ths of a calibre, which is the thickness adopted for shell guns, but $\frac{2}{8}$ths less than the thickness of the heavy iron guns.

It must, however, be remembered that the cohesive forces stated ought not to be admitted in practice, as they are liable to be affected by heat and other causes; and hence, if only $\frac{1}{3}$d be deducted from the cohesive force, d would become $= 2 \cdot 6\,r$, or $1\frac{3}{10}$ths calibre, which is greater than the maximum thickness adopted, or that at the breech. With bronze of 2475 tenacity, and reducing by one-third, the thickness would be about $\frac{6}{8}$ths calibre, the adopted thickness being $\frac{7}{8}$ths. With wrought iron, taking the English estimate, and deducting $\frac{1}{3}$d, the thickness should be about $\frac{5}{16}$ths of a calibre—the actual thickness of metal at the breech of an artillery carbine being very nearly that deduced from theory, or $\frac{1}{5}$th of a calibre. It is not to be wondered that this great saving in thickness or in weight of metal has so often led to trials of wrought iron for guns, though the great difficulty of forging such large masses has hitherto checked the extension of its use; and further, it will be shown that a certain weight is absolutely necessary for a gun, and that the use of wrought iron, therefore, is only desirable when peculiar lightness or peculiar strength are indispensable.

General Construction of Iron and Brass Guns.

	Nature of ordnance.	Lengths in parts of A.F.			Lengths in parts of D.F.		Thickness in calibres.	
		First reinforce. A.B.	From rear of base ring to centre of trunnions. A.C.	Second reinforce. B.C.	Chase. D.E.	Muzzle. E.F.	At breech.	At muzzle.
Iron guns.	68-pr., 42-pr., 32-pr., &c., new construction....	$\frac{1}{5}$	$\frac{2}{5}$	$\frac{1}{5}$ + 1 cal.	$\frac{4}{5}$	$\frac{1}{5}$	$1\frac{1}{6}$	$\frac{3}{8}$
	10 & 8-in. shell guns	$\frac{1}{5}$	$\frac{2}{5}$	$\frac{3}{10}$	$\frac{3}{4}$	$\frac{1}{4}$	$\frac{7}{8}$	$\frac{1}{4}$
	32-pr. old pattern..	$\frac{2}{7}$	$\frac{3}{7}$	$\frac{1}{7}$ + 1 cal.	$\frac{4}{5}$	$\frac{1}{5}$	$1\frac{1}{16}$	$\frac{17}{32}$
	24	...	...	...	...	...	$1\frac{2}{16}$	$\frac{9}{16}$
	18	...	...	...	...	...	$1\frac{3}{16}$	$\frac{19}{32}$
	12	...	...	...	...	...	$1\frac{4}{16}$	$\frac{5}{8}$
	9	...	...	...	...	...	$1\frac{5}{16}$	$\frac{21}{32}$
	6	...	...	...	...	...	$1\frac{6}{16}$	$\frac{11}{16}$
Brass guns.	12	$\frac{5}{18}$	$\frac{4}{9}$	$\frac{3}{16}$ + 1 cal.	$\frac{4}{5}$	$\frac{1}{5}$	$\frac{7}{8}$	$\frac{3}{8}$
	9	$\frac{5}{18}$	$\frac{4}{9}$	$\frac{3}{16}$ + 1 cal.	$\frac{4}{5}$	$\frac{1}{5}$	$\frac{7}{8}$	$\frac{3}{8}$
	6	$\frac{5}{18}$	$\frac{4}{9}$	$\frac{3}{16}$ + 1 cal.	$\frac{4}{5}$	$\frac{1}{5}$	$\frac{11}{16}$	$\frac{1}{4}$
	3	$\frac{5}{18}$	$\frac{4}{9}$	$\frac{3}{18}$ + 1 cal.	$\frac{4}{5}$	$\frac{1}{5}$	$\frac{7}{8}$	$\frac{3}{8}$

Form, Weight, and Length.—Having arrived at a tolerable knowledge of the thickness of metal necessary to resist the first shock of the gunpowder, it becomes comparatively easy to resolve most of the other elements of construction. By the law of Mariotte, for example, the pressure of gases varies directly with their densities, or inversely with the spaces they occupy; and hence the pressure, when the gases have expanded so as to occupy twice the space, will be one-half; or three times the space, one-third; and so on. This law appears to have been practically followed from an early period, as the external form has been made more or less conical, and generally indeed such as to constitute three truncated cones, corresponding to the first reinforce, second reinforce, and chase of our ordnance, though sometimes the two first have been united either into one cylinder or one truncated cone, which is an arrangement more consonant to theory. In considering the portion of the bore to which the greatest thickness of metal should be extended, it is necessary to know the position of the ball at the moment when the gases developed are in the highest state of condensation, and this has been assumed by many to be when the ball has moved forward a length equal to its own radius; and farther, to assume the greatest length of charge ever intended to be used with the gun, which therefore need not exceed either that of the proof charge, or of the charge which would produce the greatest initial velocity in a ball. In the 24-pounder the proof charge is $\frac{3}{4}$ths of the weight of the ball, in the 32-pounder about $\frac{11}{16}$ths, the 42-pounder about $\frac{5}{8}$ths, the 56-pounder $\frac{1}{2}$, the 68-pounder about $\frac{7}{16}$ths, the 18-pounder $\frac{5}{6}$ths, and the 12-pounder and smaller guns equal to the weight of the ball. In the 68-pounder the charge for producing the maximum velocity by the table of Hutton would be $43\frac{1}{4}$ lbs., whereas the proof charge may be taken at 28 lbs. On the former supposition, the length of the cylinders exposed to the maximum action of the gunpowder would be $27\frac{1}{2}+4$ inches $=31\frac{1}{2}$, or 2 feet $7\frac{1}{2}$ inches, which would extend about half-way from the termination of the first reinforce to the trunnion; and it may be remarked, in reference to this point, that the fractures on the bursting of a gun extend longitudinally, in somewhat irregular or curved lines, rather beyond the trunnions—the breech being partly broken off near the bottom of the bore on the one end, and the chase being separated from the other part of the gun on the other. With the length of the 68-pounder of 95 cwt., the whole volume of the bore, as compared to that of the maximum velocity charge, is not quite 4 to 1;—so that if 3 to 1 be adopted, the thickness at the muzzle ought to be $\frac{3}{8}$ths of a calibre. If, then, without regard to ornament, the gun were constructed upon the simple principle of a cylinder extending from the extremity of the breech to the point on the second reinforce above intimated, and from that point to the extremity of the muzzle as a truncated cone, the 68-pounder of 15 calibres would weigh 103 cwt., being the mean between the two heavier 68-pounders, one of which is 112 cwt. and the other 95 cwt., whilst the ratio between the weight of the ball and the weight of the gun would be 1 : 170.

As the weight must therefore depend, first, on the thickness of metal necessary to resist the greatest expansive force of the gunpowder intended to be applied; and secondly, on the length of gun—an element in itself depending on the charge to be used, and the initial velocity to be given to the ball—it becomes necessary to determine the length to be adopted, which is generally stated in calibres as well as in feet and inches. In the early periods of artillery every founder seemed to adopt his own fancy, and hence the variety of guns was not only great as regards the calibre, but also in reference to the length of guns of the same calibre. Some of the guns were of either monstrous size or form. Luis Collado, mentioning a culverine mounted at Naples, and firing a ball of 48 lbs. weight, which was 47 calibres in length, and the *double* cannons founded by order of the Castellan of Milan, Don Alonso Pimentol, which were 130 calibres in length; and he mentions that in his time at Milan no less than 200 varieties of ammunition were required for the service of the artillery of the castle alone. The following table of Venetian guns in the beginning of the sixteenth century is a further example of this apparently capricious multiplication of species:—

Table of the different Pieces of Artillery mentioned in the 11*th Colloquy*, 1*st Book of Tartaglia.*

Description.	Length.		Weight.			Weight of ball.	Remarks.
	ft.	in.	cwt.	qrs.	lbs	lbs.	
Culvering....	8	$5\frac{1}{4}$	10	1	10	10·6	Iron ball.
Culvering....	9	$6\frac{3}{4}$	13	0	22	9·3	Do.
Culvering....	11	3	25	1	18	13·2	Do.
Culvering....	...	...	...	...	...	19·9	Do.
Culvering....	11	$9\frac{3}{4}$	31	3	9	33·1	Do.
Culvering....	13	6	39	0	0	33·1	Do.
Culvering....	16	$10\frac{1}{2}$	76	3	8	79·4	Do.
Cannon	7	$10\frac{1}{2}$	13	0	0	13·2	Do.
Cannon	9	0	14	3	3	13·2	Do.
Cannon	...	...	...	...	...	19·9	Do.
Cannon	9	$6\frac{3}{4}$	23	2	15	33·1	Do.
Cannon	10	$8\frac{1}{4}$	52	0	0	66·2	Do.
Cannon	11	3	73	2	14	79·4	Do.
Faulcon......	7	$10\frac{1}{2}$	5	1	1	4·0	Lead.
Faulconet ...	6	$2\frac{1}{4}$	2	1	13	2·0	Do.
Saker.........	9	0	8	1	3	7·9	Do.
Saker.........	10	$1\frac{1}{2}$	12	2	23	7·9	Do.
Saker.........	9	0	7	2	20	6·6	Do.
Aspidi........	6	$2\frac{1}{4}$	7	2	20	7·9	Do.
Passavolante	13	6	16	0	21	10·6	Iron.
	11	$9\frac{3}{4}$	52	2	10	165·5	Marble stone.
	11	3	36	1	7	99·3	Do.
	11	3	32	2	0	66·2	Do.
	9	$6\frac{3}{4}$	26	2	10	66·2	Do.
Cortaldi......	7	$10\frac{1}{2}$	16	0	21	29·8	Do.
Cortaldi......	8	$5\frac{1}{4}$	9	1	23	19·9	Do.

This great variety of pieces of artillery was classed, according to Collado, by the early writers under three heads—1st, Those for long ranges; 2d, Those for battering; 3d, Those for throwing one or more stone balls. The first, of 32 calibres, comprised muskets, falconettes, medium sacers and sacers, aspics, medium culverins, culverins, &c. The second, or battering cannon, are distinguished as quarter guns, medium guns, simple common guns, reinforced and bastard guns, the serpent, double guns, basilisks, &c. These varied in length from 18 to 28 calibres. The third genus included the ancient bombards, mortars, and brass guns, with detached chambers which were fixed to the guns after being charged, as well as the guns for firing stone balls. They were heavier than those of the preceding genera, but were proportionally shorter, not exceeding $8\frac{1}{2}$ calibres in length. This attempt at classification was not, however, adhered to by all the founders of guns, and hence it became absolutely necessary to take some step to lessen the confusion. At the beginning of the seventeenth century, therefore, Christobal Lechuga attempted to reduce the vast number of existing guns to six different calibres only, and shortly afterwards Don Juan Bayarte fixed the number, which were afterwards called guns of regular calibre or of ordinance. This great progressive step of the Spanish artillery was imitated by the other European Powers, by whom the species, dimensions, and calibre of the guns to be retained were established by regulations of state, and were hence called ordnance. Cannon may naturally be divided into two great classes—namely, guns for firing solid shot, and mortars for firing shells or hollow projectiles; but an intermediate genus, partaking of the characters of both, has been interposed, namely, the howitzer, which is manipulated like a gun, but is used for the discharge of hollow projectiles. Lechuga adopted at first the calibres of 40, 24, and 12-pounders, calling the two latter medium and quarter guns, but afterwards added the 16, 8, and 2-pounders. The 40-pounder was rejected by Diego Ufano and Bayarte, and subsequently the calibres fixed by the French Ordinance of 1752 were adopted in Spain—namely, the 4, 8, 12, 16, and 24-pounders for land service, and the 6, 12, 18, 24, 32, and 36-pounders for the marine; but the 4-pounder was subsequently abandoned. Gribcauval was the great reformer in 1765 of the French artillery, when, for siege and fortress guns in brass, 24, 16, 12, 8, and 4-pounders were retained, and for field guns the 12, 8, and 4-pounders; but in the eleventh year of the Republic the list was reduced to the 24-pounder, short; 12-pounder, long and short; 6-pounder, long, short and light or field, mountain; 3-pounder; and 24-pounder howitzer; and, as is well known, the present Emperor of the French has put upon trial a still more simple arrangement, having invented a howitzer gun something like the Licorne of the Russians, and thus endeavoured to reduce calibres to a minimum. In our own service the list of guns shows that there is still a superfluity of species, or rather varieties, and that many must be considered merely experimental; as, for example, of the 68 and 42-pounder, and still more of the 32 and 24-pounder: but some of these have already been practically abandoned.

Not only does the powder, as it progressively burns, continue by successive shocks to act against the ball, but also the gases, as they expand, continue to act upon it, though with a regularly diminishing force. This variable but diminishing accelerating force is opposed to the resistance of the ball from friction in the bore, which is uniform, and by the resistance of the air, which is variable, but increasing as the velocity of the ball increases. Whenever, therefore, the sum of the retarding forces has become equal to that of the accelerating forces, it is evident that no further advantage can be obtained by the action of the gases, and hence that the limit of length has been attained. Capt. Boxer cites the experiments of Col. Armstrong (1736), who endeavoured to determine this question by the ranges obtained. He used a brass 24-pounder, 10 feet 6 inches long, which was shortened by 6 inches after each trial, and the mean ranges he obtained were—for the length of 10 feet 6 inches, 2502; for 10 feet, 2512$\frac{2}{3}$; for 9 feet 6 inches, 2564$\frac{1}{3}$; for 9 feet, 2617$\frac{2}{3}$; for 8 feet 6 inches, 2514; and for 8 feet, 2453$\frac{2}{3}$; from which it appeared that the greatest ranges were obtained from the gun of 9 feet, or 18$\frac{1}{2}$ calibres. Dr Hutton's experiments, before noticed, with the ballistic pendulum, showed that, as regards the initial velocities, they continue to increase with the length of the bore, but in a much less proportion. By Piobert's first quoted series of experiments, or those made in Hanover in 1785, cited also by Capt. Boxer, it appeared that with a charge equal to half the shot's weight, no advantage in point of range was obtained by increasing the length beyond 18 to 24 calibres; and by his second series of 1801, beyond 18 or 19—though in the trials with a 6-pounder, the 15 calibre and 12 calibre guns were very little inferior to the 18 calibre. Capt. Boxer, whilst remarking on the uncertainty as to the absolutely best length of gun, as exhibited even in these extensive experiments, points to a curious law observed in examining these ranges by Mr J. F. Heather, M.A., one of the very able mathematical masters of the Royal Military Academy—namely, that the ranges obtained from guns of 12, 15, and 19 calibres are relative maxima, being greater than those of the guns of intermediate lengths; and he adds that the Hanoverian experiments point to another such maximum in guns of 23 calibres. Reflecting on the experiments of Hutton, and on the general theory of the accelerating and retarding forces already noticed, it seems impossible to connect such alternations with the action of the gases, and they can only be accounted for by some modifying cause, such as the zig-zag motion of the ball within the bore, causing it to range further, or *vice versa*, according as the last rebound may discharge it in a direction passing above or below the axis of the piece. Although, perhaps, not fully conclusive, and still meriting further and very careful experiments, it may for the present be assumed that there is little reason for exceeding 19 calibres in length, or for going below 12, so far as the effective working of the gun, as manifested in its range, is concerned. The lesser number of calibres is best fitted for guns of large calibre, and the greater number for those of small calibre. Assuming then, as has been done, 15 calibres for the 68-pounder, and resolving the gun into two parts—a cylinder and a truncated cone—with a reinforce in rear of the charge, another at about half a calibre in front of it, and a third at the muzzle, a simple and apparently an effective gun would be obtained of moderate weight; and the same would be the result with other guns. In the particular case of the 68-pounder, as the proof charge is about $\frac{2}{3}$ds of the charge which gives the greatest initial velocity, the length of the cylinder, or breech section, might be diminished, and the muzzle or chase, or conical section, increased, by which the weight would be diminished; but as a general rule, the other appears the most satisfactory, as the proof charge is usually $\frac{2}{3}$ds of the weight of the ball.

Impossible to diminish the weight of the gun beyond a certain limit.—It would be wrong to pass from the important subject of the construction of guns without noticing the necessity of securing the carriage of the gun from too severe a shock; and this can only be done by bestowing upon the gun itself a considerable weight, or by interposing springs, which must be very difficult if not impossible in practice. This will be readily understood from the following considerations. Let W be the weight of the gun, and w that of the carriage, and WV the momentum of the gun, on first receiving the shock, and before it has acted on the carriage; now, in hard bodies, when one in motion strikes another at rest, the whole quantity of the motion of the two bodies after the shock will equal that of the first before the contact; hence, taking v as the common velocity of the gun and carriage after the shock, or velocity of recoil of the compound body, $(W+w)v=WV$. Further, the momentum of the gun on receiving the first shock of the powder cannot be altered by diminishing its weight, as the velocity would increase in the same proportion; and supposing W' and V' the new weight and velocity, $W'\,V'=WV$; and in like manner as $(W'+w)$ would then be less than $(W+w)$, so v', or the velocity of $(W'+w)$ would be greater than v, and in consequence $v'w$, or the momentum communicated to the carriage itself, greater than vw, or the motion communicated when the gun weighed W. Every diminution, therefore, in the weight of the gun increases the shock upon the carriage. And if to preserve the amount of recoil within a reasonable limit, and to increase the power of resistance of the carriage, its weight should be increased as much as that of the gun had been diminished, say by n, then the momentum of the gun and carriage would be the same as before; and the velocity, as in the first assumption, v. But this would be composed thus $(vW-vn)+(vw+vn)$; so that the carriage would have received the shock of the additional force represented by vn, and have suffered accordingly, as it is impossible to transfer the momentum of the gun to the gun and carriage without some portion of it being lost in destructive action upon the carriage, a portion which will necessarily increase as the amount of the force expended on the carriage is increased. The greater, therefore, the weight of the gun as compared to that of the carriage, the less will be the loss of force in the transmission of momentum, and of course the less injury done to the carriage. This being considered, it is evident that though by the use of wrought iron, the weight of the gun might be diminished by nearly $\frac{2}{3}$ds, it would be impossible in ordinary guns so far to diminish the weight without the introduction of other means to protect the carriage from injury. In field guns, where the recoil is of less importance than mobility and durability, wrought iron seems the very best material which could be used; and, in like manner, where the object is not a great range but a large calibre, as in flank guns, it might be advisable to replace such guns as short 24-pounders, by wrought-iron 68-pounders, or by cast-iron guns of large calibre but diminished thickness of metal, strengthened by wrought-iron hoops, as in the gun of Captain Blakeley, R.A. Hereafter, more may be expected; and a travelling 68-pounder constructed of a wrought-iron cylinder, sliding on a cast-iron bed, but checked in its motion by springs or buffers—the bed itself being supported on the carriage—the gun, or cylinder, being carried separately from the bed and carriage; guns of such large calibre might then enter into ordinary siege equipments. The monster gun of the Mersey Foundry is of wrought iron, but as its weight will be 24 tons 7 cwt., and the weight of its solid shot 300 lbs., it is rather a triumph of forging than an example of diminished weight, the proportion of the weight of gun and shot being 180 to 1. It is only further necessary briefly to state the proportions between the weights of the ball and of the gun, or between the weights of the charge of powder and of the gun, most generally adopted. In Spain the proportion between the weights of the gun and the charge in long guns is between 800 and 947 to 1; and in short, or field guns, about 480 to 1; or between the gun and ball from 234 to 313 to 1; and in short or field guns, about 142 to 1. In France the proportion in the naval 36-pounder is as 214 to 1; in the 30-pounder, 221 to 1; and in brass guns about 160 to 1. In the United States, from 299 to 1 in the iron 12-pounder, to 201 to 1 in the 42-pounder; but in their 12-feet and 10-feet columbiads, the heaviest of their ordnance, as they weigh 15,400 lbs. and 9240 lbs. respectively, the proportion is as 137 to 1. In brass guns it is as 147 to 1. In our own service, in the three forms of 68-pounder, the longest of which weighs 112 cwt., the proportions are 184, 166, and 143 to 1; in the 42-pounder, between 224 and 179 to 1; in the 32-pounder, between 223 and 140 to 1; in the 24-pounder, 233 and 154 to 1; in the 18-pounder, 261 and 124 to 1; omitting some of the very light and bored-up guns, which can only be considered exceptional cases. In the brass guns, the proportion in the light 6-pounder is 112 to 1; and in the 9-pounder and 12-pounder medium, 168 to 1. So that, taking the guns really effective for all purposes, the weights of brass and iron ordnance are nearly proportional to their respective tenacities. In the Spanish guns, however, the weights of the garrison and siege guns of bronze are as great in proportion to the ball as our iron guns—a striking illustration of the necessity, with the present system of carriage, of retaining a due weight for the gun. In addition to the bearing of the effective action of the powder, &c., on the length of the gun, as before explained, it is well to bear in mind that there is a minimum limit in respect to those guns intended to fire through embrasures, as it is necessary that the muzzle should enter at least 2 feet into the embrasure to prevent its rapid destruction by the concussion consequent upon the discharge. If, then, the trunnions be placed at $\frac{4}{7}$ths of the whole length of the gun from the muzzle, and the radius of the wheel of the travelling carriage be 2 feet 6 inches, the minimum length is given by this simple equation, $\frac{4}{7}$ths $x-2$ feet 6 inches $=2$; or $x=7$ feet $10\frac{1}{2}$ inches. So that 8 feet may be taken as the minimum in this respect.

Preponderance.—If the axis of the trunnions of a gun were fixed in the line passing through its centre of gravity, great instability would be the result, and consequent uncertainty of fire, as the shock of the ball against the bore would be sufficient to disturb its equilibrium; and the ball would be liable to disturbance, even before firing, from many accidental causes, when the front of the gun could be so easily moved vertically. The weight of metal, therefore, behind the trunnions always exceeds that before, and this excess is called "preponderance." In the Spanish ordnance this excess in garrison and siege guns is $\frac{1}{17}$th; in field guns, $\frac{1}{12}$th; and $\frac{1}{7}$th or $\frac{1}{8}$th in howitzers, excepting the mountain howitzer, in which it is about $\frac{1}{10}$th of the weight of the whole piece. Piobert gives the preponderance in the heavier guns as 8 or 9 times the weight of the projectile; in field guns as 12 to 13 times; and in howitzers as 6 to $7\frac{1}{2}$ times that weight. Tinmerhans deduces from general practice a preponderance varying from $\frac{5}{100}$ths to $\frac{12}{100}$ths of the weight of the gun. In the British artillery the preponderance is very various, being $\frac{1}{14}$th, $\frac{1}{13}$th, $\frac{1}{12}$th, $\frac{1}{11}$th, $\frac{1}{10}$th, $\frac{1}{9}$th, $\frac{1}{8}$th, $\frac{1}{7}$th—the result in some measure of the great number of pieces of the same calibre, though it is evident that it ought to be reduced in most cases, as excess of preponderance in heavy guns greatly increases the labour of adjustment. The position also of the axis of the trunnions is, as represented by the circles on the figures of Plate II., below the axis of the gun, a position which causes a rotation on the trunnion, and hence a pressure upon the elevating screw, which is useful also in securing steadiness.

MANAGEMENT OF GUNS.

Laying a gun includes two operations—pointing and elevating. By pointing is understood the placing it in such a position that the axis of the piece shall be exactly in the vertical plane passing through the object aimed at; and by elevating a gun is understood the placing it at such an angle above the horizontal line as will counteract the force of gravity, and thus cause the ball to strike the object aimed at. When a gun is both pointed and elevated, it is said to be laid. The line-of-metal is a visual line extending from the summit of the base-ring to the swell of the muzzle. Its position is ascertained by placing the trunnions perfectly horizontal, and then finding the highest point both on the base-ring and the swell of the muzzle, when the line joining those two points will be the line-of-metal. But in consequence of the conical shape of guns, this line has an inclination to the axis of from one to two or more degrees, which is called the dispart. In pointing a gun, the line-of-metal is first laid in a line with the object; then, if the trunnions are horizontal, the axis of the piece and object will be in the same vertical plane; but if the trunnions are not perfectly so, the continuation of the line-of-metal will cross that of the axis of the piece, and the shot will be thrown to that side of the object on which the lowest trunnion is. As the axis of the gun would not be in the same horizontal plane as the object when the gun had been pointed by the line-of-metal, but elevated above it by the angle of dispart, a dispart sight is placed either on the muzzle, or, according to General Millar's plan—which is now universally adopted in heavy guns—on the second reinforce; so that the visual line becomes parallel to the axis of the gun, and when laid point-blank, however much one trunnion may be lower than the other, the shot cannot be thrown more than the thickness of metal to the right or left; but when elevated it is subject to the error pointed out. A gun is said to be point-blank when the axis of the piece is in a line with the object fired at, without having any elevation or depression, or when the axis is parallel to the horizon; it is desirable also that the platform should, if possible, be laid horizontal. The elevation required to strike any object is found by ascertaining its distance. For this purpose sets of tables have been constructed from actual practice (see Tables at the end), by reference to which the different sorts of shot and shells may be projected with the greatest accuracy.

A scale made of brass, and called a tangent scale, in French, hausse, being marked with the different lengths of the tangents for the several degrees, slides up and down in the breech. By means of this the elevation may be given without any reference to the difference between the level of the gun and the object fired at, and it may be elevated and pointed at the same time. In guns which have disparts, the tangent scale only comes into use at a greater angle than that of the dispart of the gun. Degrees are therefore marked upon the base-ring, beginning at the quarter sight, by means of which the gun may be elevated at any less angle than that of the dispart.

The ·21 of an inch is the tangent of one degree to every foot of the gun's length, from the base-ring to the swell of the muzzle; and therefore, if the distance in feet between those two points, or between the base ring and the sight, be multiplied by ·21, the product will be the tangent of 1° in inches, which, when the dispart is subtracted from it, will give the length of the tangent scale above the base-ring at one degree of elevation for that particular gun, or when the dispart exceeds the tangent of 1°, and is subtracted from the natural tangent of 2° on the scale, the length of the scale at 2°: when, however, a middle sight is used, the elevation can of course be given by the tangent scale from 0° upwards to about 5°. If the scale be applied to the quarter sight of the gun, of course the dispart need not be subtracted.

Elevating guns at sea has always been attended with difficulty and uncertainty. To effect this, the following method has been proposed:—Let the trunnion of a gun be divided by lines passing through its centre, parallel and perpendicular to the axis of the piece, and the lower limb be divided into degrees, &c.; a plumb suspended from the centre of the trunnion will cut the degree of elevation or depression the gun is pointed at, which of course is always varying, from the motion of the ship. If the axis of the piece, therefore, be parallel with the deck, the degree of the inclination of the deck and gun will at the same time be ascertained, and the gun will be fired at the moment when the plumb-line cuts the proper degree marked upon the lower ring of the trunnion. Great accuracy may thus be attained at sea.

A scale has of late years been sometimes used for iron guns, marked with the number of yards range instead of degrees; and this has been found very useful to men who might not perhaps understand the tangent scale. It would unquestionably be very useful to mark approximately on the tangent scale opposite the degrees the number of hundred yards of range;—thus, for example, in the 9-pounder, $1^\circ=4$, $2^\circ=5$, &c.; and in the 24-pounder, of 50 cwt., $1^\circ=7\frac{1}{2}$, $2^\circ=11\frac{1}{4}$, $3^\circ=14\frac{1}{4}$, $4^\circ=16\frac{1}{2}$, $5^\circ=18\frac{1}{2}$ hundreds, &c.; and this is indeed the more necessary where there are several varieties of the same gun differing as to length from each other, as it becomes almost impossible to commit to memory the ranges corresponding to the elevation in each species; and great loss of time, and chance of confusion, would be avoided by thus avoiding the necessity of a reference to printed tables of ranges in the field. In marking the tangent scale, regard should be had to the mean rise of the ball on leaving the gun, referred to in treating of deviations, or else allowance should be made for it. Another mode occasionally used by the French is by the depression of the breech, and is thus effected: A line being drawn through the centre of the trunnion to the extremity of the button of the cascabel, the length of this line becomes a radius for determining the lengths of the natural tangents corresponding to the degrees of a new tangent scale; and these being marked on a long rule, the zero point being the point of contact of the rule and button, when the rule is resting on the platform, and the axis of the piece is horizontal, and the degrees or tangents being numbered from 0° downwards—a very convenient mode when in night-firing at a breach, for example, it is only necessary to secure the elevation. It may be here observed, that by using the middle sight in our iron guns, it becomes impossible to use the angle of dispart. This might be avoided by perforating the sight, and thus enabling the gunner to use the angle of natural aim, which angle, with its corresponding range, ought to be marked on each gun.

Another method, when it is required to fire continually at the same object—for instance, a breach—is, after discharging a few rounds, to observe some object which the gun points to when at the proper elevation, and always point at that object. This is called pointing at a false object.

The modes of pointing and elevating here described are used in guns, howitzers, and carronades. In respect to the first of these it will be observed, that since Colonel Paixhans proposed his *canons à bombes*, the tendency has been to return back to guns of large calibre, for a long time almost abandoned, and only partially revived in carronades; and this change is unquestionably one of great importance to the defence, and will be equally so to the attack, when the difficulty of transporting such heavy weights has been in some degree overcome. In our service at present the heaviest solid shot proposed to be used is that of 68 lbs., and there are three varieties of it, as shown by the table, of which perhaps the 112 cwt. and the 95 cwt. (or Dundas gun) are the best; but for throwing hollow shot—differing from shells by being cast concentric—or shells, there is a 10-inch as well as an 8-inch gun, these guns corresponding in their object with the canon-obusier of the French. Plate II., fig. 1, represents the 68-pounder, and fig. 2 the 8-inch gun—a shell gun, as it is commonly called, the length and weight being greatly inferior to the 68-pounder, though nearly of the same calibre. The shell guns are admirably fitted for coast batteries, as their moderate weight renders them more easily manageable than the 68-pounder, whilst the magnitude of their calibre, whether hollow shot or shells be used, renders their fire very destructive to ships. It is to be observed also, that in coast batteries space alone requires consideration; whilst in ships weight is an equally essential element, as a vessel which could carry on her broadside only eleven 8-inch guns, might be armed with fourteen 32-pounders; and as Sir Howard Douglas therefore reasons, the magnitude of the fractures being taken as the squares of the diameters, or as 704 to 506, whilst the number of shots will be as 11 to 14, the actual spaces opened or fractured will be as 7744 to 7084, or considerably in favour of the 8-inch gun; but, on the other hand, the fire of the 32-pounder would be spread over a much larger space, and be more destructive as to the men; so that it is probable Sir Howard is justified in considering that the greater number of shots from the 32-pounders more than counterbalances the greater space of fracture from the fire of the 8-inch guns. Another reason which induces Sir Howard to object to the too exclusive arming of ships with 8-inch guns is, that the 32-pounders may commence double-shotting at 400 yards; whereas the 8-inch guns cannot commence effective firing with two shots at a greater distance than 200 yards; so that between 400 and 200 yards the 32-pounder armament would have the advantage. On land, however, the number of guns would be the same in either case; and the 8-inch gun, mounted on the dwarf-traversing platform (Plate III., fig. 1), is deservedly a favourite, being associated either with the 68-pounder for longer ranges, or with the 32-pounder. (Plate II., fig. 3.) It will be observed that the shell guns (fig. 2) are *chambered* on the Gomer principle; but this system of construction will be further noticed in treating of howitzers. For field batteries the favourite brass gun of our service is the 9-pounder (Plate II., fig. 4, and Plate III., fig. 7), but these are associated with the 24-pounder brass howitzer (Plate II., fig. 7); so that in the same battery two different calibres are in use, and consequently two different classes of ammunition. The present Emperor of the French has done away with this complex construction of batteries, and has adopted one form of gun—namely, the 12-pounder howitzer gun—fitted for discharging three kinds of projectiles—namely, solid shot, shells, and case shot, and thus requiring only one form of carriage. The principles upon which this great simplification has been adopted have been described by Captain Favé of the French artillery, whose work has been well translated by Captain Hamilton Cox of the Royal Artillery. They are the principles frequently referred to in the preceding pages—namely, that though a greater initial velocity may be obtained by a greater charge, the resistance of the air so rapidly diminishes high initial velocities, that the ultimate ranges and the ultimate momentum are very little superior to those obtained from a considerably less initial velocity. This is illustrated by a reference to Piobert's tables, by which it appears that a 12-pounder, discharged with a velocity of 1610 feet per second, corresponding to a charge of $\frac{1}{3}$d the weight of the ball, retained a velocity of 1516 at a distance of 164 feet, having therefore lost in that short space a velocity of 94 feet per second; whilst, by experiments made at Metz in 1836 and 1840, a 12-pounder shot, fired with a charge of $\frac{1}{4}$th, had an initial velocity of 1516 feet per second; so that the ball propelled with a charge equal to $\frac{1}{4}$th the weight of the ball on leaving the gun was much in the same condition as to velocity as the ball propelled with $\frac{1}{3}$d at 164 feet from it—the two trajectories from these respective points being the same. It is indeed only where great momentum is required at a short distance from the gun that great charges become effective; and for the purposes of field guns there seems great strength in the reasonings which have led to the adoption of the 12-pounder howitzer gun by the French, as, in addition to what has been stated, a French battery is equally effective when called upon to fire shot, shell, or case; whereas, in the compound British battery, the howitzers are so much deducted from its strength when solid shot firing is required; and, in like manner, the guns are a loss when howitzer firing becomes the most valuable. The calibre of a 9-pounder would be too small for fulfilling all the purposes of shot and shell; and hence the French have wisely adopted the 12-pounder, and might perhaps have gone even higher in calibre, reducing the weight of their gun by a corresponding reduction in the weight of the charge.

Howitzers.—This form of ordnance is of later date than the mortar, which will be presently noticed, and was designed for the purpose of firing shells in the field, for which object it was necessary that it should be mounted upon a carriage, so that it combines in itself the functions of the gun and mortar. As the charges for the service required from howitzers are small, so are their comparative weight; for example, whilst the 24-pounder gun of 18$\frac{1}{2}$ calibres weighs 48 cwt., and is charged with 8 lbs. of powder, the 24-pounder howitzer weighs only 12$\frac{1}{2}$ cwt., and is charged with only 2$\frac{1}{2}$ lbs. of powder; and in like manner, whilst the 8-inch shell gun of 13 calibres weighs 65 cwt., the 8-inch howitzer weighs only 20 cwt. The use of such small charges renders it necessary to adopt chambers—that is to say, spaces either entirely or in part of less diameter than the bore itself, as the small cartridge containing the charge could not be so placed in a large bore as to prevent great irregularities in the relative position of the cartridge and ball. Chambers of various forms have been at different times contrived; and, according to the principles adopted by Piobert, their relative values may be thus stated, taking into account the position of the vent, or of the point of the charge at which the inflammation is first set on foot;—1st, Spherical, conical, or pyramidal, when the vent communicates with the surface of the first and base of the two last, and the truncoconical ranks with these when fired at its *greater* base. 2d, Cylindrical, when fired by the lateral surface. 3d, Cylindrical, when fired from either base. 4th, Trunco-conical, when fired from its *lesser* base. 5th, The spherical, conical, or pyramidal, when fired at the exact centre of the first or vertices of the other two: or, merely classifying the forms in general use—1st, spherical; 2d, cylindrical; 3d, trunco-conical. The Gomer form in which the truncated cone is terminated by a spherical end, is that used in the howitzers (Plate II., fig. 6), and the mortar (Plate II., fig. 9), as well as in the shell-gun. In the carronade (fig. 5) the chamber is cylindrical, being terminated by a spherical end; and such was its form in the great Antwerp mortar (fig. 10). It may also be added, that by adopting a chamber a greater thickness of metal is obtained around the charge in ordnance which are comparatively thin from their lightness. Experiments were made in France at Strasburg, Douay, and Toulouse, to ascertain whether the lodgment in the bore produced by the pressure of the gases on the ball, an important consideration in brass guns, could be lessened or obviated by a peculiar position of the vent. One was placed in the prolongation of the axis, the cascabel being suppressed so as to fire the charge in the centre of its extreme end; the second in a line, making an angle of 30°, with the vertical drawn from the extremity of the axis, and the third in the usual way. The destructive effect of the charge in producing a depression in the bore was found to be nearly in the proportion of 6 to 1 as regards the two first and the last, the difference between the two first being very small. Experiments were also made in France in 1817 to determine the best position of the touch-hole, or vent, of muskets, as regards the charge, the musket being suspended as a pendulum, and the ball being discharged against a ballistic pendulum; but the results, though exhibiting a maximum effect of the ball at a position of the vent corresponding to a distance of one line in front of the bottom of the charge, were so nearly equal to it in several other positions that they would not justify the peculiar selection of any one, unless dictated by convenience in other respects. In artillery it is only necessary to arrange it in a position which will ensure the ready conveyance of fire to the charge, and it is therefore usual to form the vent at an angle of 15° with a vertical from the axis, and terminating at two or three lines in advance of the bottom of the charge—this slight inclination facilitating the breaking of the cartridge by the pricker, which might otherwise slip between the cartridge and the bore.

Howitzers were, according to Senderos, first made in Germany, and subsequently improved by the English and Dutch, but were not used in France till a later period, as they did not appear in the ordinance of 1732, though afterwards adopted and introduced in the celebrated system of Gribeauval. In the British service the 12-pounder howitzer is associated with the 6-pounder gun in the horse artillery, the 24-pounder with the 9-pounder gun in the field batteries, and the 32-pounder may be associated either with the 12-pounder gun in the reserve for positions, or with the 18-pounder guns, should a brass gun of that calibre be adopted in our field service, as it has long been in that of Austria. The 10-inch howitzer (Plate II., fig. 6), and the 8-inch are used in sieges; and the small howitzer (fig. 8), analogous to the Coehorn mortar, for mountain service.

Carronades.—The carronade, invented, or rather improved, by Mr Gascoigne, was, in June 1779, approved as a standard navy-gun, and ten of them were appointed to be added to every ship of war. The carronade is made so short that it is worked with its carriage in the ship's port. (See Plate II., fig. 12.) It is correctly bored; and the shot so nearly fills the calibre that the *least possible* impulse of the powder is lost by the escape of gas between the cylinder and the shot, which last is also thereby more truly directed in its flight. The bottom of the cylinder is terminated by a chamber ending in a hemisphere, to which the end of the cartridge is not liable to stick, and in which the smallest charge of powder envelopes the shot, exhausting upon it nearly the whole of its impelling force. There are sights cast upon the vent and muzzle, to point the gun quickly to an object at 250 and 500 yards distance; and there is a ring cast upon the cascabel, through which the breechin-rope is reeved, the only rope used about these guns. This gun has some advantages over others of *light* construction. It is so extremely light, that the smallest ships can carry almost any weight of shot (the 12-pounder weighing under five hundredweight, and the other calibres in proportion), and that without being attended with the inconveniencies imputed generally to light guns, since it cannot injure its carriage, or jump out of its station in the port upon recoil; and it never becomes heated.

Though the carronade cannot throw its shot to an equal distance with a longer gun, yet, from the adaptation of the shot to its cylinder, with a charge one-twelfth part of the weight of its ball, at very small elevations, it will project its shot to triple the distance at which ships usually engage, with sufficient velocity for the greatest execution, and with all the accuracy in its direction that can be attained with guns of greater lengths; but it has its disadvantages, as for example, by adopting so small a windage, or difference between the diameters of the bore and shot, a windage which would have been impracticable in long guns, it often happened that the shot, although fitted for the long guns, when rusted would not enter the carronades; and the advantage, therefore, consequent on less windage ought not to exist, as the windage of guns and carronades should be the same, being reduced as much as possible, consistent with facility of loading and the use of hot shot; the windage in iron guns need not, indeed, exceed ·15 inch, and Sir Howard Douglas recommends ·14 inch for heavy guns, and ·1 inch or ·11 inch for the 9-pounder downwards. And further, carronades are liable in some positions to fire the rigging or the hammocks either by the flash or by the vent fire, an evil which might be remedied, as Sir Howard Douglas suggests, by giving the 24 and 32-pounder carronades a somewhat longer bore, and adding " something to the flash-rim."

The serious results of the too general adoption of carronades in our ships of war during the last American War on the Lakes, where the Americans obtained such great advantage by the use of their long and heavy guns, fully justify Sir Howard Douglas in his final remarks on this description of ordnance:—" The defects of carronades, and the danger of employing this imperfect ordnance, are now generally felt and admitted; that ordnance, however, rendered important service in its time, for it taught us practically the great value of a reduced windage, the advantages of quick firing, and the powerful effects produced at close quarters by shot of considerable diameter striking a ship's side with moderate velocity;" and these remarks are in some measure applicable, though in a minor degree, to the bored-up guns, in which it has been attempted to obtain increased calibre with diminished weight by *reaming* or boring out guns of originally lesser calibre, as may be seen on inspection of the table of iron ordnance.

The fire of artillery may be divided into two classes—*horizontal* (or at angles near the horizon), and *vertical. Horizontal fire* may be subdivided into *horizontal direct*, and *enfilade. Direct fire* is that used in the field or at sieges, where the gun is discharged directly at the object with a full charge. The *enfilade fire* is that which is not directed against the front of a line but along its prolongation, and the most important form of it is the *ricochet fire*, which is not confined to any particular charge or elevation; each must vary according to the distance and level of the object to be fired at, and particularly the spot on which it is intended it shall make the first bound. Firing *en ricochet* was first invented by Marshal Vauban, at the siege of Ath; and it is principally used in sieges for enfilading the face of a work, by sweeping or bounding along it. *Vertical fire* is that which is thrown from mortars at elevated angles. It was much used at the siege of the citadel of Antwerp in 1832; still more, perhaps, at the late siege and defence of Sevastopol, and became the principal fire at the attack on Sveaborg. Coehorn, who was opposed to Vauban, the author of ricochet fire, was a great advocate of vertical fire, as was also Carnot.

Mortars.—Mortars have succeeded to the ancient bombards, and were at first intended for discharging either one very large ball of stone or a shower of smaller stones. As they are now intended for the projection of shells only, they are designated, not by the weight of the hollow projectile, which is subject to considerable variation, but by its diameter in inches, as 13-inch, 10-inch, 8-inch iron mortars, and 5½-inch and 4⅖-inch brass mortars, of the British Service—the 5½ being also called the " Royal," and the 4⅖ the Coehorn, having been invented by that celebrated engineer, and intended to be used against "sap-heads;" and, indeed, from its portability, to be carried to any point, either in the defences of the place or in the trenches, from which the nearest portions of the approaches, or of the counter-approaches of the enemy could be most efficiently molested. (See Plate II., fig. 11.) The projectile used is the shell or "bombe" of the French, which is thickened at the end next the powder, or at the point of greatest shock, and also about the hole in the shell intended to receive the fuze, or, in the earlier periods of artillery, the match for igniting the bursting powder. It is also provided with loops to facilitate the operation of lifting and placing it in the mortar, in which respect, as well as in having the " culot," or thickening at the bottom, it differs from the " obus," or howitzer shell of the French. The object is twofold; first, as a simple projectile, in which character it acts by the explosion of the bursting powder within, which shatters the shell, and causes its splinters to fly about and act as so many distinct projectiles; and, second, as a mine. In the first case, only that quantity of powder necessary for explosion need be carried, but in the second, the effects depend on the quantity, and hence it is that in a previous article the advantage of very large shells has been strongly urged. The difficulty of constructing mortars for propelling very large shells is undoubtedly very great; but should Mr Mallett succeed with his proposed 36-inch mortar, formed of flat rings bound together by longitudinal bars of wrought iron, the problem will be solved, and the effect of the explosion of 480 pounds of powder, sunk deep into the ground, or penetrating, by the weight—probably 3000 lbs.—of the charged shell through the roof of a magazine or casemate, may readily be conceived. The weight of this mortar and its bed will be 45 tons, and the weight of the heaviest piece when asunder about 15 tons. Mr Mallett is sanguine as to its success. See CANNON for examples of the former use of wrought iron in the manufacture of ordnance in France and Spain, both at remote and recent epochs; the St Etienne Company having submitted an 8-pounder to the most severe trials, and offered, in 1813, to supply the government with 24-pounders of forged iron at the rate of eight per diem.

The mortar is made much shorter than guns, in order to facilitate loading (see Pl. II., fig. 9). It is chambered conically, or on Gomer's construction, so that the shell fits into the chamber, and does away with windage, an advantage which cannot be fully secured by that form of chamber in guns or howitzers fired horizontally, or nearly so. The great Antwerp mortar (fig. 10) had a cylindrical chamber, but it was only partially successful from the defects in the casting of its shells (fig. 17). Senderos states that the art of projecting shells was a happy invention of the latter end of the fifteenth century, and that the difficulty which first attended it, as well as the amount of subsequent improvements, may be judged by the fact that the celebrated artillerist Don Antonio Gonzales, for a long time afterwards, deemed it necessary to set fire to the charge and to the fuze of the shell *separately*, which was called serving it with two fires, a tedious and dangerous process. Until lately it was usual in loading the mortars to lift up the heavy shells by means of handles provided with hooks adapted to seize upon the loops of the shell; and with such weighty masses as the 13-inch shell, the firing could only be slow and gradual, which, after all, must always be the most effective fire. It is now customary to use a "derrick," as in Pl. II. fig. 14, for this purpose; this simple form being that of Sergeant Forrest, Royal Artillery, represented here as in use, but drawn back when not in use. The navy use also mechanical means, and in consequence the firing against Sveaborg was so rapid and continuous that many of the mortars were destroyed by it. Fig. 13, Pl. II., represents also another modern arrangement, namely, the suspension of the large sea mortar, according to the plan of Captain Julius Roberts of the Royal Marine Artillery. The figure explains that by the rotation of the circular platform below, ready means are obtained of pointing the mortar in any direction; and as the mortar revolves round the horizontal axis on firing, it is hoped that the ill effects of recoil will be avoided. In anticipating the results of this arrangement it must be remembered that as the mortar is at an angle of 45°, one half of its momentum will be expended in the direction of recoil, and that the other half must act with a most powerful shock on the axis. Some were tried in the Baltic, but the results are not yet conclusive, though several new mortar-boats are fitting with them.

The moment of bursting is regulated by the fuze fixed into it, as seen in figs. 15, 16, and 17, Pl. II. Fuzes may be either concussive, percussive, or time fuzes. The object of the two first is to cause the shell to burst immediately on striking an object; of the latter, to cause it to burst after a certain time, as determined by the length of the burning composition in the fuze. The concussive fuze is provided with an internal mechanism, so adjusted that though it resists the shock of firing, or even that of a short graze, it shall yield to the shock of impact, the concussion shaking the burning composition into the loaded cavity of the shell, and causing it to explode. The percussion fuze or shell depends for its explosion on a chemical composition of highly explosive character, which bursts the shell at the moment of striking, without being previously ignited. Captain Moorsom's percussion fuze is well known as the British type of this class of fuze, just as Captain Boxer's now is of the time-fuze. The time-fuze is divided into metal and wooden fuzes, the former being used in the navy, and regulated to burn according to the specific use, 20″, 7″, and 2″; the object of percussion or concussion fuzes being to replace especially these short-timed fuzes. The wooden fuze now so admirably constructed by Captain Boxer, and which has so entirely replaced the old fuzes, which required to be *cut* in the field to the proper length, has been figured and explained in art. Artillery. The composition-bore is now made eccentric, so as to allow more thickness for the *two* powder channels. Two rows of holes are made, one into each powder channel, the bottom hole in each row being continued into the composition-bore—each hole of one row, corresponding to the centre of the space between a pair of holes of the other, admitting therefore of subdivision without too much weakening the fuze by bringing the holes of one row close together. By a simple boring-bit a communication between any one hole required for the special length or range, and the composition of the bore, is readily made. The fire, therefore, is communicated from the composition of the fuze, when it has burnt down to this perforation, to the rifle powder in the powder channel: see Artillery for further explanation: and it may be observed that Captain Boxer has since extended the principle, with the necessary modification, to fuzes for mortars.

As mortars are not fired through embrasures but behind epaulements, they are directed by pointing rods, placed in the proper line upon the epaulement; the mortar being brought into line with them by means of a plumb-line held by a gunner standing behind the mortar, on which the line of metal has been marked, the line being placed in the vertical plane passing through the two pointers. Other modes of pointing both guns and mortars will doubtless be hereafter introduced, as the great improvement of artillery practice at long ranges will require the use of telescopic sights, and the introduction of the collimating principle, a fact which has not escaped the attention of artillery officers. The elevation is given by the gunners' quadrant.

Besides the ordinary projectiles, shot and shells, grape and case shot are fired from guns; the first being a number of balls tied or quilted together like a bunch of grapes, and the other a cylindrical tin case filled with balls. They are not calculated for long ranges, but are very destructive at short ranges from 200 to 400 yards either against advancing troops, or fired from the flanking defences of a fortress along the ditch. The Shrapnel shell, or spherical case, is, however, a projectile of still greater value, as it can now be used at almost any range. They can be fired from either gun, howitzer, or mortar; but the object is to fire them from the two first, as, on bursting, the balls which fill them fly forwards with the then velocity of the shell, and being spread by the resistance of the air, deal out destruction equivalent to the action of many muskets in addition to that effected by the splinters of the shell. The practice of putting balls into shells, in addition to the bursting powder, is by no means modern; for Lucar (1588), after explaining the mode of charging shells, and causing them to burst by means of a piece of gunner's match fixed in the match or fuze hole, says—

> "Also you may, if you will, put into the saide hollow baule or pellet certaine square or rounde pieces of lead, or divers shorte pypes of iron like unto *pocked dogges full charged with gunpowder and pellettes*, and fill up the rest of the concavatie with fine gunpowder, and having *annointed* it with turpentine, and roled it in fine gunpowder, shoote it out of a peece of artillery, with a trayne laid to the mouth."

This was in every respect a Shrapnel shell, the mode of firing being consequent upon the early idea that the fuze required to be separately ignited. Shrapnel, however, revived this forgotten projectile, and by giving it an effective form, became its second inventor; as Captain Boxer may now be considered its third, as by the total separation of the balls from the bursting charge, he has done away with the failures by premature bursting consequent on the ignition of the powder by friction against the balls, and rendered it possible to use it with high charges, and for all ranges—the Shrapnel still becoming the true counterpoise to the improved Minié rifle ball, and restoring to artillery its superiority over musketry. Carcasses, or shells filled with a highly inflammable composition which escapes in several directions through the holes (3 or 4) made in them for that purpose, may be fired from mortars or guns: they are also a very old invention.

Rockets.—The history, principle, and possible importance of these projectiles have been fully discussed in art. Artillery, where it was shown that almost every country but that of Congreve, who had first introduced into modern Europe war rockets, had paid great attention to their improvement. In France also they have latterly been much improved; and it has been found possible to use a *short* stick instead of the long one seen in Pl. II., fig. 19. In our own arsenal also, the subject has been taken in hand by Captain Boxer, and mechanical means adopted for insuring precision in the bore, and in the position and form of the vent with every prospect of success. But with every respect for these laudable and skilful efforts, it would be unjust to deny to Mr Hale the merit of having first in this country invented machinery of a most beautiful description for the manufacture of rockets, and for doing away with the stick entirely. Mr Hale's contrivance consists in causing the rocket to rotate on its axis during its flight; and, as in the case of an elongated shot, to move steadily with the point foremost. For this purpose the burning material issues from five orifices made near the neck, obliquely to the axis of the tube, the effect of which is, that the body of the rocket is made to rotate when it is also propelled. Sir Howard Douglas adds to his description of these rockets that the contrivance is very ingenious, and may be expected to produce advantageous results. He, however, adds that, at low angles, they had been found liable to failure, being subject, on a graze, to be deflected from their original direction much more than ordinary rockets, and that unless this cause of failure could be removed they would be of little use against troops in the field, that is to say, in horizontal firing or plane battle-fields. He also observes, that "in other respects also the success of the Hale rocket may be doubted; the stick rocket continues its flight, directed by the stick, after the composition is burnt out; but the Hale rocket loses its directing power as soon as the composition is consumed, because the rotation then ceases, and nothing can be expected from the rocket beyond the distance it has reached when the composition ceases to burn" (which is sooner than in the common rocket, as the composition is more powerful). This objection, however, does not appear well founded, as the object of giving a sufficiently rapid rotation has been effected before the composition *has been burnt out*, and the rotation then continues as in any other rotating projectiles. Mr Hale also promises to realize Congreve's anticipations, by throwing up bundles of rockets hooped together and rotating in mass, to the amount of 400 lbs. It is time that these inventions should be subjected to some decisive trial, and either adopted into the service, or, if found defective, rejected on sound and scientific reasons. The rocket stands of Mr Hale are most ingenious and effective, and strongly contrast with the rude apparatus figured in Pl. III., fig. 13,—the waggon for conveying them being represented in fig. 14.

In respect to the other figures of Pl. III., their names sufficiently explain their object—the two upper figures exhibiting the mode of firing over a high genouillère, or a low barbette, by means of a dwarf traversing platform; and the other of firing over a parapet by means of a high one; and this figure is represented of iron, as generally used in our colonies, and in times of peace—cast iron carriages being inadmissible in actual warfare, as they are so easily injured by shot, and are not repairable.

RANGES AND PENETRATION.

Before closing this article it is necessary to say a few words on these important points in practical gunnery, as, in fact, the main object of the science is to insure that the gunner shall so throw the shot or shells that they shall either strike or explode at some defined point, and also that the shot shall have force sufficient at that point to perform the work required from it,—as, for example, if the residual velocity of a Shrapnell shell were almost 0 at the time of its explosion, the balls would fall almost harmless on the ground, just as the balls would do when fired from a mortar, as proposed by Carnot (see FORTIFICATION). The trajectory of a projectile would be *in vacuo*, as before stated, a parabola, and therefore easy of computation, supposing the initial velocity known. As, however, all military projectiles are projected in the air, and are resisted in their motion by that elastic fluid, the trajectory is not a parabola; and that simple theory can only in rare cases be applied to practice, or in cases where the velocity is less than 300 feet per second. It is, however, necessary for the clear understanding of the phenomena of projectiles to know at least the formulæ which represent the results of the parabolic theory, and they are therefore given as follows:—

Let V be the initial velocity in the direction of projection;
ϕ the angle of projection above the horizontal plane;
x and y the horizontal and vertical co-ordinates to the curve of the trajectory at any point P, estimated from the commencement of the curve, or point of departure as the origin;
t the time of flight to that point, v the horizontal velocity at it, and v' the velocity in a vertical direction;
θ the angle of inclination of the tangent at that point with the horizon;
X the whole horizontal range, or horizontal co-ordinate, when y becomes again 0 as it was on departure;
Y the greatest height of ascent, or when y is a maximum;
T the whole time of flight;
H the height, falling from which a body would acquire a velocity equal to V.

$x = \mathrm{V}t \cos\phi,\ y = x \tan\phi - \dfrac{x^2}{4\,\mathrm{H}\cos^2\phi}$;

$t = \dfrac{x}{\mathrm{V}\cos\phi}$; $\mathrm{V}^2 = 2\,g\mathrm{H}$, or $\mathrm{V} = \sqrt{2\,g\mathrm{H}}$, g being the velocity acquired in falling through 1 second by the force of gravity (32·2 feet nearly).

$\mathrm{X} = 4\,\mathrm{H}\sin\phi\cos\phi$; $\mathrm{Y} = \mathrm{H}\sin^2\phi$;

and as $v = \dfrac{dx}{dt} = \mathrm{V}\cos\phi$, which is constant, it is evident that v, or the horizontal velocity at every point of the curve is constant; $v' = \mathrm{V}\sin\phi - gt$, and the velocity in the direction of the curve $= \sqrt{v^2 + (v')^2} = \sqrt{\mathrm{V}^2 - 2\,\mathrm{V}gt\sin\phi + g^2t^2}$, or $= \dfrac{\mathrm{V}\cos\phi}{\cos\theta}$.

$\mathrm{T} = \dfrac{4\,\mathrm{H}\sin\phi}{\mathrm{V}}$, or $= \sin\phi\sqrt{\dfrac{8\,\mathrm{H}}{g}}$. Since $\cos\phi\sin\phi$ is the same for any given angle and its complement, it is evident that there are two angles of elevation, ϕ and $90° - \phi$, which with the same initial velocity give the same range. The elevation remaining the same, the horizontal ranges being $= 4\,\mathrm{H}\sin\varphi\cos\varphi = 2\,\mathrm{H}\sin 2\,\varphi$, it is evident that the initial velocities, or H, remaining the same, those ranges vary with $\sin 2\,\varphi$, and such range is therefore the greatest when $\sin 2\,\varphi$ is greatest, or when φ is 45°.

As the influence of the resistance of the air in modifying the motions of a projectile is less in proportion as the projectiles are greater, the true range of a musket, as compared to the theoretic, being 1 to 18, with field and siege guns the range *in vacuo* exceeds that in the air, as 3·05, 2·80, 2·69, 2·47 to 1 respectively, the proportion diminishing as the projectiles become greater; so that it might be reasonably anticipated, that with still heavier and larger projectiles, whether shot or shells, the approximation of the real range to the theoretical one, on the parabolic theory, would be still closer; but unfortunately there is here a difficulty, as the initial velocity of shells fired from mortars at high angles has not yet been determined experimentally, and the ranges therefore cannot be satisfactorily calculated. Supposing, however, the ranges observed, the times of flight may be calculated, and compared with the same times observed, and this has been done in France with the 8½ and 11-inch mortars. In the 8½ inch, fired at 45°, the ranges being 375, 688, 1254, 1960 yards respectively (the charges varying from ½ lb. to 2⅙ lbs.), the differences in time were 1″·4, 1″·6, 0″·7, 1″·6. In the 11-inch fired at the same angle, the ranges being 505, 803, 1238, 1701, 1922 yards, and the charges varying from 1 lb. to 3½ lbs., the differences in time are 1″·3, 1″·5, 1″·8, 2″·2, 4″·1, or between $\frac{1}{10}$th and an $\frac{1}{8}$th of the whole time, excepting in the last case, where it amounts to about $\frac{1}{6}$th. When fired at an angle of 30°, the difference in the times vary from $\frac{1}{13}$th to $\frac{1}{7}$th of the whole times, the time observed always exceeding the time calculated; the retardation being due to the resistance of the air. In the case, therefore, of shells, the movement approximates much more closely to the parabolic motions than in either cannon or musket balls. The velocity indeed of the 11-inch deduced from the range and theoretic time, would be about 435 feet per second; and Griffiths gives 500 feet as the velocity of the 10-inch fired with 3 lbs. charge.

These examples taken from Didion, prove that a limited use may be made of the parabolic theory in respect to the motion of shells when fired with such moderate velocities; but it is totally inapplicable to the case of guns; and the labours of the most able mathematicians have been applied to the solution of the difficult questions involved in the determination of the trajectory of the projectile in the air, when moving with such great velocities.

For elevations not exceeding 10°, Poisson's formula is—

$$y=x \tan \varphi - \frac{1}{8\,k^2h \cos^2 \varphi}\,(e^{2kx} - 2\,kx - 1);$$

x and y being the horizontal and vertical ordinates at any point of the curve, the origin being in the axis of the bore at the muzzle of the gun, ϕ the angular elevation of the gun, h the height due to the initial velocity of the shot, r its semi-diameter, $e=2·71828$ the base of the Napierian logarithms, and $k=\frac{q\delta}{r\delta}$, the co-efficient of the square of the velocity in the expression for the retardative force of the resistance of the air, δ being the density of the air or medium, δ' that of the shot, and q a fraction which must be determined by experiment, and which, though doubtful, may be assumed as 0·225. It can be simplified for small elevations and short ranges, by developing e^{2kx} in series, neglecting all above the fourth term, and substituting the result, when the formula becomes—

$$y=x \tan \varphi - \frac{x^2}{4\,h \cos^2 \varphi}\,(\tfrac{2}{3}\,kx+1);\ \text{or}$$

$$y=x \tan \varphi - \frac{gx^2}{2\,V^2 \cos^2 \varphi}\,(\tfrac{2}{3}\,kx+1);$$

V being the initial velocity.

Didion has given other formulæ of considerable simplicity, but as they require for their practical application the use of the tables of values of several co-efficients, which he has calculated and published in his admirable treatise already so frequently referred to, they will be better studied in that work.

In ranges corresponding to 1° of elevation, which in the larger natures would give about 700 yards, the cosine may be taken as equal to radius, or 1; and hence, as Captain Boxer points out, the equation becomes—

$$y=x \tan \varphi - \frac{x^2}{4\,h}\,(\tfrac{2}{3}\,kx+1).$$

The time of describing any portion of the trajectory is expressed by the equation $t=\frac{1}{k\sqrt{2\,gh} \cos \varphi}\,(e^{kx} - 1)$; and when X, or the *whole range*, is substituted for x, $t=T$, the whole time of flight.

Sir Howard Douglas also gives an empirical formula from the *Aide Mémoire Navale* for deducing the ranges of shot from the maximum range determined by experiment, the elevation being between 10° and 30°.

Let R represent the range at 30°, considered the maximum, then $X=R\,(\sin 3\,\phi)^{\frac{2}{3}}$.

It will be observed that in all these formulæ, and it must be so in every formula, everything depends on the accurate determination of the initial velocity, and a correct knowledge of the nature and amount of resistance opposed by the air to the motion of the projectile. The mode of determining the former experimentally has been already pointed out; but as it may be necessary to determine by calculation the initial velocity of one ball from the experimentally determined velocity of another, Piobert has proposed the following empirical formula:—

$$V=v\,\frac{\sqrt{\log\left(1+\frac{p}{W}\right)}}{\sqrt{\log\left(1+\frac{p}{w}\right)}};$$

V being the initial velocity sought of the ball whose weight is W, and v the experimentally determined velocity of the ball whose weight is w, the charge p being the same in each case. Major Mordecai, of the United States army, has found this rule to agree with his experiments when the charges do not exceed one-third of the weight of the ball, and the gun is at least 16 calibres in length, but does not consider it sufficiently accurate for higher charges. Taking $\frac{v}{\sqrt{\log\left(1+\frac{p}{w}\right)}}=M$ as a factor, Major Mordecai found that with a 32-pounder, the charge being one-third, and the windage 0·16 inch, M = 5200; with a 24-pounder, the charge being one-third, and the windage 0·14, M = 5400.

A British empirical formula is $V=1600\sqrt{\frac{ap}{w}}$; p being the charge, w the weight of the ball, and a a co-efficient depending on experiment, and varying, according to Hutton, with the length of the gun between 2·1 and 2·5, as also with the ratio of the weight of the charge to that of the shot. General Millar, by experiments in 1817, has also shown that it increases as the windages decrease, being 2·8 with a windage of 0·202 of an inch, and 3·55 with a windage of 0·075; whilst from experiments made at Deal in 1839, and on board the "Excellent" from 1837 to 1847, the mean values of a are 3·2 for a windage of 0·233; 3·4 for 0·2; 3·6 for 0·175; 4·4 for 0·125; and 5· for 0·09; and when the windage is 0, a becomes 6·66. The velocity, therefore, with a windage of only 0·125 being to that without windage as 1 to 1·23, the loss from that small windage being one-fifth nearly of the whole velocity, a convincing proof of the propriety of reducing the windage of all balls to that quantity which will admit their ready introduction, allow for the chance of rust, and for their expansion when used as hot shot, which in the largest balls is about $\frac{1}{70}$th of the calibre, or in an 8-inch shot, 0·114 of an inch; so that 0·15, proposed by Sir H. Douglas, would be amply sufficient. With carronades, in which the windage varied from 0·061 to 0·078, the mean value of a was 4·5.

The initial velocities and ranges being known by experiment, the co-efficient for the resistance of the air, may be obtained from the equation $k=\frac{3}{2}\cdot\frac{V^2 \sin 2\ \ -gx}{gx^2}$.

The velocity at known distances from the gun may be represented by $v=\frac{V}{e^{kx}}=Ve^{-kx}$; or, according to the formula of the French School at Metz, as quoted by Sir H. Douglas: $v=\frac{V}{(1+aV)\,e\gamma^{x}-aV}$. v the velocity at the point sought, V the initial velocity, and x the distance, or horizontal co-ordinate, being expressed in English feet, $a=0·0007$; γ varying with the nature of the shot, but in a 32-pounder is equal to 0·0001034; this formula being founded on the assumption that the resistance of the air is partly proportional to the square, and partly to the cube of the velocity.

The penetration of shot, the velocity at the point of contact having been determined by one or other of the above formulæ, may be thus represented: $P = \frac{2v^2r\delta}{3\rho g}$; P being the depth penetrated, v the velocity of the shot at the instant of striking, r the semi-diameter, δ the density of the shot, and $g = 32{\cdot}2$ feet, the force of gravity; ρ a co-efficient of resistance, to be determined by experiment on various substances.

When the resisting substance is the same, P varies as $rv^2\delta$, or when the density of the shot is the same as rv^2; the penetration in this case then varying as the diameter of the shot and the square of the velocity. From Poncelot's hypothesis that the resistance of a material struck by a shot is proportional to the square of the shot's diameter; and from the Gavre experiments, P, in respect to value, may be represented by this formula (Sir H. Douglas having modified it so as to represent P in English feet):—

$P = 4{\cdot}612\ rd \log\left\{1 + \frac{v^2}{1076696}\right\}$; d representing the specific gravity of the shot; water being 1. For firm earth this may be multiplied by 1·64; for sand and gravel, by 1·3; for loose earth, by 3·21; for sound masonry, by 0·41. In the previous formula the specific gravity may be also substituted for the density when it becomes $P = \frac{2v^2rd}{3\rho g^2}$, as $d = g\delta$.

Terminal Velocity.—When a body descends in air from a state of rest, its velocity increases for a time by the action of gravity upon it; but the resistance of the air *increases* as the velocity increases, and hence it must at length become equal to the accelerative force of gravity which is *constant*, after which the body will move uniformly with the velocity acquired, or with the *terminal velocity*, making therefore, $kv^2 = g$, $v^2 = \frac{r\delta g^2}{q\delta}$; or $v = \sqrt{\frac{r\delta g}{q\delta}}$; and with shells $v \sqrt{\frac{r\delta g}{1{\cdot}42qd}}$; the weight of a solid shot to that of a shell being as 1·42 to 1; q being $= 0{\cdot}225$, as before stated.

As the terminal velocities vary with the square roots of the diameter of the shot, the density being the same, and the terminal velocity of a shot 2 inches in diameter, as deduced from Hutton's tables, being 248 feet per second; that of a 24-pounder is 415·53, or

$$\sqrt{2} : \sqrt{5{\cdot}612} :: 248 : 415{\cdot}53;$$

and that of a shell of the same diameter would be

$$\frac{415{\cdot}53}{\sqrt{1{\cdot}42}} = 415{\cdot}53 \times 0{\cdot}8392 = 348{\cdot}71.$$

General Duchemin has given the following formulæ for the loss of velocity by windage: V being the initial velocity, V^- the velocity lost, s the diameter of the vent, C the calibre of the gun, C′ the calibre of the shot, $C - C' = C^-$ the windage, $\alpha = 3{\cdot}5$, a constant, and $\beta = 0^m{\cdot}182857$, a constant also of the same species as C and C′:—

$$V^- = V\left\{1 - \left(\frac{s}{\alpha C}\right)^{\frac{1}{2}} - \left(\frac{C^-}{\beta}\right)^{\frac{1}{2}}.\right.$$

In using this formula for English feet, it is only necessary to represent C, s, and C^- in decimals of a foot, and to make $\beta = 0{\cdot}599955$; or if these terms are given in inches, to make $\beta = 7{\cdot}199458$.

Duchemin has also given the following empirical formula for the charge of greatest effect—

$$M = \frac{34^{gr}{\cdot}0423}{(0^m{\cdot}0513)^3} C^3 \sqrt{a\delta}\ ; \quad a \text{ being} = \frac{b}{C}$$

or the number of times the calibre is contained in the length of the bore, and C and δ as before. This formula may be used for the charge in English weights and measures by using $0'{\cdot}1683$, or $2''{\cdot}0198$ instead of $0^m{\cdot}0513$, according as C is represented by a decimal of a foot, or in inches—and replacing $34^{gr}{\cdot}0423$ by its value 75·0973 in English pounds.

Many other usual formulæ might be extracted from various authors, but those given will be sufficient for the reader, and indeed for most purposes of general study. Those who desire to obtain a still more accurate knowledge of the dynamical theory of projectiles, should turn to the admirable work of Didion; and those who wish to know still more fully its bearing on the purposes of war, whether in our marine or land armaments, should read the excellent work of Sir Howard Douglas, now arrived at its third edition, which is unquestionably the best book on the subject in our language. The work of Captain Boxer (of which the first part only has as yet been published) preparing as a course book for the Royal Military Academy, is even now deserving a careful perusal, and will, when finished, render references to writers on foreign artillery unnecessary. Sir Howard Douglas was originally an officer of artillery, and has ever since retained a feeling for his first service, which has led him to apply the powers of a highly scientific mind towards its improvement. Captain Boxer is an officer of artillery, and now occupies his right position as a man of science at the head of the Royal Laboratory: let, indeed, the system now maintained by Lord Panmure of appointing to such posts only men of science be continued, and the Royal Artillery will soon supply officers fitted to fill the posts of its manufacturing establishments with honour, and thereby to advance the interests of their country.

Of other works I need only name the excellent Spanish treatise of Senderos, so often quoted in this essay.

Valuable, however, as the investigations of science always are, and essential also as they must be for perfecting the theory, and thereby also the practice of gunnery, it is manifest that the calculation of formulæ could never be undertaken in the field; and hence that the results of the labours of the calculator must be placed in such a form as to be readily consulted at the moment they are required. Tables, therefore, have been formed for that purpose, such as those of the French, and those of the English service, which close this article. The latter, for heavy guns, have been carefully digested by Lieutenant-Colonel Lefroy, R.A., from the results of both land and sea-practice; the sea being that of the "Excellent," the instructional gunnery-ship at Portsmouth. The tables for field-guns are those of Col. Burn, R.A., as printed and published by him on cards for the general and convenient use of the members of his profession. They represent, therefore, our *practical* knowledge up to the present day; but they must not be considered as results finally and fully determined. Far from this, as every day ought to do something for their improvement, and will do so when the important establishment at Shoebury-Ness has been rendered fully efficient in all its details. It is bad economy to stint such an establishment in anything necessary for its efficiency; or by denying those instruments which have become familiar in foreign arsenals, to make it only a school of drill, instead of an important element in the great school of instruction, which, beginning at Woolwich, should end here.

It has been already remarked that the electro-magnetic cronograph for determining the time of flight of a projectile through various points of its trajectory, was submitted by Wheatstone to the select committee at Woolwich; but as yet it has not been applied at Shoebury-Ness. It is true that this mode of determining the time of flight has not always succeeded; but the causes of failure do not appear difficult of removal; and a government establishment is assuredly the right place for experiment.

This article, then, is closed with a fervent wish that the spirit of inquiry, which is beginning to spread over our artillery, will be fostered, and the thirst for professional knowledge, which now animates so many of its officers, will be encouraged and rewarded; and that ere long our artillery will be as distinguished for its science, as it has always been for its discipline and valour.

ENGLISH TABLES OF RANGES.

Tables of Ranges of Iron Ordnance. From the Handbook of Field Service of Lieut.-Colonel J. H. Lefroy, F.R.S., *Royal Artillery.*

IRON ORDNANCE.

Ranges of 10-inch and 8-inch Guns.

Gun.	Charge.	Elevation.							
		P. B.	1°	2°	3°	4°	5°	6°	8°
cwt.	lbs.	315							
				10-Inch Gun Hollow Shot of 83 lbs.					
85	12		635	935	1205	1450	1665	1825	2095
...	...	...	s. 2·2	s. 3·4	s. 4·2	s. 5·0	s. 6·4	s. 7·0	s. 8·7
				8-Inch Gun Hollow Shot of 47 lbs.					
65 60	10	...	580	920	1240	1510	1740	1940	2200
				Id. Naval H. S. of 56 lbs.					
65 60	10^{b}	340	740	1100	1410	1700	1930	2100	2410
65 60	**10^{e}**	**?**	**550**	**900**	**1200**	**1500**	**1760**	**1980**	**2340**
5	8^{b}	290	545	795	1035	1245	1450	1665	1925
6^{d} 60 52	**8^{e}**	**?**	**510**	**830**	**1130**	**1430**	**1660**	**2060**	**2240**
				Id. Naval Shell of 51 lbs. *Filled.*					
65 60	10^{b}	320	660	980	1270	1490	1680	1845	2110
65 60	**10^{e}**	**?**	**660**	**950**	**1240**	**1500**	**1760**	**1980**	**2340**
...	...	...	s. 2·0	s. 3·0	s. 4·5	s. 5·2	s. 6·2	s. 7·2	s. 9·2
5	8^{b}	305	550	800	1040	1260	1457	1612	1890
5	**8^{e}**	**?**	**550**	**880**	**1160**	**1430**	**1660**	**1880**	**2240**
...	...	...	s. 2·0	s. 3·0	s. 4·0	s. 5·0	s. 6·0	s. 7·0	s. 9·0
5	**5^{e}**	**?**	**330**	**600**	**830**	**1020**	**1170**	...	...
			s. 1·5	s. 2·5	s. 3·5	s. 4·5	s. 5·5	...	...
				Id. Shrapnel of 61 lbs.					
...	...	...	...	$1\frac{7}{8}^{\circ}$	$2\frac{1}{2}^{\circ}$	$3\frac{7}{8}^{\circ}$	5°	$5\frac{5}{8}^{\circ}$	...
65 60	6^{b}	...	...	550	800	1050	1310	1400	...
...	...	...	...	·2	·4	·6	·8	·9	...

Remarks.—The ranges for the 10-inch gun are the mean of the two scales of Colonel Burn, one 8 feet, the other 5 feet above the plane. The same data must be nearly correct for the shell of 87·5 lbs. The times are interpolated from the "Excellent's" Tables, 1852; which, however, allow about 0·5° greater elevation for the same ranges. Height of gun above plane B 6·5 feet.—"Excellent" not stated.

The ranges for the 8-inch gun, hollow shot of 47 lbs. are interpolated by projection, from the mean of 137 rounds fired at Shoebury Ness, 1850–2; for the sea service, hollow shot of 56 lbs. and shell of 50 lbs.; the first, with each charge, is from Colonel Burn, the second from the "Excellent."

For the Shrapnel shell, from Colonel Burn.

Ranges of 68, 56, and 42-Pounders.

Gun.	Charge.	Elevation.							
		P. B.	1°	2°	3°	4°	5°	6°	8°
cwt.	lbs.				68-Pounder Gun.				
112	20	400	980	1400	1760	1980	2240	2480	2840
112	**20**	**340**	**833**	**1247**	**1558**	**1737**	**2035**	**2307**	**2640**
...	...	...	s. 2·25	s. 3·25	s. 4·25	s. 5·25	s. 6·25	s. 7·75	s. 9·7
95	15	310	700	1070	1430	1710	1930	2130	2520
91	**15**	**318**	**707**	**1074**	**1401**	**1712**	**1926**	**2144**	**2559**
...	...	...	s. 2·0	s. 3·0	s. 4·25	s. 5·5	s. 6·5	s. 7·5	s. 9·0
87	14	300	680	1050	1360	1650	1900	2140	2490
87	**14**	**303**	**682**	**1055**	**1360**	**1652**	**1904**	**2162**	**2440**
...	...	...	s. 2·0	s. 2·75	s. 4·25	s. 5·0	s. 6·5	s. 7·25	s. 9·0
					Id. Shells.				
95	16	350	850	1250	1560	1840	2100	2350	2690
95	**16**	**298**	**742**	**1070**	**1420**	**1724**	**1984**	**2200**	**2540**
...	...	...	s. 2·0	s. 3·0	s. 4·5	s. 5·25	s. 6·5	s. 7·5	s. 9·5
87	14	310	710	1080	1350	1610	1850	2080	2450
					56-Pounder Gun.				
98	16	490	930	1340	1720	2000	2200	2400	2740
98	**16**	**290**	**753**	**1267**	**1663**	**1890**	**2067**	**2260**	**2557**
...	...	...	s. 2·0	s. 3·0	s. 4·25	s. 5·75	s. 6·50	s. 7·75	s. 9·5
87	14	380	900	1310	1660	1940	2100	2310	2580
...	...	**310**	**821**	**1234**	**1516**	**1793**	**2010**	**2193**	**2630**
...	...	...	s. 2·25	s. 3·25	s. 4·25	s. 5·25	s. 6·50	s. 7·25	s. 9·25
					42-Pounder Gun.				
84	14	400	940	1340	1620	1840	2050	2250	2590
84	**14**	**317**	**775**	**1183**	**1500**	**1792**	**2002**	**2190**	**2663**
...	...	...	s. 2·0	s. 3·0	s. 425	s. 5·5	s. 6·5	s. 7·25	s. 8·5
67	10	300	730	1120	1420	1660	1880	2110	2500
75	**12**	**257**	**775**	**1170**	**1510**	**1713**	**1958**	**2190**	**2603**
...	...	...	s. 2·0	s. 3·0	s. 4·5	s. 5·25	s. 6·5	s. 8·0	s. 10·0

The data above, printed in ordinary type, are from Lieutenant-Colonel Burn's Cards; those in darker type, from the Tables of the "Excellent." The differences, like those shown in the Tables of the 8-inch gun, deserve notice, but are not attributable to a difference in the height of the plane, which, when given, is from 5 feet to 8 feet. A similar discrepancy between the naval and land service tables in the French service led to an investigation of the subject, by a committee, at Gavre, 1843, which came to the practical conclusion, that the mean deviations at sea do not differ *cet. par.* from those on land (Douglas, 3d edit., 146). Officers will readily decide, from their own experience, which data, under their particular circumstances, are to be relied on.

RANGES OF 32 AND 24-POUNDERS.

Gun.	Charge.	Range in Yards. P.B.	1°	2°	3°	4°	5°	6°	8°	10°
cwt.	lbs.		32-Pounder Gun—Solid Shot.							
64 56	10	370*a*	779	1160	1460	1690	1910	2110	2460	2760
58	10	390	790	1160	1480	1760	2000	2220	2570	2840
58	10	400	850	1250	1560	1860	2090	2290	2650	2930
56	8	340	700	1040	1360	1620	1830	2020	2340	2640
56	6	200	530	820	1100	1340	1540	1720	2060	…
46	6	340	700	1026	1300	1560	1760	1940	2250	2430
32	5	290	640	960	1250	1510	1720	1900	2191	2430
50 A	**8**	**346***b*	**747**	**1173**	**1435**	**1698**	**1900**	**2127**	**2453**	**2777**
…	…	…	s. 2·0	s. 3·0	s. 4·0	s. 5·25	s. 6·25	s. 7·25	s. 8·75	s. 10·0
45 B	**7**	**333**	**716**	**1040**	**1320**	**1600**	**1800**	**2026**	**2340**	**2697**
…	…	…	s. 2·0	s. 3·0	s. 4·0	s. 5·25	s. 6·25	s. 7·25	s. 8·75	s. 10·0
42 C	**6**	**326**	**700**	**1026**	**1300**	**1566**	**1710**	**1890**	**2250**	**2576**
…	…	…	s. 2·0	s. 3·0	s. 4·0	s. 5·25	s. 6·25	s. 7·25	s. 8·75	s. 10·0
			Id. Shells.							
56	10	380	780	1170	1470	1700	1910	2100	2450	2750
56	8	350	720	1040	1320	1520	1720	1920	2220	2500
56	6	250	580	900	1180	1420	1640	1820	2100	2300
			Id. Shrapnel.							
56	6	…	1⅛°	1⅞°	3°	4°	5°	5½°	…	…
…	…	…	750	1000	1200	1450	1550	1660	…	…
…	…	…	·2	·4	·6	·8	·9	1·0	…	…
			24-Pounder Gun—Solid Shot.							
50 48 40	8	355 *c*	752	1120	1420	1645	1835	1910	2230	2435
50	**8**	**360**	**763**	**1123**	**1486**	**1640**	**1850**	**1960**	**2240**	**2630**
40	**8**	**350**	**735**	**1135**	**1413**	**1593**	**1828**	**1980**	**2220**	**2600**
50 48 40	**6**	…	**600**	**980**	…	…	…	…	…	…
			Id. Shrapnel.							
50 48	5	…	750	1000	1200	1400	1500	…	…	…
…	…	…	1⅛°	1⅞°	3°	4°	5°	…	…	…
…	…	…	·2	·4	·6	·8	·9	…	…	…

(*a*) Mean of two. B: the guns differ effectively by 4 inches of length; the rest that follow also B.

(*b*) The data that follow are for the 32-pounder guns in general use in the navy. Tables of "Excellent."

(*c*) Mean of two B, not differing more than 15 yards from what is here given, at any range.

CARRONADES.

Carronade.	Weight.	Charge.	Range in yards. ½°	1°	2°	3°	4°	5°
	cwt.	lbs.				Carronades.		
68-Pr.	36	5·0	270	500	730	940	1100	1260
42 „	22	3·5	230	430	700	900	1050	1200
32 „	17	2·5	220	380	600	800	975	1170
24 „	13	2·0	200	360	580	770	950	1120
18 „	10	1·5	180	340	550	745	920	1050
12 „	6	1·0	150	310	520	715	890	970

The above are the Tables of the "Excellent." The ordinary charges for land service are $\frac{1}{12}$th the weight of the shot.

	cwt.	lbs.	P. B.			Carronades		
68-Pr.	36	5·66	450	650	890	1000	1100	1280
42 „	22	3·5	400	600	860	980	1020	1170
32 „	17	2·66	330	560	830	900	970	1080
24 „	13	2·0	300	500	780	870	920	1050
18 „	10	1·50	270	470	730	800	870	1000
12 „	6	1·00	230	400	490	740	810	870

RANGES OF 18, 12, AND 9-POUNDERS.

Gun.	Charge.	Elevation. P.B.	1°	2°	3°	4°	5°	6°	8°	10°
cwt.	lbs.		18-Pounder Solid Shot.							
42 38	6	330 *a*	680	1020	1340	1580	1770	1920	2130	2310
38	6	380 *b*	700	960	1200	1430	1650	1860	…	…
			Id. Shrapnel.							
…	…	…	…	…	…	…	…	…	7°	…
38	4·5	…	600	900	1150	1380	1590	1780	1950	…
…	…	…	·2	·4	·6	·8	1·0	1·2	1·4	…
42 38	**6**	**350** *c*	**600**	**993**	**1335**	**1558**	**1770**	**1920**	**2130**	…
„	**4**	**260**	**570**	**900**	…	…	…	…	…	…
22	**3**	**230**	**543**	**850**	**1078**	**1300**	**1586**	**1668**	**1841**	…
„	**2**	**190**	**500**	**800**	**1030**	**1260**	**1540**	**1620**	**1790**	…
			10-Inch Howitzer.							
42	7·0	323	511	709	934	1073	1270	(1406)	(1848)	…
DEAL.	*t.*	s. 1·1	s. 1·72	s. 3·45	s. 3·55	s. 4·10	s. 4·87	s. (5·62)	s. (7·82)	…

(*a*) Burn.

(*b*) A table verified by considerable practice by the late Col. Colquhoun, R.A., at the siege of Bilboa, December 1836.

(*c*) The Tables of the "Excellent."

MORTARS.

AT 45°.

Range.	13-inch. charge.	13-inch. fuze.	10-inch. charge.	10-inch. fuze.	8-inch. charge.	8-inch. fuze.	5½-inch brass. chrge.	5½-inch brass. fuze.	4⅕-inch brass. chrge.	4⅕-inch brass. fuze.
	lb. oz.	inch.	lb. oz.	inch.	lb. oz. dr.	inch.	oz. dr.	inch.	oz. dr.	inch.
200	…	…	…	…	…	…	…	…	2 0	1·55
250	…	…	…	…	…	…	…	…	2 3	1·6
300	…	…	…	…	…	…	4 8	1·65	2 6	1·65
350	…	…	…	…	…	…	4 12	1·7	2 9	1·7
400	1 12	1·8	0 15	1·8	0 9 8	1·8	5 0	1·75	2 12	1·75
450	1 15	1·9	1 0	1·9	0 9 12	1·9	5 4	1·8	3 0	1·8
500	2 1	2·0	1 2	2·0	0 10 12	2·0	5 8	1·85	3 4	1·85
550	2 3	2·1	1 3	2·1	0 12 8	2·1	5 12	1·9	3 8	1·9
600	2 5	2·2	1 4·5	2·2	0 13 12	2·2	6 0	1·95	3 12	1·95
650	2 7	2·3	1 6	2·3	0 14 10	2·3	6 4	2·0	4 0	2·0
700	2 9	2·4	1 7·5	2·4	0 15 4	2·4	6 8	2·1	4 5	2·1
750	2 11·5	2·45	1 8·5	2·45	0 15 14	2·45	6 12	2·2	4 10	2·2
800	2 13·5	2·5	1 10	2·5	1 0 10	2·5	7 1	2·3	4 15	2·3
850	3 0	2·55	1 11	2·55	1 1 4	2·55	7 6	2·4	…	…
900	3 2	2·6	1 12	2·6	1 2 0	2·6	7 11	2·45	…	…
950	3 4	2·65	1 13	2·65	1 2 12	2·65	8 0	2·5	…	…
1000	3 7	2·7	1 14	2·7	1 3 8	2·7	8 6	2·55	…	…
1050	3 9	2·75	2 0	2·75	1 4 0	2·75	„	…	…	…
1100	3 11	2·8	2 1·5	2·8	1 4 12	2·8	„	…	…	…
1150	3 14	2·85	2 2·5	2·85	1 5 4	2·85	„	…	…	…
1200	4 0	2·9	2 4·0	2·9	1 6 0	2·9	at 15°		at 15°	
1300	4 5	3·0	2 6·5	3·0	…	…	6 0	350 0·7	4 8	450 0·8
1500	4 15	3·2	3 0	3·2	…	…	7 0	400 0·75	4 12	500 0·85
									at 25°	
1700	5 10	3·4	3 4	3·4	…	…	7 8	450 0·8		
2000	…	…	…	…	2 0 0	…	8 0	500 0·85	4 0	540 1·1
2400	…	…	4 0	…	…	…	extreme ranges for land service.			
2900	9 0	…	…	…	…	…				

13-inch mortar weighs 36 cwt.; bed, 49 cwt.
10 … … … 25 … … 16·5 …
8 … . . … 9 … … 7·5 …
Brass 5½ … … … 1·4 … … 1·0 …
4⅖ … … … 0·9 … … 0·75

The sea-service 13-inch mortar weighs 101 cwt.; bed, 83·5 cwt.; and, with charge of 20 lbs., ranges 4200 yards. The sea-service 10-inch mortar weighs 52 cwt.; bed, 55·5 cwt.; and, with charge of 10 lbs., ranges 4000 yards.

BRASS ORDNANCE.

Memorandum of Ranges of Guns, &c, at High Elevations.

1.—*The 68-Pounder Carronade used as a Mortar and fired at* 45°.
With a charge of 8 lbs. of powder threw its shell (of 8 inches diameter and 44 lbs.), Sutton Heath, 1810...3500 yards.

2. *A 24-Pounder of 6½ Feet at 45° Ranged as follows* :—

With a charge of	3 lbs.	3500 yards.
Ditto ditto	4 ...	3700 ...
Ditto ditto	6 ...	4000 ...

3. *A 24-Pounder of 9½ Feet at 45° Ranged as follows* :—

With a charge of	6 lbs.	4500 yards.
Ditto ditto	8 ...	4300 ...

4. *An 18-Pounder of 9 Feet at 40° Ranged as follows* :—

With a charge of	3 lbs.	3700 yards.
Ditto ditto	4½ ...	4000 ...
Ditto ditto	6 ...	4200 ...

These data may sometimes be useful in annoying an enemy from some very distant spot.

5. *Range of Iron Mortars at 45°.*

13-inch mortar, land service, charge	9 lbs.	2800 yards.
13-inch, sea service, charge	10 ...	2800 ...
Ditto ditto	12 ...	3400 ...
Ditto ditto	14 ...	3500 ...
Ditto ditto	16 ...	3900 ...
Ditto ditto	18 ...	4100 ...
Ditto ditto	20 ...	4400 ...
Ditto ditto	25 ...	4700 ...
Ditto ditto	25 ...	4850 ...
Ditto ditto	28 ...	4500 ...
Ditto ditto	30 ...	4500 ...

6. 10-*Inch Land Service at* 45°.

Charge	6 lbs.	2400 yards.
10-inch sea service at 45°	5 ...	2800 ...
Ditto ditto	8 ...	3400 ...
Ditto ditto	10 ...	3500 ...
Ditto ditto	12 ...	3800 ...
Ditto ditto	20 ...	4500 ...

TABLES OF BRASS GUNS.

From the Cards of Colonel Burn, R.A.

Ranges of Brass 12-Pounder Medium.

Length.		Cal.	Weight.	Charge.	Prop. of Spher. Case
ft. in. 6 6·6	cals. 17	in. 4·62	cwt. 18	lbs. 4	0⅓

Solid Shot.		Spherical Case.				Com. Case·		Ricochet.		
				Range.						
Elevation.	Range.	Letter and length of Fuze.	Elevation.	From	To	Elevation.	Range.	Charge.	Elevation.	Range.
deg.	yards.	in.	deg.	yards.	yards.	deg.	yards.	oz.	deg.	yards.
PB	300	B ·2	1⅜	660	960	PB	150	...	...	400
0¼	400	C ·3	1⅞	820	1110	0¼	175	...	...	400
0½	500	D ·4	2¼	960	1230	0½	200	6	6½	500
0¾	600	E ·5	2¾	1080	1340	0¾	220	5	7	500
1	700	·6	3¼	1195	1445	1	250	...	...	600
1¼	775	·7	3½	1305	1545	1¼	275	...	...	600
1½	850	·8	4⅜	1415	1645	1½	300	...	...	...
1¾	925	·9	5⅛	1520	1740	...	...	...	...	...
2	1000	1·0	5¾	1620	1830	...	...	...	...	...
2¼	1050	1·1	6⅜	1720	1920	...	...	...	...	...
2½	1100	1·2	7	1815	2005	...	...	...	...	...
2¾	1150	1·3	7⅝	1905	2085	...	...	...	...	...
3	1200	1·4	8¼	1990	2160	...	...	...	...	...
...	...	1·5	8⅞	2070	2230	...	...	...	...	...
...	...	1·6	9⅜	2140	2290	...	...	...	...	...
...	...	1·7	...	2200	2340	...	...	...	...	...

TABLES OF BRASS GUNS,—*Continued.*

Ranges of Brass 9-Pounder Gun.

Length.		Cal.	Weight.	Charge.	Proportion of Spherical Case
feet. 6	cal. 17	in. 4·2	cwt. 13½	lbs. 3	0⅕

Solid Shot.		Spherical Case.				Com. Case.		Ricochet.		
				Range.						
Elevation.	Range.	Let. & Lgth. of Fuze.	Elevation.	From	To	Elevation.	Range.	Charge.	Elevation.	Range.
degs.	yards.	in tenths.	degs.	yards.	yards.	degs.	yards.	o z.	degs.	yards.
PB	300	B·2	1⅜	640	920	PB	150	7	5	500
0¼	400	C·3	1⅞	800	1060	0¼	175	6	6¼	500
0½	500	D·4	2¼	930	1180	0½	200	5	6¾	500
0¾	600	E·5	2¾	1050	1290	0¾	225	7	6½	600
1	700	·6	3¼	1160	1390	1	250	6	7½	600
1¼	775	·7	3¾	1260	1480	1¼	275	5	9½	600
1½	850	·8	4⅜	1360	1570	1½	300	...	...	...
1¾	925	·9	5⅛	1455	1655	...	...	...	..	...
2	1000	1·0	5¾	1550	1740	...	...	...	...	...
2¼	1050	1·1	6⅜	1640	1820	..	...	...	...	...
2½	1100	1·2	7	1725	1895	...	...	...	...	...
2¾	1150	1·3	7⅝	1805	1965	...	...	...	...	...
3	1200	1·4	8¼	1885	2035	...	...	...	...	...
...	...	1·5	8⅜	1960	2100	...	...	...	...	...
...	...	1·6	9⅜	2030	2160	...	...	...	...	...
...	...	1·7	10	2095	2215	...	...	...	...	...
...	...	1·8	10¾	2165	2275	...	...	...	...	...

Ranges of Brass Light 6-Pounder Gun.

Length.		Cal.	Weight.	Charge.	
feet. 5	cals. 16	in. 3·668	cwt. 6	lbs. 1	oz. 8

Solid Shot.		Spherical Case.				Common Case.	
				Range.			
Elevation.	Range.	Let. on Fuze and Length.	Elevation.	From	To	Elevation.	Range.
degs.	yards.	in10ths	degs.	yards.	yards.	degs.	yards.
PB	200	...	1	380	640	PB	100
0¼	300	B.2	1¼	570	800	0¼	125
0½	400	C.3	1⅝	720	930	0½	150
0¾	500	D.4	2¼	845	1045	0¾	175
1	600	E.5	2⅞	955	1145	1	200
1¼	650	·6	3⅜	1060	1240	1¼	225
1½	700	·7	4	1160	1330	1½	250
1¾	750	·8	4⅝	1255	1415	1¾	275
2	800	·9	5¼	1345	1500	2	300
2¼	850	1·0	5⅞	1430	1580	...	...
2½	900	1·1	6⅝	1510	1655	...	...
2¾	950	1·2	7¼	1585	1725	...	...
3	1000	1·3	7⅝	1655	1785	...	...
3¼	1050	1·4	8¼	1720	1840	...	...
3½	1100	1·5	8⅞	1780	1890	...	...
3¾	1150	1·6	9⅝	1835	1940	...	...
4	1200	1·7	10¼	1885	1980	...	...
4¼	1250	1·8	11	1953	2020	...	...
4½	1300	1·9	11⅝	1980	2055	...	...
4¾	1350	2·0	12⅜	2025	2090	...	...
5	1400	...	...	...	...	...	...

Tables of Brass Howitzers. From the Cards of Colonel Burn, R.A.

Ranges of 12-Pounder Howitzer.

Length.		Cal.	Weight.	Charge.	Car. cafs.
ft. in.	cals.	in.	cwt.	lbs.	lbs. oz.
3 9·2	10	4·58	6½	1¼	8 13

Common Shells.			Spher. Case.			C. Case.		Ricochet.		
Fuze.	Elev	Range.	Fuze.	Elev	Range.	Elev	Range.	Charge	Elev	Range.
in.	deg.	yards.	in.	deg.	yards.	deg.	yards.	oz.	deg.	yards.
·1	1	400	·1	1¼	450	PB	100	...	...	...
·1½	1¼	450	·1½	1½	500	0¼	125	...	...	...
·2	1½	500	B ·2	1¾	550	0½	150	...	...	...
·2½	1¾	550	·2½	2	600	0¾	175	...	...	...
·3	2	600	C ·3	2¼	650	1	200	...	...	...
·3½	2¼	650	·3½	2½	700	1¼	225	6	7	600
·4	2½	700	D ·4	2¾	750	1½	250	8	6	600
·4½	2¾	750	·4½	3	800	1¾	275	10	5	600
·5	3	800	E ·5	3¼	850	2	300	...	...	...
·5½	3¼	850	·5½	3½	900	...	...	...	...	...
·6	3½	900	·6	3¾	950	...	...	...	...	...
·6½	3¾	950	·6½	4	1000	...	...	...	...	...
·7	4	1000	·7	4¼	1025	...	...	...	...	...
·7½	4¼	1025	·7½	4½	1050	...	...	...	...	...
·7¾	4½	1050	·7¾	4¾	1075	...	...	...	...	...
·8	4¾	1075	·8	5	1100	...	...	...	...	...
·8¼	5	1100	·8¼	5¼	1125	...	...	...	...	...
·8½	5¼	1125	·8½	5½	1150	...	...	...	...	...
·8¾	5½	1150	·8¾	5¾	1175	...	...	...	...	...
·9	5¾	1175	·9	6	1200	...	...	...	...	...

Ranges of 24-Pounder Howitzer.

Length.		Cal.	Weight.	Charge.	Car. cafs.
ft. in.	cals.	in.	cwt.	lbs.	lbs oz.
4 8·6	10	5·72	12½	2½	16 9½

Common Shells.			Spher. Case.			C. Case.		Ricochet.		
Fuze.	Elev	Range.	Fuze.	Elev	Range.	Elev	Range.	Charge	Elev	Range.
in.	deg.	yards.	in.	deg.	yards.	deg.	yards.	oz.	deg.	yards.
...	PB	250	·1	1	450	PB	150	6	7	400
...	0¼	300	·1½	1¼	500	0¼	175	9	4¾	...
...	0½	350	·2	1½	550	0½	200	8	9	500
...	0¾	400	·2½	1¾	600	0¾	225	10	7½	...
·1	1	450	·3	2	650	1	250	11	6	...
·1½	1¼	500	·3½	2¼	700	1¼	275	11½	5½	...
·2	1½	550	·4	2½	750	1½	300	12	5¼	...
·2½	1¾	600	·4½	2¾	800	1¾	325	14	5	...
·3	2	650	·5	3	850	2	350	9	7¾	600
·3½	2¼	700	·5½	3¼	900	2¼	375	12	6½	...
·4	2½	750	·6	3½	950	2½	400	1 lb.	4¾	...
·4½	2¾	800	·6½	3¾	1000	...	...	...	...	...
·5	3	850	·7	4	1050	...	...	...	...	...
·5½	3¼	900	·7½	4¼	1100	...	...	...	...	...
·6	3½	950	·8	4½	1125	...	...	...	...	...
·6½	3¾	1000	·8½	4¾	1150	...	...	...	...	...
·7	4	1025	·9	5	1175	...	...	...	...	...
...	...	...	·9½	5¼	1200	...	...	...	...	...

FRENCH TABLES OF RANGES.

Land-Guns fired with Charges equal to One-third the weight of the Ball.

Désignation de canons.		Portées de but en blanc.*	Portées sous les angles de										
			2°	3°	4°	5°	6°	7°	8°	9°	10°	15°	40°
		mètres.	m.	m.	m.	m.	m	m.	m.	m.	m.	m.	m.
De campagne de	8	500 à 510	640	1085	1285	1470	1635	...	...	...	...	2700	3300
	12	540 à 550	918	1170	1390	1585	1780	...	...	...	...	2800	3700
De place de	8	535 à 555	655	1162	1317	1507	1676	...	...	...	...	2700	3300
	12	630 à 650	964	1228	1455	1664	1870	...	...	...	...	2900	3800
De siége de...........	16	660 à 690	955	1230	1460	1665	1850	2020	2200	2350	...	3100	4000
	24	680 à 720	1055	1345	1590	1810	2015	2200	2360	2540	2670	3300	4400
De côté de †	24	720	1020	1295	1550	1775	1975	2190	2350	2520	2660	...	...
	36	800	1070	1350	1610	1850	2080	2280	2470	2630	2790	3360	4620
	48	820	1200	1480	1760	2000	2200	2390	2570	2720	2875	3460	4740

* Les portées de but en blanc varient sensiblement avec l'état de l'àme des canons de siége et de place.

† Les portées des canons de 12 et 16 de côté sont un peu moindres que celles des mêmes calibres de place et de siège.

Field-Guns fired with Charges equal to One-third the weight of the Ball.

		Hausses pour les distances de										
		200 m.	300 m.	400 m.	500 m.	600 m.	700 m.	800 m.	900 m.	1000 m.	1100 m.	1200 m.
Canons de	12	−25	−19	−12	−4	5	14	24	35	47	60	75
	8	−21	−15	− 8	0	9	17	28	40	53	68	85
	6	−15	−10	− 4	3	11	20	31	45	61	79	98

Let a be the number of metres,

then $a+\frac{1}{10}a-\frac{6\frac{1}{2}}{10}\cdot\frac{1}{10}\cdot\frac{1}{10}a=$ the number of yards nearly;

and $3a+\frac{1}{4}a+\frac{1}{10}\cdot\frac{1}{4}a+\frac{1}{5}\cdot\frac{1}{10}\cdot\frac{1}{4}a+\frac{1}{5}\cdot\frac{1}{5}\cdot\frac{1}{10}\cdot\frac{1}{4}a=$ the number of feet.

Thus :—

1582 metres—	or,	1582
158·2		3
1740·2		4746
10·28		395.5
		39·55
1729·92 yards		7·91
3		1·58
5189·76 feet.		5190·54 feet.

(J. F. P.)

GUNPOWDER.

THE invention of gunpowder is popularly ascribed to Barthold Schwartz, a German monk and alchemist; and the date of the discovery is further supposed to have been in 1320. The prior claims of our countryman Roger Bacon—whatever they be—are, however, unquestionable, as this substance is described in his writings about the year 1270, or fifty years before the time of the supposed discovery of Schwartz. But even Bacon has as little title to this invention as his supposed rival; nor, indeed, when we examine his own description of this then wonderful compound, do we perceive that he makes any claim to have been the discoverer. On the contrary, he quotes it as a well-known substance, in common use all over the world for making squibs to amuse children. So pertinacious are vulgar errors. The passage in Bacon stands as follows:—"Ex hoc ludicro puerili, quod fit in multis mundi partibus, scilicet, ut instrumento facto ad quantitatem pollicis humani, ex violentia salis qui salpetræ vocatur, tam horribilis sonus nascitur" (this is the description of a parchment cracker) "in ruptura tam modicæ pergamenæ, quod fortis tonitru rugitum et coruscationem maximam sui luminis jubar excedit."[1] Thus the claim is shifted without difficulty from Bacon, and, as Dutens thinks he can show, is removed to Magnus Græcus, whose manuscript he quotes, and from which he presumes that Bacon derived the invention; although, by his own showing, Bacon need not have consulted an obscure writing for an invention of general notoriety. The title of the manuscript in question is as follows:—"Incipit *Liber Ignium* a Marco Græco perscriptus, cujus virtus et efficacia est ad comburendum hostes, tam in mari quam in terra;" so that even the military uses of gunpowder were then known. In the same manuscript are contained directions for making a rocket, which we do not quote on account of its length; but it is such as to prove that the nature of this fire-work was understood. It is even remarkable that he recommends particularly the charcoal of willow wood, which in modern times has been found to be amongst the best for making gunpowder.

Thus far, although we have not fixed the date of the invention, we have carried it, not only beyond Bacon, but even beyond his supposed predecessor; as he himself does not pretend to be the inventor, but the compiler, of a *Liber Ignium*, or treatise on Pyrotechny. If, in attempting to ascend still higher, the evidence becomes more rare and more obscure, there are still insuperable facts to prove that its antiquity is far greater, however impossible it may be to approximate to the date of the invention, far less to assign that which seems buried amongst the obscurities of oriental learning. The question of gunpowder, as applied to artillery, is a separate one; but there is abundant reason to believe that this compound was not only used in some form or other as an explosive and combustible substance, but was even applied to military purposes; it may be, in the shape of rockets or other fire-works, which, for objects of amusement at least, have been familiar to the Chinese beyond all record.

The earliest date to which we can refer the knowledge of gunpowder, in defect of a sufficiently remote acquaintance with oriental history, is 355 before Christ; although, from the very nature of this evidence, it follows that it was then not only known to the eastern nations, but that it must have long been so; since, even at that early period, it was applied to warlike purposes. In the code of Hindu laws, indeed, where it is mentioned, it is referred to a period which oriental antiquaries have considered as coincident with the time of Moses. But the evidence to which we more particularly allude is found in a passage of the Life of Apollonius Tyanæus, by Philostratus; the purport of which is, that Alexander was unwilling to attack the Oxydracæ—who lived between the Hyphasis and the Ganges—because they were under the care of the gods, and overthrew their enemies with thunder and lightning, which they shot from their walls. The same tale is told of the repulses experienced in this country by Hercules and Bacchus.

The next of these early dates, in which also our evidence is imperfect, is 212 before Christ; but the establishment of the truth of the last would render this one more credible. In the defence of Syracuse by Archimedes, Vitruvius relates that one of his engines threw large stones with a great noise; a description which does not apply to any of the mechanical artillery of the ancients. On a notice so superficial, we must not, however, lay too much stress; but it would appear that the earliest knowledge of gunpowder is capable of being traced from the East, through the intervention of the Arabs, and thence into Europe; and, indeed, the military use of rockets in the armies of India ascends to a period beyond record.

Of the earliest period at which it was known in China, we have, in defect of their own evidence, the testimony of Uffano, an Italian author, who affirms that not only gunpowder, but ordnance, was in use in that nation in the year 85 of our era; and that cannon were, in his day, remaining from the most ancient times, in some of the maritime provinces, made both of iron and brass. Hence some writers presume that the Chinese communicated the invention to the Indians; whilst it has also been said, but on no sufficient authority, that they themselves received it from Tartary—a nation respecting which we know little or nothing, and in which we should not be inclined to look for an early acquaintance with the arts. This, however, refers to a date so late as 917; so that, if there is any dependence to be placed on the Indian and Chinese hypothesis, the Tartars must themselves have borrowed the invention from those to whom they are said to have lent it.

There is after this a long blank; and the first author on the subject that we have discovered is in 1249, twenty years before the date of Bacon's narrative. This is an Arabic writer, in the Escurial collection, who is translated by Casiri. His description is such that it may apply both to rockets and to shells. In the former case it only proves the knowledge of the detonating compound; the latter, were it proved, would show that they were also acquainted with the use of ordnance, although it is not impossible but that such projectiles might have been thrown by mechanical artillery.

As the invention of gunpowder has been popularly attributed to Bacon and to Schwartz, so the use of ordnance has been referred to the time of the field of Cressy, or 1346. To pass over the Chinese hypothesis on this part of the subject, we shall find that cannon were known at least as early as 1312. This we derive from the source quoted by Casiri; from Arabian writers, who describe the use of ordnance in 1312 and 1323; whilst, if Barbour is to be trusted, Edward III. was also provided with some pieces of artillery in 1327; and Père Daniel asserts that cannon were known to the

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[1] Bacon, who was apparently afraid of revealing too much, conceals one of the ingredients under the veil of an anagram. He writes—"Sed tamen salis petræ *luru mone cap ubre*, et sulphuris, et sic facies tonitrum et coruscationem, si scias artificium." The italics are unmeaning in their present form, but the letters may be so combined as to make *carbonum pulvere*, or powdered charcoal. The passage may then be translated thus:—"But, nevertheless, take of saltpetre, with pounded charcoal and sulphur, and thus you will make thunder and lightning, if you know the mode of preparing them."

Gunpowder.

French in 1338. We need not carry this discussion lower; though, in favour of the oriental origin of this invention, we would still remark, that artillery was much in use in the Mediterranean when it was still but little used elsewhere; as by the Venetians against Genoa in 1380, and by Alphonso XI. in his wars against the Moors.

In a work, published at Paris in 1845, entitled *Du Feu Grégeois, des Feux de Guerre, et des Origines de la Poudre à Canon*, the authors (MM. Reinaud and Favé) endeavour to connect gunpowder with the celebrated Greek fire which the Greeks of the Lower Empire and the Arabs used at the beginning of the mediæval epoch; and they even endeavour to establish a Chinese origin for the Greek fire. So long back as 200 years B.C., the Chinese appear to have used various incendiary compositions under the names of "devouring fire," "earth thunder," &c. Now, the Greek fire was introduced from the East into Constantinople in the year 673, and it greatly assisted the Greeks of the Lower Empire in gaining many battles. Its composition was kept secret under the severest penalties, but the engines of war with which it was used are described by contemporary writers, and these are said so closely to resemble the Chinese engines, as to leave no doubt of their common origin. In the treatise of Marcus Græcus, which our authors ascribe to some period between the ninth and twelfth centuries, the composition of a combustible compound as used by the Greeks is given, and tends also to confirm the common origin. The historians of the Crusades refer to the terror experienced by the Christians at the incendiary resources of the Arabs, but it is only the Western historians who speak of the Greek fire; while, in a manuscript discovered by M. Reinaud, containing a treatise on Pyrotechny by one Hassan-Abramman, the author speaks of Chinese fires, or employs Chinese epithets to them. MM. Reinaud and Favé state that, from the eighth to the ninth centuries of the Christian era, the Arabs had frequent intercourse with the Chinese. They admit the difficulty of ascertaining when fire-arms were first used in Western Europe. Either the Crusaders may have learnt the use of them from the Eastern Arabs, or the secret of the Greek fire may have been revealed at the taking of Constantinople in 1204; but there is no doubt, they assert, that Albertus Magnus and Roger Bacon obtained their information from the earlier work of Marcus Græcus, and hence these two writers have been wrongly regarded as the inventors of gunpowder. Roger Bacon hints that religious scruples rather than ignorance prevented the nations of Eastern Europe from generally adopting the use of the Greek fire. These scruples appear, however, gradually to have yielded. Froissart mentions it, and later writers refer to it, either under the name of Greek fire, or by some analogous name, and the substance referred to generally agrees with the recipe given by Marcus Græcus; hence our authors conclude that the art of making the Greek fire has never been lost, but has simply been superseded by better contrivances. Favé thinks that the reason why gunpowder was not known as a means of propulsion, arose from the impurity of the ingredients. He has no doubt that saltpetre, sulphur, charcoal, and other matters, were employed for deflagration, and, being impure or badly mixed, the compound would burn rather than explode. He conjectures that gunpowder, as such, was first used in the western parts of Europe, especially in Hungary and the neighbouring countries. In a Latin MS. in the Imperial Library at Paris (No. 7239) the use of powder in mines is referred to. This MS. was brought from Constantinople in 1687, and contains a treatise on the implements of war, and a map evidently constructed between 1395 and 1396, and M. Favé assumes the MS. to be of the same date.

Composition of Gunpowder.

The present composition of the Chinese gunpowder corresponds so nearly with our own, that the difference is nearly insensible; but whether it had arrived at that degree of perfection in their ancient periods, we have no means of knowing. Neither can we judge of its nature and power as known to the Arabs. But in our own country it was late in arriving at its present state of perfection; nor do the various proportions given by one of our earliest writers on the subject argue much in favour of their chemical knowledge. Peter Whitehorne, who wrote in 1573, gives numerous proportions, without seeming to be well aware of their respective values; and, respecting some of them, it is easy to see that they were scarcely fit for squibs, much less for the purpose of projecting shot. Such is nitre, sulphur, charcoal, equal parts; whilst, in the very opposite extreme, we have nitre 12 parts, sulphur and charcoal, of each 3 parts; and, still worse, nitre 27 to 3 of the other two ingredients; or nitre 48 parts, with 7 of sulphur and 3 of charcoal. Here, such as these compositions are, want of experience can scarcely be pleaded, as they are not better than those given by Nye in 1380. In France also, the composition, at no very remote period, was—nitre 50, sulphur 16, charcoal 34; from which it varied to, nitre 67, sulphur 13, charcoal 20; and to nitre 84, sulphur 8, charcoal 8; these differences being supposed to be necessary for the larger cannon, and the smaller progressively, the last being their musket powder.

But as we cannot afford space to describe the gradual progress of improvement in the composition of gunpowder, we will state the proportions at present in use in different nations. They do not materially differ from each other, although it is unquestionable that they are not all of equal power.

	Nitre.	Sulphur.	Charcoal.
Royal Mills at Waltham Abbey	75	10	15
France, National Establishment	75	12·5	12·5
French, for sportsmen	76·9	9·6	13·5
French, for mining	62	20	18
United States of America	75	12·5	12·5
Prussia	75	11·5	13·5
Russia	73·78	12·63	13·59
Austria (musket)	72	16	17
Spain	76·47	12·75	10·78
Sweden	76	9	15
Switzerland, round powder	76	10	14
Chinese	75·7	9·9	14·4

Without any knowledge of the law of definite proportions, and even before that law was known to exist, each nation had experimentally hit upon nearly the best proportions of the three ingredients, namely, 1 equivalent of nitre, 1 of sulphur, and 3 of charcoal; or 75 per cent. of nitre, 11·77 of sulphur, and 13·23 of charcoal. In practice the proportions used for the manufacture of 100 lbs. of gunpowder are—saltpetre $77\frac{1}{2}$ lbs., sulphur $10\frac{1}{2}$ lbs., charcoal 16 lbs. = 104 lbs., the extra 4 lbs. being allowed for waste.

The proportions in the *commercial* gunpowder of England vary indefinitely, according to the views of the manufacturer respecting the markets, the price, and other matters. Cheapness being the leading object where it is only made for sale, and the nitre being the only expensive article, the proportion of this is diminished, and those of the other two ingredients increased. The worst is made for the Guinea trade; and, if we are not misinformed, that for the Canada trade is nearly as bad, whilst the next upwards in the scale is that sold to Turkey. We have never met with any specimen in which there was less than 62 of nitre; but we have reason to believe that some of the inferior kinds do not contain more than 50. For the use of miners it is also made with a low proportion of nitre, producing advantages in mining not intended by the makers, whose only object is to manufacture a cheap article. But the proportions of all the commercial powders are very inconstant, even when furnished *bonâ fide* to the government.

It is not for want of experiments if greater uniformity has not been attained in these compositions, and if all adhere to their own. Baptista Porta was one of the first who made accurate investigations on this subject; and, as long ago as the sixteenth century, he fixed on the proportions now used in France. Beaumé fixed on 80 of nitre, 5 of sulphur, and 15 of charcoal; while Morveau and the Committee of Public Safety assumed three proportions, viz., 76, 77, and 80 of nitre, 9, 7, and 5 of sulphur, and 15, 17, and 15 of charcoal respectively. Chaptal gives the proportions 77, 9, and 14; and Proust 78, 9, and 13. It is easy to account for these differences of opinion, when we recollect the numerous accessary circumstances which modify or vitiate the results obtained from practice. With the very same power it is scarcely possible to procure uniform results, as is well known to artillerists; and hence, from practice alone, unless after an enormous number of trials, no certain conclusions can be drawn. It will, indeed, appear that, under various proportions, the effects may really be the same; because, as the force of powder depends partly on the quantity of gas generated, and partly on the heat to which it is raised, any deficiency on the one hand may be compensated by an increase on the other. Thus, as the greater quantity of gas is produced by the largest proportion of charcoal, the greater heat is caused by augmenting that of the sulphur. In all the trials that have been made in this country, no reason has been found for varying from the proportion 75 nitre, 10 sulphur, and 15 charcoal; and the same is used for arms of all calibres, the only difference for the respective arms being made in the sizes of the grains.

It is proper, on this subject, to state, that whilst the explosive power depends fundamentally on the quantity of gas that is permanently generated, that gas is almost entirely produced by the combustion of the charcoal; the nitre being the cause of that combustion, and furnishing one part of the generated gas from its decomposed acid, as it does the other by converting the charcoal into carbonic acid. Were nothing else required, therefore, to produce the effect, the best powder would consist of nitre and charcoal alone, as the sulphur consumes a considerable part of the oxygen of the nitric acid, without adding anything to the permanently elastic gas. But as there are two other important elements in this problem, namely, the rapidity of the inflammation and the heat, the sulphur becomes an indispensable ingredient; whilst, by expanding the gas at the moment of explosion, it more than compensates for the diminution of permanent bulk which it causes. Perhaps, on this compound view of the subject, M. Beaumé's composition is really the best, abstractedly considered, as the nitre is sufficient to burn the whole of the sulphur and the charcoal also, and as both the degree of heat and the quantity of gas seem to be best balanced for the intended effect. But a composition of this accurate nature requires equal accuracy of mixture and manufacture; and as that is scarcely attainable on the great scale, it is found better so to increase the sulphur and charcoal as to ensure the total decomposition of the nitre, this being further an object of economy.

Sportsmen, as well as artillerists, ought to know that the fouling of their barrels after firing is in a direct ratio of the weakness and badness of their powder; and this effect is most completely obviated by using M. Beaumé's, or any similar mixture. Not only does the feebleness of such powder prevent the barrel from being swept clean at the explosion, but as the foulness consists chiefly in a mixture of the carbonate and sulphate of potash with charcoal, that becomes necessarily greatest wherever the nitre is reduced in quantity for the purpose of introducing the cheaper ingredients. The analysis of powder, at least as far as that ingredient is concerned, is so easily made, that every one who feels an interest in his success as a sportsman should examine what he uses, as the very worst mixture can be rendered beautiful to the eye by a minute grain and a high polish.

The British government use but one proportion for all services. As far as artillery and musketry are concerned, we do not consider this as of much moment; or that any material object would be obtained by using different ones proportioned to the respective calibres. But we consider that they commit a great error in adopting the same for the *mining* service; and that some of the failures caused in our wars, in attempting to blow up works or demolish bridges, have been produced by the very excellence of the powder—in short, by its too great strength. To take the case of common blast-mining as a simple one, and to put the extreme case of all: If it be attempted to spring a rock by the powder of chlorate of potash, either the plug will be blown out, or a very narrow space round the mine will be broken. With the best musket or cannon powder the same effects, but in a less degree, follow. Here the miners' powder, which seldom contains as much as sixty per cent. of saltpetre is effectual; and, what is more, it is rendered still more active by being damp from careless keeping, or from remaining some time in the mine before it is fired. Mathematicians will immediately see the solution of this apparent incongruity, by recollecting that the element of time is an ingredient in the problem. With too great a velocity the parts of the general mass nearest to the acting force are disintegrated; so that not only is the force expended in this act, but the gas thus escapes from the opening. With a power acting more slowly, the whole mass, or a much larger one at least than in the first case, is moved; and thus the rock is widely shaken, although not blown into the air. It will be found practically, that the further the fragments are dispersed, the less is the effect; and thus the mine which is most dangerous to the workmen is also the least efficacious.

It is from this variation respecting the power of gunpowder, hitherto unattended to, from confounding impulse and pressure, to which at least it bears a certain relation, that so many different opinions have been entertained respecting the force of powder in particular cases. Hence also have arisen various projects for increasing its efficacy; amongst which quicklime has been repeatedly recommended. In mining it does actually increase the effect, though not the force. On the contrary, it diminishes the force; and it is from that very cause that it is more effectual in mining or shaking a rock. The same object can be obtained by a mixture of saw-dust; but it must also be remembered that this will not happen unless good powder be used. Ordinary miners' powder will not often bear this kind of dilution. It is easy now to apply this principle to military mining, where the object is to produce as extensive a shock as possible. Mathematicians have calculated the globes of compression for certain charges; but it will be found that these vary so much, according to the strength of the material, that the conclusions cannot be depended on. This, however, is a very important problem, because the destruction of a work depends on the area of the base of the paraboloid, or whatever else the figure be, which the explosion produces. We cannot, however, enter further on this subject, as it would lead us beyond our limits.

On the Choice and Examination of the Materials.

Nitre, as it is imported from India, whence all that is used in this country is procured, is mixed with much dirt and with some salts, consisting chiefly of the nitrates and muriates of lime, and of muriate of potash. As the deliquescent salts, in particular, are extremely injurious from their property of attracting moisture, it is most important that the nitre to be used in gunpowder should be thoroughly refined.[1] For this purpose rain-water ought to be used if possible, and if not, such river or other waters as are found, on trial by the appropriate tests, to contain the least quantity of saline matters. The nitre is first boiled, and the grosser impurities separated by filtering through hempen bags, after which it is crystallized. After draining, one washing is sufficient to render the first crystallization sufficiently pure; but the subsequent ones require repeated solution and crystallization before all the foreign salts can he separated. The loss which rough nitre sustains in refining is termed the *refraction*. But we need not dwell on this subject. We shall only add, that no nitre ought to be used unless it will stand the tests of nitrate of silver and of carbonate of potash, without exhibiting a precipitate.

It is held necessary that the nitre should be thoroughly dried; and, accordingly, much unnecessary labour is bestowed on this subject, since it must be moistened in the mill when the composition is submitted to the rollers. The only real use in drying it is to enable the workman more easily to allot the true weight, which might equally well be done by an average and an experiment. We should scarcely have noticed this, but that the French manufacturers boast much of the superiority which they derive from reducing the nitre to minute crystals, by agitating the solution. In the royal mills it is further the practice to fuse the nitre into large cakes. By this method it is speedily dried, easily stored away, and protected from depredation. These advantages are held to be sufficient to compensate for the expense; but it ought to be remembered that there is a degree of hazard in the process, as, if the salt should be overheated, it might be so far decomposed as to have a portion of potash united with it.

Sulphur, as it is received from Sicily, the great emporium of this commodity, is mixed with a considerable proportion of lime, whilst a portion of it is also combined with that substance, forming calcareous hepar, or sulphuret of lime. From this and the grosser accidental matters it is purified by melting; the sulphuret and the earth subsiding to the bottom of the mould, so as to admit of being mechanically separated. This residue, yielding no more pure sulphur by that process, is afterwards submitted to distillation. When the sublimed material is to be used, it requires previous washing, till it be entirely freed from the sulphuric acid adhering to it, and it may be tested for this purpose by means of the muriate of barytes. The fused sulphur, if doubted of, may be submitted to combustion, and the residue noted; but a little deficiency in the purity of this ingredient is of no moment.

With respect to the charcoal, there is considerably more nicety required than is generally imagined. The soft woods have been preferred from time immemorial, since even in the receipt of Magnus Græcus, formerly quoted, the willow is mentioned. The poplar and many others have been used abroad; but in this country those commonly adopted are the white willow and the alder. Even among these soft woods there is a considerable difference, as our own experiments have shown; and in them it was proved that the greatest explosive power, *cæteris paribus*, was produced by the wood of the *Rhamnus frangula*, commonly called black dogwood, as we shall show more particularly hereafter. The hard woods are invariably rejected, and with justice; though the reasons for this practice, which are derived from the presence of salts in these, are not the causes of their inferiority, certainly not the only ones. It is nevertheless true that no wood which contains carbonate of potash, or other deliquescent salts, is fit for the purpose, and for the most obvious reasons. This is the case in the oak, elm, fir, and other trees. But there is another reason for the badness of these kinds of charcoal, the cause of which is not so obvious, although it is evidently connected with their hardness. To us it appears to depend on the small proportion of hydrogen combined with the carbon in these charcoals, compared to that which exists in the produce of the softer woods. Even these can be reduced to the same state by overheating. Thus the hydrogen is dissipated, and the charcoal becomes so hard as to scratch steel; in which case, however obtained, it is always unfit for powder.

As this subject is yet obscure, from our imperfect acquaintance with the true nature of charcoal, and with the modifications of which it is susceptible, it becomes necessary to have recourse to experiment, for the purpose of determining, at any rate, the proximate cause of this difference in the explosive powers of the several kinds. Various trials have accordingly been made, as well by ourselves as by the French chemists; and, for brevity's sake, we add the most important results in the subjoined table. We are not informed of the process which was adopted by the French for measuring the gas; but in our own we had recourse to the pneumatic apparatus, using it in the manner which is described in another part of this article for collecting the total produce of the combustion of gunpowder. The mixture, in the French experiments, consisted uniformly of 60 parts of nitre and 12 of the charcoal submitted to trial. In our own they were varied, and the results taken from those in which the combustion of the charcoal was completed, and the quantity of gas the greatest. As no more nitrous acid could be decomposed than there was coal present to burn the oxygen, it is plain that in these the results are correct.

	Prop. Parts Gas.	Solid Residue.		Prop. Parts Gas.	Solid Residue.
French Hemp stalks	62	12	French Fir	66	30
... Asphodel	62	20	... Chestnut	66	36
... Vine	64	20	... Hazel	66	33
... Peartalks......	62	21	... Lamp black...	54	44
... Spindle tree (*Euonymus europeus* ...	66	28	... Coke...........	54	45
			... Filbert	72	30

These results are such as to prove that there are important differences in the produce of gas; but, with regard to practice, they are of very little value, as few of the substances submitted to trial could be used. To admit of comparison between our own experiments and these, we shall reduce our proportions to the same standard, by taking our scale from the filbert at 72. We neglect the residue, knowing that it proves nothing, as the results are uncertain, in consequence of the irregular absorption of water, and partly from the impossibility of collecting the solid and the gaseous matters both from one charge.

	Gas.		Gas.
Filbert	72	Oak bark...........	58
Oak	61, 63	Animal charcoal...	50, 46, 42, 40
Mahogany	58	Coke..................	52, 48
Elm	62	Lamp black.........	54, 52
Willow, *Salix alba* ...	76, 78	Oak charcoal overheated	54, 56
Alder.....................	74, 73	Willow ditto	59, 64, 66
Black dogwood, *Rhamnus frangula*	80, 82, 84		

These various results, and some others which we have thought it unnecessary to record, may, in a certain degree, depend on inaccuracies in the experiment; but in the greater number they arise from real differences in the charcoals from the same substance, produced, as we before insinuated, by overheating. This is apparent in the two cases above cited of oak and willow; but in some trials, the differences were even greater. Coke and animal charcoal are particularly liable to vary.

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[1] Were it not for its hygroscopic properties, nitrate of soda might be advantageously substituted for nitrate of potash in the manufacture of gunpowder, on account of its containing a much larger amount, by weight, of gas-forming ingredients.

It is evident from the preceding table that the best charcoals for gunpowder must stand in the following order: Black dogwood, willow, alder, filbert. From the French tables, in which we do not, however, place much confidence, we may add, consecutively, hazel and the spindle tree; but our own trials raise these to 70 at least in the scale. Such, at present, are the results of these trials as to the best charcoal; but we are by no means satisfied that we have yet found out the best wood for this purpose. The experiments are laborious; yet we think the subject deserving of more attention than has yet been bestowed on it. With respect to coke and animal coal, they stand very low in the scale, as the over-hardened wood charcoals do; and, in all cases, there is a direct relation between the produce of gas and the facility of combustion under ordinary circumstances.

To satisfy ourselves by trials of a more direct nature, and more applicable to practice, we chose a method derived from the flight of rockets, as less liable to disturbance from collateral causes than any practice with pieces of ordnance. The rockets were of compound dimensions, and were all made with the same proportions, and driven by the same hand, so as to ensure all possible uniformity, the only variation being in the nature of the charcoal. The vertical elevations were taken by two quadrants at the same time, and all the flights that deviated from the perpendicular rejected. The mean vertical ascent of a great number of those made with willow, alder, and dogwood, was 480 yards; but between these three charcoals, the differences were so great as to give various results, which may be represented by the following numbers:—Dogwood, 515, 550, 525; willow, 470, 480, 490; alder, 455, 460, 470.

Greater accuracy is not attainable in this way, as may easily be conceived by those who know by how many collateral circumstances a rocket is influenced; but these trials are quite sufficient to justify the general inference made from the experiments in the pneumatic apparatus.

It has been held that the charcoal for gunpowder ought to be made in cylinders or retorts by distillation; and this expensive process is consequently adopted. It is doubtful if this is not a mistake of the *causa pro non causa.* Pit charcoal, being made in coppice woods, is always the produce of oak; and it is probable that this wood, if charred in close vessels, would be even worse than it is now. There is more danger of overheating in the retort than in the pit, while the wood is not better burned; and hence, by a careless management of the process, even the charcoal of willow or alder may be rendered as bad as that of oak. Considering these various circumstances, charcoal requires to be submitted to three tests. It ought to act as little as possible, mechanically, even on copper; it ought to exhibit no salts on being treated with boiling distilled water and tested; and it ought to be thoroughly burned. The best test of this latter circumstance is its giving out no smoke when heated.

A new and economical method of distilling charcoal was invented by Sir William Congreve. Subsequently, but without any knowledge of what had been done, the same process was suggested in America by Dr Bollman, to whom we are indebted for the cheap method of purifying pyroligneous acid, and rendering it a substitute for common vinegar. In this process the retorts or cylinders are ranged in a row, a gas pipe from each being conducted to the bottom of the next in succession. By means of a fire under the first alone, the distillation of the whole may be conducted together; the gas which issues from that one being sufficient to char the next, and so on in succession to the end of the chain. The acid is collected in this case, as in others, by means of a separate pipe arising from a lower point in the retort.[1]

Before we dismiss this important department of the gunpowder manufactory, we must refer to the property which charcoal possesses of absorbing and retaining water, and which we have ascertained to be different in the different kinds of wood. It is from this hygrometric power that gunpowder attracts moisture, even when the nitre has been perfectly purified; a circumstance which materially interferes with its rapidity of inflammation, and consequently with its strength. But as the various hygrometric powers of different charcoals have not been properly examined, we can communicate no information on this subject which is worth recording.

Manufacture of Gunpowder.

Grinding.—The first part of the process consists in pulverizing all the ingredients separately, after which they are weighed and mixed in a general and rude manner before being submitted to the mill. In some countries a pestle engine is used, or a stamping-mill; but it is subject to more hazard and inconveniences than the grinding-mill which is adopted in this country. This is formed on the model of the common bark-mill, and with two rollers at different distances from the axis, so as to cover the whole bed. The weight of each roller is commonly about three tons, and they are generally made of limestone, although iron cylinders have been adopted in some works, with the gudgeons working in gun metal. The bed, which is surrounded by a wooden margin, is of the same materials; and the whole house is built of slight-framed wood, to diminish the evils that might arise from a casual explosion. A wooden rake follows the rollers, for the purpose of bringing the mixture under the cylinder; and the motion is communicated either by water or by the power of horses.

The mixture being distributed on the stone, to the amount of forty or fifty pounds, is moistened with distilled or rain-water, but so as not to be wetted. It is barely sufficient to prevent the dust from flying. According to the velocity, the grinding is perfected in a space of time varying from three to seven hours; and it depends on the inspector to determine by trial for each velocity when the mixture is perfect. After that, time is a sufficient measure. The removal of the *mill-cake*, as it is called, requires caution, as it is commonly at this time that the explosions take place. These, indeed, will generally be produced if the bed and cylinder should come into contact while they are moved round slowly, to enable the materials to be taken out; the friction, under so great a weight, even of the purest limestones, or of iron, being sufficient to inflame gunpowder. To prevent this risk, a thick piece of hide is carried before the cylinder as the powder is removed, and by this plan the contact is prevented.

Pressing, Granulating, and Drying.—The mill-cake thus completed is gunpowder, and may be granulated. But it is yet not so firm as it can be rendered by further pressure; and that property is very essential to its durability in travelling. For this reason, it is further condensed by pressure of about 75 tons per superficial foot, by means of Bramah's hydraulic engine; for which purpose the mill-cake powder is placed on the bed or follower of the press, and separated at equal distances by sheets of copper, so that, when taken out, it is in the form of thin solid cakes, termed *press-cake:* this is equal in hardness to that of many stones, and its specific gravity is also increased. By being divided into cakes of an inch or more in thickness, it can be more easily broken into pieces for the granulating engine.

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[1] In the manufacture of the best kinds of sporting powder, a plan has been introduced in France for carbonizing the wood by means of high-pressure steam, producing what is called *charbon roux*, on account of its rusty-red colour. In the *Annales de Chémie et de Physique* for 1848, will be found a memoir on this subject by M. Violette, in which he insists upon the importance of preparing the charcoal from the same kind of wood at a uniform heat, since it varies greatly in its properties according to the temperature at which it is made. At the temperature of 250° C. and below, the wood is but imperfectly carbonized; at 300° C. and about, the red charcoal is produced; at 350° C. and beyond, black charcoal is formed. The advantages of the red over the black charcoal are its greater yield, from 40 to 42 per cent. of charcoal being obtained; while at from 350° to 400° C., only from 26 to 30 per cent. were obtained, and the force of the powder made from red charcoal is greatly augmented. From 25 to 30 kilogrammes of wood can be carbonized in two hours, and six charges can be passed through the apparatus per day. The super-heated steam effects the carbonization with great facility, and the temperature can be exactly maintained by means of a bath of tin or fusible metal.

The press-cake is crushed between hollowed rollers of different successive gauges, and is next passed to the granulating engine. This consists of a number of sieves made of strong vellum, perforated by punched holes, and supplied with top and bottom covers, like those used by druggists. A platform, to which a horizontal circular motion is communicated by machinery, receives a number of these, which are fixed in it. The lumps of the press-cake are introduced into each of these, together with two flatted spheroids of lignum vitæ or other hard wood. During the rotatory motion the lumps become thus broken into smaller fragments, which fall through the holes, together with the dust; the *grained* powder, as it is called, is received by hair-cloth sieves, which allow the dust to pass into a receptacle below.

It remains to separate the grains according to the sizes that are required; and for military purposes these are three: one for large ordnance, another for musketry, and a third for pistols. The powder generally used by sportsmen is of still finer grain than the last. The separation is performed by means of wire gauze, or strong silk gauze, of different apertures; the sieves being commonly cylindrical, and turned by the machinery. At the same time the dust is separated, and afterwards returned to the press.

The last operation is known by the name of *glazing*, a term literally true in the case of sportsmen's shooting-powder. But the real object of this operation is to take off all those acute angles from the grains, which would otherwise be ground off in travelling, and thus produce great inconveniences, by introducing dust into the casks. This process is performed by causing the separate classes of grains to revolve in cylinders so constructed as only to let the dust through; and the mutual friction of the grains produces the desired effect. When it is required to give the powder a brilliant surface, as is the case with fine sportsmen's powder, the cylinder is lined with a woollen cloth; and sometimes, if a high polished gloss is desired, some black lead is introduced into it. But these are matters of mere ornament.

Although the powder thus completed appears dry to the touch as well as to the sight, it contains a considerable quantity of water. This must be separated by drying. In hot climates exposure to the sun is sufficient; but in most cases artificial heat is required. In France a complex process was adopted by passing heated and dry air through a closed chamber, with the intention of diminishing the risk of explosion; but, with any moderate degree of care, it may be done in any manner. In some of the older works the stove in use was a closed room with air-holes above, heated by means of an iron cupola or large pot, to which a fire was applied outside of the building; the temperature being regulated by a thermometer fixed in the door, and indicating the heat externally. In this room the powder was exposed in flat trays round the circumference. Lately, the method by steam pipes has become generally adopted; and in this way every possible security, real as well as imaginary, is obtained.

Analysis of Gunpowder.

It is often useful, and frequently indispensable, to analyse gunpowder. This process will, indeed, generally supersede the necessity of *proving* by the usual methods, as it is always certain that a specimen of gunpowder, well made, will produce the best proof. It is particularly convenient in the case of gunpowder purchased from merchants, or by contract; as, from the several causes which may easily be conjectured, such an article may be deficient in the quantity or in the quality of the saltpetre, or in both. It is useful, moreover, in the case of damaged powder, returned from military and naval service; as we can determine by these means whether it has been wetted by rain or by sea water, or whether any portion of the nitre has been washed out. Powder thus damaged by fresh water only, and otherwise uninjured, may be committed to the mill and restored at a very trifling expense. If the saltpetre is diminished, it can thus also be restored; but, on the contrary, if the damage has been produced by sea-water, it becomes necessary to destroy the powder for the purpose of extracting the nitre.

By washing the powder, previously weighed in a filter, with hot distilled water, the nitre is dissolved, and admits of being crystallized and weighed. The tests, nitrate of mercury and carbonate of potash, may then be used to determine its purity. Thus it may be ascertained whether, in a new sample, the nitre is in sufficient proportion, and whether it has been well purified; and in a damaged one, whether the injury has arisen from fresh or from salt water. It only remains to examine the proportions of the charcoal and sulphur; the sulphur may be dissolved out by means of bisulphide of carbon, evaporating and weighing; the charcoal that is left may also be weighed, but it is scarcely necessary to perform the latter part of this analysis, as the manufacturers are under no great temptation to assume a wrong proportion of sulphur and charcoal, although the joint quantity of the whole may be in excess.

Analysis of Gunpowder after Explosion.

To a certain extent, at least, an analysis of gunpowder after explosion is necessary, for the purpose of procuring data whence its force may, *a priori*, be calculated. The rest is only matter of curiosity, and we have borrowed the determination from the experiments of the late Mr Cruickshank. As far as this analysis may differ from that of others, it must be recollected that the separation of mixed gases is not a very easy problem. The mere collection of the total gaseous products is easy; and had the same method been followed by Robins and others, less difficulty would have been found in their computations. Had Count Rumford and others adopted so simple an expedient, they would not have had recourse to the expansive force of steam, or of the air contained within the charge, for an explanation of the cause and nature of the force.

By ramming a hundred or one hundred and thirty grains of powder into a narrow metallic tube, furnished with a long handle, it is easily caused to burn under water, as the combustion is slow and safe when it is thus condensed; and this quantity is sufficient for any purpose of experiment. The tube being plunged under the water with its mouth downwards, under the bell-glass of the pneumatic apparatus, the powder may be lighted without any loss. This is done by introducing into that part of the tube above the charge, which is purposely left empty, a crooked wire heated to redness. After the hot wire and the tube in this position are immersed under the bell, the former is brought into contact with the charge. To prevent the water from absorbing any portion of the carbonic acid, sulphuric acid may be added to it, as well as many other matters too obvious to mention; or else it may be heated. Thus the gaseous product may be collected and examined at leisure, by the means which chemistry furnishes, and which our limits will not permit us to detail.

To collect the solid product, it is most convenient to use a glass vessel, on account of the certainty of obtaining the produce, which is, in great part, carried up in smoke, and adheres to the receptacle in which the powder is burnt. But we need not describe the numerous modes in which this object can be attained; and shall only add, that to diminish the hazard, the powder employed for this purpose may be wetted without affecting the results.

The chief gaseous results of the analysis of gunpowder are carbonic oxide, carbonic acid, nitrogen, and sulphurous acid; while the solid residue consists of carbonate and sulphate of potash, sulphuret of potassium and charcoal. The maximum gaseous volume is produced by the formation of carbonic oxide and sulphurous acid with the liberation of nitrogen. With 1 equivalent of nitre, 1 of sulphur, and 3 of charcoal, the nitre yields 5 proportionals of oxygen, of which 3, combining with 3 of charcoal, furnish 3 of carbonic oxide gas, and the remaining 2 convert 1 of sulphur into sulphurous acid gas, and the single proportional of nitrogen is disengaged alone. Hence the gaseous volume produced by 130 grains of gunpowder, equal in bulk to 75·5 grains of water, or $\frac{3}{10}$th of a cubic inch will, at the atmospheric temperature, be as follows:—

	Grains.	Cubic inches.
Carbonic oxide	42	141·6
Sulphurous acid	32	47·2
Nitrogen	14	47·4
		236·2

being an expansion of 1 volume in 787·3. But as the temperature of the gases at the moment of formation must be incandescent, this volume must be estimated at three times the above amount, or considerably more than 2000 times the bulk of the solid.

This theoretical account does not, however, quite agree with the products obtained by experiment, especially as regards the evolution of carbonic acid, and the residuary sulphuret of potassium. Professor Graham has therefore given the following view of the results of the deflagration as being more consistent with experiment:—

Before Combustion.		After Combustion.
3 Carbon.	3 carbon	3 carbonic acid.
Nitrate of potash.	6 oxygen nitrogen potassium	—nitrogen.
Sulphur.	sulphur	sulphuret of potassium.

The sulphuret of potassium, on coming into contact with the air, becomes converted into sulphate of potash, thus giving rise to the white smoke that follows the explosion of gunpowder.

Gunpowder ignites at a temperature of 600° Fahr. It is not readily ignited by flame, as may be shown by putting a heap of it on a cork, contained in a saucer, and then pouring in ether or spirits of wine; the latter on being ignited will surround the gunpowder with a copious flame, and not fire it for a considerable time. A piece of gun-cotton may be placed on a heap of gunpowder and fired without igniting the powder. Gunpowder may even be sprinkled on the top of gun-cotton, and be scattered about by its explosion without igniting; but this is partly due to the greater rapidity of action of gun-cotton. (See GUN-COTTON.)

On the Sizes and Forms of the Grains in Gunpowder.

The variety in the effects of gunpowder, arising from differences in the sizes and forms of the grains, has been an object of much inquiry. The conditions of the problem are somewhat complicated. Within certain limits, which gunpowder made of nitre cannot exceed, rapidity of inflammation is essential to the production of a full effect. Not to inquire into other causes, without this property, a part of the charge is rendered useless by being blown out unburned; an accident not uncommon on ordinary occasions. This may also happen from the form of the piece and that of the charge; it will occur in a long charge or in a short piece, or, most of all, when both are united. Hence variations in the effect of gunpowder, which are independent of its quality, and which will render computations founded on that circumstance alone deceptive. As we have not room to dwell on this subject as it deserves, we must refer our readers to Robins and others who have written on it.

Now, this rapidity of inflammation may be attained, in some measure, in two ways; by intense heat, and by facility of transmission of the flame. But if a charge is considerable, no intensity of heat can compensate for the absence of the second condition. To put an extreme case: If the eight-pound battering charge of a 24-pounder were a single grain or lump, it requires little thought to perceive that the shot would have quitted the gun before the charge was half burned. Hence granulation is as necessary for ensuring the full effect as it is for convenience. And thus, also, we are led to the cause of the bad consequences of hard ramming. A charge very thoroughly rammed, and lighted at the anterior end, would burn like a fuse or a squib; if lighted by a touch-hole, it will be blown out like a shot. Thus the rapidity of the inflammation is secured by multiplying as much as possible the intervals for the passage of the flame, or by diminishing the size of the grains. Yet there is a limit even to this; and as that can only be determined by experiment, it is from such trials that the grain for the smallest charges has been fixed. As the charge, however, increases in dimension, the volume of flame and the intensity of the heat produced admit of a grain of greater bulk, or one containing, in a given dimension, a smaller number of intervals. Much refinement on this subject being, however, unnecessary, one size is used for all ordnance; whilst an inferior size is made for muskets, and one still less for pistols. The powder manufactured for fowling-pieces is also of the smallest size.

But there is a further element concerned in this question; and that is, the different specific gravities of the different sizes of powder, or, what is especially to the purpose here, the different spaces occupied by the different sizes. The same measure which contains 172 grains of the smallest, contains 180 of the medium, and 195 of the largest. If powder be measured instead of weighed, it is evident that there will be one-ninth more of the large than of the small grained in a given charge. If weighed, the larger will occupy about one-ninth less space. In either case the greater force will be excited by the large-grained, presuming that the inflammation is perfect. When it is weighed, as is the correct practice, it will not be very difficult to calculate the difference; as the force of the expanding fluid is in a certain inverse ratio of the space in which it is confined.

To increase the rapidity of inflammation, the French have manufactured spherical powder. The principle of the process is similar to that used by confectioners in making comfits. Angular grains are rolled in machinery adapted to that purpose, in powder dust slightly moistened; and thus small globules are formed. This grain is less liable to wear in travelling, from the absence of angles; but it is at the same time more tender, and less able to bear pressure than pressed powder. Nor do the French experiments, either by the eprouvettes or the tables of practice, prove its superiority; on the contrary, the average results of its comparison with ordinary powder are unfavourable and this also was observed in our own trial. Hence it has not been adopted in Britain.

Proving of Gunpowder.

To ascertain, by practical trials, the strength of gunpowder, is not merely a matter of curiosity, but of absolute necessity. As the force in battering ordnance, and the range in mortar and howitzer practice, are regulated by the quantity of the charge, it is obvious that no regular practice in the field, or consistent results, will be obtained, unless the standard of strength in the powder is both known and invariable. This is particularly the case with mortar practice against small works or redoubts, or against the enemy's trenches; and also with howitzer practice against moving columns in the field. An invariable standard is, unfortunately, impossible; but it is always something to approximate to it. In military arrangements, a proof is also requisite, for the most obvious reasons, when powder is purchased from merchant manufacturers; not only that a minimum standard of strength may be fixed, but that, as far as is possible, the various qualities furnished may be reduced by mixture to a uniform standard.

It is usual, in the *first* place, amongst the workmen, as well as the merchants, to form a judgment of the quality of gunpowder by the aspect and firmness of the grain; and the latter, indeed, is a quality which is indispensable, if it is to be exposed to much land-carriage. The nicety of tact required for this is, however, only to be attained by practice, as in all other species of sampling. The moisture is judged of by weighing, and by subsequent drying and comparison. The quantity of this is a question of profit and loss in the purchase. But it is more important to ascertain its hygrometrical powers, by exposure to moisture after drying. That is the best which gains least weight by this operation; nor, in any case, should the absorption of water amount to ¾th per cent. It is also a common practice to try it by what is termed *flashing;* but this only serves to show whether it has been thoroughly ground; if not, the charcoal will produce sparks.

The trial of force is made by eprouvettes of different constructions, or else by practice. The most common eprouvette is a short chamber, provided with a gun-lock, the orifice of which is closed by a cover, connected with a graduated and ratchet wheel and spring. The quantity of the wheel's revolution is the esteemed measure of the force. But, often as this machine has been varied and improved, the results are so irregular, that it may fairly be considered as useless. Various other instruments for this purpose have been invented and tried; but, without figures, we could not render their constructions intelligible. Regnier's does not materially differ from the preceding in its principles; and the results are equally unsatisfactory. His hydrostatic one appears to be still worse. We may say the same of that described by Saint-Remy, and of another recommended by the Chevalier d'Arcy; and, of the whole, we would remark that the leading fault is want of simplicity. In a case like the explosion of gunpowder, where so many disturbing forces are always at hand to vitiate the true results, we cannot be too careful in eliciting all unnecessary causes of disturbance. If there is any one class of machinery in which simplicity is indispensable, it is that which belongs to gunpowder, under any of its relations.

We consider, however, that, as an eprouvette, Dr Hutton's pendulum is as free from exception as any machine can be. The disturbing forces are nothing, or as little as possible; the charging and firing admit of great uniformity; and, on trial, the consistency of the results justifies the expectations formed from its simplicity. In this pendulum, the barrel is fixed upon the bob, and the force of the gunpowder is therefore measured, not, as in Robins', by the impulse of a shot, but by the recoil. The indication of the extremity of the arc of vibration is made by a hand continuous with the pendulum rod, which moves an index furnished with a spring sufficiently strong to retain it at that point of a graduated arc where it was left by the movement of the hand. The barrel used for this purpose is an inch in diameter, and is charged with two ounces of powder put in loosely, without wadding or ball. In this, as in all other cases of eprouvettes, the standard of strength is arbitrary; and, for service, is assumed from the best average of gunpowder manufactured by government. The goodness of particular specimens is estimated by their agreement, or otherwise, with this standard.

Notwithstanding, however, the apparent accuracy of this method, artillery officers, both in France and in England, are not satisfied with it as a method of proving powder for service. It is perhaps right that practical men should, in a matter of so much importance, rely only upon such a method of proof as agrees best with the particular objects for which the material is intended. Yet it should also be recollected, that all Robins' conclusions respecting the force of gunpowder were drawn from experiments made on his ballistic pendulum, and that the much more accurate ones of Dr Hutton, on which we now rely, were the results of the practice with that pendulum which we have just described.

The method of proving, then, adopted both in France and England, consists in real practice from a mortar at short ranges. In France a mortar is used of which the diameter is 0·191 metres, or nearly eight inches English, and that of the touch-hole somewhat less than two lines. The diameter of the ball is 0·1895 metres, and the windage consequently is ·0015. The weight of the ball is about sixty pounds. A troublesome verification of the diameter of the bore, of the vent, and of the shot, is made for each day's practice. The mortar is condemned when the diameter is enlarged to 0·192, or if that of the vent becomes ·0005 more than it ought to be. A difference of windage, amounting to ·0002 metres more than what is allowed, condemns the shot, or, as it may happen, the whole apparatus.

All these verifications are so tedious, and the wear of the mortar, the vent, and the shot, so rapid, that it becomes inconvenient and impossible to follow them so nicely in practice when there is much business. It is, therefore, found more convenient to make a standard trial for each day's proof, and to refer all the others to this one; instead of trying to preserve what becomes impossible in practice, an absolute and invariable range.

The English proof-mortar nearly corresponds with the French, it being of the eight-inch calibre, and of brass. The shot is turned and polished so as to be true, and to have at the commencement the least practicable windage. During the progress of use, as the windage increases from the wear both of the bore and of the shot, the range becomes contracted; a circumstance which also follows from the enlargement of the vent, in consequence of which a greater proportion of the generated air escapes at that aperture. But, from the practice adopted with us, these variations are of no moment, till the range becomes contracted so as to render it expedient to replace the shot or the mortar, or both.

The quantity of powder that is used is four ounces, and the mortar being elevated to forty-five degrees, the range is measured in each trial. If the standard range for the day is 225 yards, the powder that gives a range of only 200 is rejected. The chief precautions requisite to procure fair results in this comparative method, are, to take care that the level of the platform and the elevation of the mortar are subject to no accidents; that the powder be fairly placed in the chamber; that the priming tube always reaches to the same depth within the charge; and that the mortar be brought to the same temperature at each experiment. For this purpose, it is to be cooled with water.

Musket powder is submitted to a different species of proof, founded on the same views of rendering the proof for each kind as nearly corresponding as possible with the purposes for which they are designed. A barrel fitted with a turned steel ball, and with as little windage as possible, is used for this purpose. The ball is discharged at the distance of a few yards only, against a compound butt, made of elm planks an inch thick, soaked in water, and separated at a short distance from each other. The extent of the penetration is the proof of the strength of the powder; and the trials in this case also are referred to a standard experiment made each day. Before concluding this subject, we must add, that trials are also made for the purpose of ascertaining the hygrometrical property of the powder to be purchased or issued. This is done by exposing a quantity for a given time in a box perforated with holes, and in a damp room, and then submitting it to the same proof.

Powder from Chlorate of Potash.

To increase the strength of gunpowder has been a favourite project with inventors at all times; most of them forgetting that the same end can be attained, as far as it is attainable, by augmenting the charge, and that neither the one nor the other is practicable without an entire reformation of the whole system of artillery. Could the force of powder be increased one-half, for example, it would be necessary to condemn almost every gun in use; and not only every gun, but every carriage, breeching, ringbolt, nay, we might almost add, every ship in the service. And supposing a new species of ordnance to be invented to suit the new powder, it would require at least one-half as much more of weight in guns and mortars; the same in gun-carriages, with additional strength in every object concerned about them. In the field, in the same manner, an increased number of horses would be required. This view presumes that the object is, what in fact it always has been with inventors on this subject, to gain additional force or range. If the purpose is only that of being enabled to reduce the quantity, and thus diminish the bulk and trouble of transportation, it is so trifling an object as scarcely to be worth attaining. With regard to the main intention, or that of gaining greater range and force, it is only necessary to say, that the powder is already too strong for the artillery.

As soon as chlorate of potash was known, it became obvious that it would not answer the same purpose as nitre, but, from its more energetic action, produce a more rapid combustion. It was first proposed and made by M. Berthollet in 1786, and was long known under the name of oxymuriate of potash; but an accident having happened from it at Essone, by which many people lost their lives, it was abandoned. The proportions used were 80 of chlorate, 5 sulphur, and 15 charcoal. Afterwards they attempted to make a modified compound, by using only a proportion of it with the nitre; but after various trials of this kind, the whole project was abandoned.

We have repeated Berthollet's method, at different times, and on a very large scale, without accidents; but we consider that the proportion of oxymuriate is too large, or at least that it is larger than is necessary. A better proportion appears to be 75 of chlorate, 5 sulphur, and 20 charcoal. As this compound is very easily exploded by friction, it is necessary to be extremely cautious throughout the whole process, particularly in the granulations; nor is it safe to make more than one pound at a time. Of course, it may be mixed in wooden mortars, as it requires no large apparatus.

The great objection to its use is the facility with which it is inflamed by friction, or by a hard blow. It is also more expensive than nitre. It also corrodes the barrels very quickly. In fowling-pieces it is, however, of use; being the detonating priming of Forsyth's and Manton's gun-locks.[1] We may add, that very good powder may be made from this salt and charcoal alone, in the proportion of eighty to twenty; but the grain is not very compact, and it is subject to the same faults as the former.

The action of this powder on the shot in a charge is very capricious, and far from intelligible. In the French trials, it was found to give ranges sometimes double and sometimes triple those of common powder, using the same weights. In various experiments made in this country, the ranges were double in a majority of comparisons, when moderate charges were used. But, by increasing the charges beyond this, the ranges, instead of increasing in the same ratio, began to contract; double the quantity producing but a moderate increase in the range, and a third proportion making an addition still less than the preceding. This, however, agrees with Robins' experiments on common gunpowder; and he has accounted for it by what he calls the triple resistance; proving, as he thinks, that whenever the initial velocity exceeds 1142 feet in the second, a vacuum is formed behind the shot, which, by increasing the resistance before it, speedily reduces the velocity to what it would have been with a smaller charge. We need say no more respecting a compound, the use of which is not likely to be ever extended beyond its application to the detonating gun-locks.

A white gunpowder has been prepared by mixing chlorate of potash with yellow prussiate of potash and sugar.

Keeping and Restoration of Powder.

Powder for service, whether by sea or land, is kept in barrels, containing each one cwt., the size of which is nearly that of a ten-gallon cask, and they are hooped with copper. It being difficult to keep dry casks water-tight, as indeed it was not thought necessary that they should be so, much powder was always rendered useless on service by wet. Lately copper linings have been very properly introduced, and the casks are now water-tight. As great quantities of powder, however, always have been, and always must be, returned unserviceable, it is an important object to be able to restore it, or render it useful, in the most economical manner.

Sometimes the grain is merely adhering, and can be shaken loose again; and this effect is not unfrequent even in magazines on shore. Such powder, when dried by restoring, appears to be sufficiently perfect; but it will be found that it is increased in bulk, and has become spongy and tender. On examination by the magnifying glass, it will also be perceived that the nitre is partially separated. Powder which has once undergone this change is deteriorated, yet is still fit for all ordinary purposes. It is not strong enough, however, to bear travelling; and should it be required for that purpose, it ought to be re-milled, and granulated over again.

When the casks have been opened on service, before being returned, it is necessary to examine carefully whether they do not contain nails, or other foreign matters, an accident not uncommon. In such a case it is unsafe to commit them to the mill, and they must be reserved for extraction. When the powder has been so wetted as to be nearly formed into lumps, it is first necessary to examine, by the test of nitrate of mercury, whether the damage has been done by fresh or salt water. If by the latter, it must also be sent to the extracting house. If it has been very thoroughly wetted, even by fresh water, it will often be found that some of the saltpetre has been washed away. In this case it must be analyzed, so far at least as to determine the proportion of saltpetre wanting, which must be added to it in the mill. In the process of extracting, nothing more is necessary than to boil the powder in pure water, and to filter the solution through thick woollen bags. The crystals are purified exactly as in the case of rough nitre. This is a wasteful process, however, and, in all cases where it is possible, re-milling is to be preferred.

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[1] Percussion caps for muskets are filled with a mixture of equal parts of fulminating mercury and chlorate of potash, fixed by a varnish: caps for cannon are charged with two parts of chlorate of potash, two of native sulphuret of antimony, and one of powdered glass: the last ingredient takes no part in the chemical action but serves to promote friction. Fulminating mercury and collodion are also being tried for caps.

Accidental Explosions in Powder Manufactories.

This is a subject which deserves far more attention than it has yet received; and we can only regret that our researches do not enable us to add more to the present suspicions as to the causes of these, than the little which follows. That want of sufficient care is the general source of these disasters is, however, certain; as certain merchants' mills have been celebrated for them, whilst in others, as well as in those belonging to the government, they have been extremely rare. Such accidents may take place in any part of the works; but they are most frequent, as well as least injurious, when they happen in the mills, the quantity of powder in these never exceeding fifty pounds. It ought at least to be an invariable rule to remove each charge to the pressing-house as soon as it is completed.

We have already hinted at the cause of the explosions in the mills, when they happen at the time of removing the powder from beneath the stones. As stamping-mills are not used in this country, it may be thought superfluous to remark, that, in these cases, this accident sometimes happens from attempting to remove, by a mallet and chisel, the lumps of powder which adhere to the pestles. It is one of the inconveniences attached to that mode of grinding. But it is also proper to observe, that the mills are sometimes blown up whilst working; and, from some examinations which we have made, we have little doubt that this has arisen from fragments of the stones falling off, and being bruised together with the powder. We indeed consider metallic rollers as every way safer than stone ones; since they can only produce fire in case of friction in contact during the removal of the charge. If iron be held objectionable, it is easy to face them with a sheet of copper; but it is proper to recollect that even thus the chances of explosion from friction are not removed. It is a great mistake to suppose that the absolute hardness of any metal is indispensable to the production of explosion in gunpowder. A blow sufficiently powerful, or friction caused by sufficient weight and rapidity, will compensate for the absence of this, in very soft metals, as well as in many other substances which do not readily give fire. Limestone we consider to be a very objectionable substance. Excepting that of Carrara, we know of none, either primary or secondary, which does not contain much silica; often, indeed, particles of quartz sand. In the secondary calcareous rocks it is universal, nor is even the finest white marble of Carrara always exempt, as is well known to sculptors. But the softness even of the purest limestones is no defence; as the friction between these is still more capable of setting fire to gunpowder than that of iron. The readiest way of putting these different substances to the test is by experiments in fulminating silver; as the irritability of this substance enables us to ascertain the facts with a moderate and convenient force.

We know of no explosions in the stove, except in one noted instance, when it was pretty well ascertained to have been produced by a workman, who had determined on suicide in this manner. In the steam stove it can never happen from overheating; but, as the floor must necessarily be dry when the workmen enter to remove the powder, instead of being wet, as it always is in the other houses, it requires additional care respecting the feet of the people employed. The only method that is quite safe, in all houses and magazines, is to oblige the workmen to labour barefooted. The heavy leather slippers in common use are far from safe; as, from not fitting well, they are frequently dragged along; in which way they may easily entangle particles of sand. It ought to be known to all powder-makers, that the breaking of a fragment of quartz, or the sufficient friction of two grains between copper, or even wood, is capable of igniting gunpowder. This is more particularly the case when the finer charcoals are used; as it is this which is the susceptible ingredient.

Explosions in the pressing and granulating houses have happened much too often, nor have the causes been ascertained. As there is a considerable quantity of powder always present here, these are of a very serious nature. It would be proper that these two buildings should always be separated, and, in the usual way, by a work of earth. The old granulating houses are far from safe, as the cranks and other parts of the moving machinery are contained within the house, which is always filled with the dust of the powder. It is trusting too much to the attention of persons, whom practice renders habitually careless, to expect that they will always keep the parts oiled. It is easy to remedy this evil by entirely separating the working machinery from the granulating engine, which may be suspended and steadied by ropes, so as to avoid all chance of friction.

In the pressing house there seem to be two sources of danger, both of which may be obviated. It is easy for powder to become entangled among the threads of the screw; and the consequence of this must be obvious. This would be remedied by adopting Bramah's press. We also think that the sudden condensation of air entangled among the fragments in the pressing box may be sufficient to produce fire. Whether this be the case or not, it will always be prudent to make the first pressure as slowly as possible, that the air may be allowed to escape.

We have observed three other causes of accident, though neither of them belong properly to the manufacturing houses. It is, nevertheless, very important that they should be generally known. Charcoal, in certain cases, is liable to take fire spontaneously, and that even in the lump. This is a case exactly analagous to the pyrophorus of Homberg; and it unquestionably arises from the same cause, namely, the presence of a portion of potassium. It is an accident which, we imagine, can only happen to charcoal made in retorts; as, in the pit method, the potassium could scarcely be expected to escape combustion. The precautions hence requisite, respecting the stowage of charcoal, and the place of the distilling houses, must be evident. When in a state of powder, and under pressure, it also has been known to inflame; and, possibly, from the same cause.

We are not aware that it is usual to keep many waggons and powder-cart tilts about powder magazines; but we do know that this has happened, and with the effect of producing fire. It ought to be generally known, for many other reasons, that fresh painted canvas, stowed close, is subject to spontaneous combustion.

Lastly, it has frequently been observed that fire was struck in closing up the powder barrels, as well on board ships as in magazines; an accident which was supposed impossible, since both copper hoops and hammers are exclusively used. We at length discovered that this accident had arisen from using cast rivets, in the surface of which the sand of the mould had become entangled. Hence the obvious necessity of using none but forged copper rivets; and since the adoption of these in the government stores. this accident has been unknown. (C. T.)

GÜNS, a free town of Hungary. See Köszegh.

GUNTER, Edmund, an ingenious English mathematician and mechanist, was born in Hertfordshire about the year 1581. He was educated at Westminster, and afterwards at Christ Church College, Oxford, where he graduated. Though he took holy orders in 1614, mathematics, which had been his favourite study from his youth, continued to engross his attention, and in 1619 he was chosen to the chair of astronomy in Gresham College, where he remained till his death in 1626. Of Gunter's written works the chief are his *Canon Triangulorum*, a table of logarithmic sines and tangents, extended to seven decimal places, and forming a sort of complement to the logarithms of natural numbers by his colleague Brigg. His practical inventions are detailed below under their respective heads.

Gunter's Line, a logarithmic line, usually laid down upon scales, sectors, &c. It is also called the *line of lines* and *line of numbers;* being only the logarithms graduated upon a ruler, which therefore serves to solve problems instrumentally in the same manner as logarithms do arithmetically. It is usually divided into 100 parts, every tenth of which is numbered, beginning with 1 and ending with 10; so that if the first great division, marked 1, stand for one-tenth of any integer, the next division, marked 2, will stand for two-tenths, 3 for three-tenths, and so on; and the intermediate divisions will in like manner represent hundredth parts of the same integer. If each of the great divisions represent 10 integers, then will the lesser divisions stand for integers; and if the greater divisions be supposed to be each 100, the subdivisions will be each 10.

Use of Gunter's Line. 1. *To find the product of two numbers.* From 1 extend the compasses to the multiplier; and the same extent, applied the same way from the multiplicand, will reach to the product. Thus, if the product of 4 and 8 be required, extend the compasses from 1 to 4, and that extent, laid from 8, the same way, will reach to 32, their product. 2. *To divide one number by another.* The extent from the divisor to unity will reach from the dividend to the quotient. Thus, to divide 36 by 4, extend the compasses from 4 to 1, and the same extent will reach from 36 to 9, the quotient sought. 3. *To three given numbers, to find a fourth proportional.* Suppose the numbers 6, 8, 9; extend the compasses from 6 to 8; and this extent, laid from 9 the same way, will reach to 12, the fourth proportional required. 4. *To find a mean proportional between any two given numbers.* Suppose 8 and 32; extend the compasses from 8, on the left-hand part of the line, to 32 on the right; then bisecting this distance, its half will reach from 8 forward, or from 32 backward, to 16, the mean proportional sought. 5. *To extract the square-root of any number.* Suppose 25. Bisect the distance between 1 on the scale and the point representing 25; then the half of this distance, set off from 1, will give the point representing the root 5. In the same manner the cube root, or that of any higher power, may be found by dividing the distance on the line between 1 and the given number into as many equal parts as the index of the power expresses; then one of those parts, set from 1, will find the point representing the root required.

Gunter's Quadrant, an instrument made of wood, brass, or other substance, containing a kind of stereographic projection of the sphere, on the plane of the equinoctial; the eye being supposed to be placed in one of the poles; so that the tropic, ecliptic, and horizon, form the arcs of circles; but the hour-circles are other curves, drawn by means of several altitudes of the sun for some particular latitude every year. This instrument is used to find the hour of the day, the sun's azimuth, &c., and other common problems of the sphere or globe; as also to take the altitude of an object in degrees.

Gunter's Scale (generally called by seamen the *Gunter*) is a large plane scale, usually 2 feet long by about 1½ inches broad, and engraved with various lines of numbers. On one side are placed the natural lines (as the line of chords, the line of sines, tangents, rhumbs, &c.), and on the other side the corresponding artificial or logarithmic ones. By means of this instrument, questions in navigation, trigonometry, &c., are solved, with the aid of a pair of compasses.

GUNTOOR, one of the districts in Hindustan, on the western side of the Bay of Bengal, called the Northern Circars. It is situated principally between the 15th and 17th degrees of N. Lat., and lies immediately N. of the Carnatic, and S. of the River Kistnah or Krishnah, which separates it from Masulipatam. It is the most southerly of the Northern Circars, and comprehends an area of about 3500 square miles, exclusively of the mountainous district on the W. This district was the jaghire of Bassalut Jung, the brother of the nizam, when Lord Clive obtained, in 1765, the Northern Circars from the Mogul, on which account he was allowed to retain it during his life; but after this it was to devolve to the Company. He died in 1782, but the country was not taken possession of by their agents till 1788. It is a low, flat country, better calculated for growing rice than the more valuable grains. Its principal seaport is Mootapilly; and its chief town is Guntoor, the population of which is estimated at 20,000. The Guntoor territory now forms one of the districts under the Madras presidency, into which the Northern Circars were divided when the present Madras judicial and revenue system was established. Guntoor, the capital, is in E. Long. 80. 30., N. Lat. 16. 18.

GUNWALE (pronounced *gunnel*), the uppermost wale of a ship or boat, or that piece of timber which finishes the upper part of the hull. The raised work above this is called the *bulwark.*

GURNEY, Elizabeth, better known under her married name of Mrs Fry, was born in 1780 at Earlham, in Norfolk. While still a girl she was noted for the benevolence of her disposition, which manifested itself even when, on reaching womanhood, she mingled freely in the gay and brilliant society which her wealth and birth opened to her. Before her marriage, however, which took place in 1800, she had retired from the gay frivolities of the fashionable world, of which she had been so fond. Settling in London, she found there a field wide enough even for her wide sympathies. She began her career of active benevolence among the dregs of the capital, by visiting them in their disease-stricken and poverty-stricken homes, and alleviating their miseries according to their several wants. She then extended her visits to the wards of hospitals; and at last found courage to do what few other English ladies of that day could boast—to entrust herself within the precincts of a jail. She there found men, women, and children recklessly huddled together;—from the comparatively innocent young girl imprisoned on suspicion of a petty theft, to the murderer awaiting his execution;—and certain, if they entered the jail with no deep stain on their souls, to leave it familiarized with every known form and degree of vice and crime. The reformation that Mrs Fry accomplished in this sink of iniquity is as well known as the means she employed to effect it; and the title of "the female Howard," which rewarded her philanthropy, by no means too strongly expressed her deserts. To carry out her benevolent designs more thoroughly, she visited the principal jails in Scotland, France, Prussia, Holland, and Denmark; and, from a study of the various systems employed in these countries, obtained some valuable practical hints for the more effective working of her own schemes. The care and labour entailed upon her by her pious philanthropy proved at length too much for her enfeebled constitution, and she died, at length, of sheer exhaustion, at Ramsgate, Oct. 11, 1844. Her death was felt throughout Europe to be a loss to humanity.

GURWAL, a native state of Northern Hindustan, under the protection of the British government, at the foot of the Himalaya Mountains, principally between the 30th and 31st degrees of N. Lat. The great Himalaya range separates it from Thibet on the N., on the S. it has the Deyrah Doone, on the E. the district of British Gurwal, and Bussahir on the W. It comprehends an area of 4500 square miles. This country formerly included the province of Kemaon, and the district now known as British Gurwal, together with the Deyrah Doone; and in 1814 the Ghoorkhas had possession of the whole tract, which extended northward to the dependencies of China. Since the country was conquered by the British, it has been distributed into distinct portions, the British government having retained possession of the Deyrah Doone, the passes of the Ganges and Jumna, at either extremity of that valley, as also the country directly eastward of the Alacananda and Mandakini; which last tract has been annexed to Kemaon, and the remainder restored to the expatriated rajah. The present boundaries, therefore, of his territories are the Alacananda, from Rudraprayag until its conjunction with the Bhagirathi, and thence to the plains by the united streams of the Ganges, and above Rudraprayag, where the Alacananda receives the Mandakini by the latter river, which has its source on the hills in the north-eastern angle of the province. This country being the commencement of the Himalaya Mountains, presents, to the southward, towards Lolldong, an assemblage of hills jumbled together in many forms and directions—sometimes in chains lying parallel to each other, but of no great extent, and often connected at their termination by narrow ridges running across the valleys at right angles. The summits of all are usually narrow, and of various shapes, and the distance between each other short; and so confined are the valleys, that it is scarcely possible within their narrow limits to accommodate a corps of 1000 men. These ranges are occasionally covered with trees; others are naked and stony, affording shelter for neither birds nor beasts. On the eastern borders of this province, amongst the lower ranges of the mountains, are extensive forests of oak, holly, horse-chestnut, and fir; and beds of strawberries are also seen (denoting the temperate nature of the climate), which equal in flavour those of Europe. From Lolldong to the Ganges the country forms, with very little interruption, a continued chain of woody hills, which extend eastward to an indefinite extent. The elephant abounds in these forests, but is greatly inferior in size and strength to the Chittagong elephant, on which account it is seldom domesticated. On the eastern borders there are hill pheasants among the mountains, which seldom, however, venture into the valleys, unless compelled by heavy falls of snow. A small portion of the country is only cultivated, a great proportion being left in the undisturbed possession of the wild animals. Gurwal is tolerably well watered by the head streams of the Ganges. The Bhagirathi and Alacananda, whose junction forms this great river, are the largest streams in the country. The Bilhang, which falls into the Bhagirathi, the Mandakini, the Pinden, the Mandaioki, the Birke, and the Dauli, all of which join the Alacananda, may be considered as streams of the second order. Most of these streams have their sources in the Himalaya Mountains; the Dauli rises on these mountains, and is one of the remotest sources of the Ganges. None of them are fordable; and they are crossed by rope and platform bridges, at the most convenient points of communication, the rocks and stones which encumber their channel preventing the use of boats. The roads are merely footpaths, carried along the slope of a mountain in the direction of the principal streams and water-courses. Those leading to Bhadrinath are annually repaired for the accommodation of pilgrims, who congregate in great numbers at this sacred resort; but they are almost impracticable for cattle. This province abounds with celebrated places of worship, which have been held sacred for many ages, although the conversion of the inhabitants to the Brahminical faith is not of any very ancient date. Four of the five places noted for the holy junctions of rivers, and celebrated for their sanctity, are within the limits of this province.

Gurwal was a dependent province on some of the neighbouring and more powerful hill states until the reign of Mohiput Shah, who declared himself independent, and built Serinagur, where he resided. His son was his successor, and he was succeeded by his uncle's son, who considerably extended the Gurwal territories to the north, penetrating into Thibet, and exacting a tribute from the rajah of Deba. Gurwal was subdued by the Nepaulese about the year 1803; when Purdumin Shah, the rajah, an indolent and unwarlike prince, at the head of 12,000 men, was defeated and slain at Gurudwara. On the occurrence of this event the inhabitants of Gurwal discontinued all resistance to the Nepaulese, who made ruthless use of their victory. After the country was conquered by the British in 1814, part of his dominions, with a revenue of L.10,000, was restored to the rajah's son. But Serinagur, the chief town, is within the territory reserved by the British; the rajah has consequently fixed his residence at Barahaut, where the details of his civil government are conducted by his own officers, and he is under the protection of the British government. The district over which he rules was estimated by the Nepaulese, when they were in possession of the country, to contain 25,720 inhabitants; a very scanty population for so extensive, and in many places so fertile, a tract of country. Under later authority the population is estimated at 100,000.

GURWAL, *British*. See KEMAON.

GUSTAVUS, ERICKSON, better known as GUSTAVUS WASA, founder and first king of the dynasty of Wasa, was born in 1490, at the Castle of Lindholm, in Sweden. On reaching manhood, he found his country pining under the cruelty and tyranny of the Danes, and himself, from his connection with the old royal house, an object of peculiar suspicion. To save his life, he fled first to Lübeck, and afterwards to Dalecarlia, where he wrought for a time as a miner in the iron-works of Fahlun. Leaving the mines, he began a kind of vagabond life, wandering in the most remote and unknown parts of Sweden, till at length he came to Rattwik, where he formed the scheme of rescuing his country from the hated yoke of the stranger. Going about from house to house, he roused the peasants to a sense of their wrongs, and at length seduced them into open rebellion. In 1521 he had collected an army of 15,000 men, and taken the stronghold of Hesteras. Town after town yielded on his advance, and Stockholm—thrice besieged in vain—at last fell into his hands, and the bloodthirsty Christian of Denmark was obliged to return in disgrace to his own kingdom. Gustavus was now solicited to accept the Swedish crown, but he steadfastly refused; and it was not till 1527 that he could be persuaded to mount the throne. He reigned with admirable success for more than thirty-three years, and his name is still held in reverence by his countrymen, in whose memories he holds much the same rank that Alfred does in that of every Englishman.

GUSTAVUS ADOLPHUS was the grandson of Gustavus Wasa, and was born Dec. 9, 1594. He was only seventeen years of age when he began to reign, but even at that early age gave indications of the great military talents which afterwards made him famous. He successfully repelled the attempt of his relation, Sigismund of Poland, upon the Swedish crown, and defeated his ally, the Czar of Russia. Through the mediation of England and Holland, peace was concluded on terms as honourable as they were advantageous to Gustavus. The Thirty Years' War was at this time devastating Germany. The atrocities committed by Tilly and the imperial troops upon the Protestants of Bohemia determined Gustavus to come to their rescue. His history from this time till his death on the bloody field of

Lützen, Nov. 1, 1632, is the history of Europe. His success was unchecked by a single reverse of importance; and, at Leipzig, and afterwards at the Lech, he routed the *élite* of the imperial army, and finally slew Tilly himself. Even at Lützen, where he fell (not without suspicion of murder by the hand of a near relative of his own), the Swedes drove the Austrians in route from the field, though commanded by Wallenstein, the greatest soldier of his day. Gustavus Adolphus is one of the most faultless names on the roll of kings. He was simple, wise, and brave. So long as he lived Sweden was the best governed kingdom in Europe. His military talents enabled him, while a mere youth, to beat the most skilful and practised veterans of the empire, such as Tilly, Pappenheim, and Wallenstein. In all his triumphs, however, his mind never lost its balance; nor was he ever hurried away, in the heat of passion, to the commission of any ungenerous or cruel deed. His clemency was that of a Christian, rather than a Protestant; and though he upheld and promoted the Reformed faith, he refused to steel his heart against such as preferred to walk in the old paths. His humanity was not that of the sects. The Germans, whom he had come over to assist, felt but did not lament his death. He had helped them too effectively, and restored their fortunes only too successfully. They had already begun to feel themselves too much in his debt, and had latterly received him with cold unfriendliness. But long before the war came to a close they had reason bitterly to regret the untimely end of the champion of their faith. (For the details of Gustavus Adolphus' life, see SWEDEN. For Gustavus III. and Gustavus IV. also see that same article.)

GÜSTROW, a town of Northern Germany, grand duchy of Mecklenburg-Schwerin, on the left bank of the Nebel, 20 miles S. of Rostock. It is the capital of the circle of Wenden, or old duchy of Güstrow, and the seat of a court of chancery and several government boards. Its walls have been converted into promenades, and the old castle is now used as a house of correction. The cathedral and some of the churches are handsome buildings. Güstrow is a place of some commercial importance, having several breweries, distilleries, and factories of various kinds, and some trade in corn. Pop. 9100.

GUTENBERG, or GUTTEMBERG, JOHANN (whose real name was Gensfleisch), was born at Sorgenloch, near Mentz, in 1397. It is now generally admitted that to him is due almost the entire credit of inventing the art of printing by moveable types. The respective claims of Fust, Gutenberg, and Schoeffer, are fully discussed under FUST.

Gutenberg, after a life of much suffering and hardship, died at Mentz in 1468, in great poverty. Posterity has done him the justice denied him by his contemporaries. The statue by Thorwaldsen, erected in his honour at Mentz in 1837, furnished an example which has since been followed by many towns in Germany. The Gutenberg Society keeps his name in memory by an annual festival. No books are extant that are known for certain to have been printed by Gutenberg. The famous *Mazarin Bible*, Donatus' *Grammar*, and the *Catholicon* of Janua, are believed to have issued from his press. (See PRINTING.)

GUTTA PERCHA. This valuable substance has only been known in Europe within the last twelve years. It is the concrete juice of a large tree (*Isonandra gutta*) growing in certain parts of the Malayan Archipelago—hitherto chiefly obtained from Singapore. The first specimen of the inspissated juice which appeared in England was presented to the Society of Arts in 1843, but two or three years elapsed before a just sense of the importance of the substance began to gain ground. In 1845 the importation of gutta percha into England amounted to only 20,600 lb.; in 1848 it had reached 3,000,000 lb.; in 1852 it amounted to 30,580,480 lb.—a rate of increase which gives serious cause to doubt whether the supply will long be adequate to meet the demand; for it is unfortunately the case that the trees which yield gutta percha are not only limited in their growth to certain districts, and less abundant in quantity than india-rubber trees, but they have been subjected for several years to the barbarous and wasteful mode of cutting down the trees for the sake of the sap. Whatever European industry may be able to do in checking this destructive system, and extending the cultivation of the gutta percha tree, there is yet reason to doubt whether this slow-growing tree can be reared in sufficient quantities to counterbalance the havoc already made. The *Isonandra gutta* belongs to the natural order Sapotaceæ, and is the only tree which yields gutta percha. It rises to the height of 60 or 70 feet, and the trunk is 3 or 4 feet in diameter. The tree flourishes in alluvial soils, at the foot of hills, and sometimes forms the chief part of the jungle in such situations. The foliage is of a pale green on the upper part, and covered with reddish-brown hairs beneath. The wood is soft, fibrous, spongy, pale in colour, and traversed by longitudinal receptacles or reservoirs filled with the gum, forming ebony-black lines. This gum has many of the properties of india-rubber, but it has also special properties of its own which admit of its being applied to uses for which caoutchouc is not adapted. It possesses the same indestructibility by chemical agents which makes india-rubber so valuable, and it has also the peculiarity of becoming soft and plastic on being plunged into boiling water. In this state it can be moulded into any desired form, which form it permanently retains on cooling. The great convenience and utility of such a substance could not fail to strike the natives of the countries in which it is produced; and accordingly, we find that, long before gutta percha became known to Europeans, it had been fabricated by the Malays into whips, basins, jugs, shoes, &c., thus at length exciting the attention of travellers, and leading to the introduction of some of these articles into Europe under the name of india-rubber, or, earlier still, of *mazer-wood*.

The honour of having drawn attention to its real nature and uses is due to Drs D'Almeida and W. Montgomerie. The latter, writing from Bengal, remarked on the ordinary name of the plant thus:—"The word is a pure Malayan one—*gutta* meaning the gum or concrete juice of a plant, and *percha* the particular tree from which this is procured. The *ch* is not pronounced hard like *k*; but like the *ch* in the English word *perch*." In 1843 Dr Wm. Montgomerie, of the Indian Medical Service, observing certain Malay knife and kris handles, inquired the nature of the material from which they were made; and from the crude native manufacture inferred at once the extensive uses to which the gutta percha might be put in the arts of Europe. He purchased a quantity of the raw material, sending from Singapore part of it to Bengal, and part to Europe, and suggesting some of the uses to which he thought it might be applied. The quantity sent to England secured to him at once, as the discoverer, the gold medal of the Society of Arts. The surgical uses of gutta percha were early discovered by Dr Oxley of Singapore, who declared it to be "the best and easiest substance ever discovered for the management of fractures, combining ease and comfort to the patient, and very much lessening the trouble of the surgeon."

Gutta percha arrives in lumps or blocks of several pounds' weight, but these often contain impurities, such as stones, earth, &c., introduced by the Malays for the sake of increasing the weight. The purification and preparation of this substance on a large scale are conducted as follows:—The lumps of gutta are subjected to the action of a vertical wheel, on the face of which are fixed three knives which, as the wheel revolves at the rate of 300 revolutions per minute, cut the lumps into thin slices. These are then softened in hot water, and thrown into a rotating machine, where they are further reduced by the action of jagged teeth. From this machine they again fall into water, and are further cleansed. They are then kneaded into a paste in hot water, and rolled between heated cylinders. The mass has now become uniform in texture, and is either rolled out into sheets between steel rollers, or is passed in the mass through heated iron cylinders; after which it is ready for use. Gutta percha is scarcely affected by boiling alcohol, but it dissolves nearly completely in benzine and in spirit of turpentine with the aid of heat, and also in naphtha, coal-tar, sulphuret of carbon, and in chloroform. Its solution in sulphuret of carbon or in chloroform may be almost entirely deprived of colour by filtering, the process being conducted under a glass jar, in order to prevent loss by evaporation. If this solution be exposed in a flat dish to the air, the solvent will evaporate, leaving a solid cake of white gutta percha, which retains all the properties of the common gutta; and it may be melted by a gradual increase of temperature without acquiring any perceptible colour.

The purposes to which gutta percha is applied are too numerous for recapitulation. Only a few of the more important uses can be here mentioned. It resists the action of water, and is at the same time a bad conductor of electricity; it is therefore employed for inclosing the metallic wires used in the electric telegraph. The efficiency of the submarine telegraph is largely due to this valuable substance.

Various other maritime uses have been found for it in the construction of buoys, life-boat apparatus, &c. Manufacturers and agriculturists have applied gutta percha to use in bands and straps for machinery, tubes, buckets, &c. Architects have accepted its aid in the interior ornamental work of houses, such as cornices, centres for ceilings, &c. Scientific men are aided in their electrical experiments by its high insulating power. Miners, railway officials, and others, find the value of speaking tubes made of this substance; deaf persons are also greatly benefited by its power of conducting sound. Stereotype plates have been made in gutta percha. A mould is taken by pressure of a page of type with woodcuts in gutta percha; from this mould a cast is obtained on a cylinder of gutta percha, and from this last the printing is carried on. The dentist employs gutta percha in fixing or stopping teeth. The chemist is indebted to it in the preservation and conveyance of acids which corrode glass or metallic vessels. It is also extensively used in the manufacture of waterproof clothing, waterproof shoes, &c.

Within the last few years a substitute for gutta percha has been discovered in the juice of the muddar (*Asclepias gigantea*), a common plant in India, which also affords a valuable kind of hemp. Care is required in the collection of the milky juice, on account of its exceedingly acrid nature; but when exposed to the air it hardens into a substance closely resembling gutta percha, and having many of its valuable properties. It is, however, unfitted for electrical purposes, for it is found to conduct electricity as freely as a piece of untanned hide. (C. T.)

GUTTA *Serena* (*amaurosis*), obscurity of vision depending on a morbid condition of the optic nerve—its root, its course, or its termination.

GUTTA *Trap*, a substance evidently allied to gutta percha and caoutchouc, employed at Singapore in the manufacture of bird-lime. It is the inspissated juice of an artocarpus; and it is highly probable that there are several similar vegetable productions, such as the mangegatu (*Ficus indica*), from Visagapatam, which might advantageously be introduced into commerce, and employed in the arts for purposes similar to those for which caoutchouc and gutta percha are now so extensively employed.

GUTTÆ, in *Architecture*, little conical-shaped ornaments, somewhat resembling drops; used in the Doric entablature, immediately under the triglyph and mutule.

GUTTURAL (Lat. *guttur*), a term applied to letters or sounds formed as it were in the throat.

GUTTY, in *Heraldry*, charged or sprinkled with drops.

GUY, THOMAS, the founder of Guy's Hospital in Southwark, was originally a bookseller, and afterwards a stockbroker in London. He made the bulk of his fortune by the South Sea Scheme in the memorable year 1720. He died four years later, leaving L.18,793 for the building of an hospital to be called by his name, and L.219,499 for its endowment. Guy, during his life-time, had no other reputation than that of an intensely avaricious and selfish man. He left almost all his large fortune, however, in charities, a fact which confirms, while it seems to contradict the judgment of his contemporaries.

GUY, a rope used to steady any weighty body while it is being hoisted or lowered; also, a tackle to confine a boom forward to prevent the sail from gybing. Guy likewise denotes a large rope extending from the head of the mainmast to that of the fore-mast, to sustain the tackle used for loading and unloading a ship.

GUY'S *Cliff*, in Warwickshire, a great cliff on the west side of the Avon, 1 mile N. of Warwick. Here in the time of the Saxons there was a hermitage, to which Guy, earl of Warwick, is said to have retired from the world. This hermitage was kept up till the reign of Henry VI. when Richard Beauchamp, earl of Warwick, established there a chantry, in which he erected a statue in memory of the famous Guy, at the same time raising a roof over the adjacent springs.

GUYON, MADAME, whose maiden name was Jeanne Bouvier de la Motte, was born at Montargis in 1648. She was educated successively in two of the convents of her native city. On leaving school in her twelfth year, she displayed a strong disposition to that quietism which she afterwards brought into fame and for a time into fashion. In her sixteenth year she was married to M. Guyon, a man of wealth, by whom she had five children, and who left her a widow at the age of twenty-eight. Disengaging herself from the care of her children, and thus snapping all her home-ties, she began a sort of proselytizing journey through the country, in the course of which she composed her *Moyen Court et très-facile pour l'Oraison; Le Cantique des Cantiques, interprété selon le sens Mystique;* and *Les Torrents;* works that have now indeed ceased to excite much interest, but which were at first praised and abused alternately, in terms so strong as to make their author known if not famous. Madame Guyon, having completed her "mission," returned to Paris in 1686, but her views were coldly received by the dignitaries of the church, who even thought it expedient to confine her in a convent, while her confessor, La Combe, was sent to the Bastille. The influence of Madame de Maintenon soon procured the release of the innocent and pious mystic. The first convert of note to the new gospel was Fénélon, then an abbé; but it soon came to number disciples even at the court of Louis the Great. It was vigorously opposed by Bossuet, who saw in it nothing but a revival of the gnostic heresy condemned by the church some thirteen centuries before. But it was as resolutely defended by Fénélon, who showed that Madame Guyon's views differed but little from those of St Thérèse, St François de Sales, and other mystics whom the church approved. But Bossuet had no sympathy with anything that he could not clearly and readily understand; and the beatific contemplations and holy raptures of Fénélon and Madame Guyon were in his eyes no better than flat heresy. Some extravagances committed by the more zealous of the sect determined him to crush them and their doctrines by force. Madame Guyon was arrested; and the bishops were ordered to forbid the reading of her works, which Bossuet set himself to expose and refute. Fénélon's defence of his friend in his *Maximes des Saintes*, merely aggravated her disgrace and involved himself in it. The good bishop was banished from the court, and his book sent to Rome for condemnation by the head of the church. But Bossuet's zeal overshot the mark. Many persons were disgusted with his fierce intolerance, and took part with his opponents, whom they called his victims; while the Pope himself, instead of putting the *Maximes* on the Index, merely passed upon them a censure so gentle as to be almost equivalent to an approval. On her release from the Bastille in 1701 or 1703, Madame Guyon seems to have gone into retirement with one of her sons at Diziers near Blois, where she spent the remainder of her days in the exercise of every pious and charitable act. She died June 9, 1717, at the age of sixty-nine.

Had Madame Guyon been a little more worldly-wise, she might have escaped many of the sorrows and misfortunes she had to undergo. But she often allowed her zeal to get the better of her discretion, and used language which some people called that of a fanatic, others of a madwoman. Her mental structure was singularly ill-balanced, the emotional part being developed at the expense of the purely intellectual. Her capacity of intense feeling was great, and sometimes bore her up in poetic flights of no mean aim. Witness her *Recueil de Poésies Spirituelles*, the best of which are familiar to most English readers in the exquisite translations of Cowper. This collection, however, which shows the author's strength, shows no less clearly the author's weakness. And one does not know whether to laugh or be angry, when he meets such stanzas as these:—

> Grand Dieu, pour te servir,
> Je suis dans une cage;
> Ecoute mon ramage, &c.
>
> * * * *
>
> Dieu possédant notre fond,
> Rien ici-bas ne nous touche;
> Je suis comme une souche;
> C'est lui qui vous répond!

Had the Catholic Church exhibited in Madame Guyon's case the wisdom which it generally shows in absorbing the influence of its more erratic votaries, the mystic might have been soon forgotten. But she was not only a mystic but a persecuted one, and has thus continued to enjoy a consideration greater perhaps than she deserves. There is no great harm in her writings, and her life was confessedly stainless and unimpeachable. She often in her ecstacies gives expression to ideas which might be defined as heresy, if they could be defined at all, but she never either openly attacked any dogma of the church, or proved by her daily life that she was an unworthy member of it. None of her works have any value but those already mentioned.

It is by no means proved that the *Vie de Madame Guyon, écrite par elle-même*, which was printed after her death, is entirely of her composition. It seems indeed to have been composed from different memoirs furnished by herself, first, to the official or judge of the bishop's court, Chéron, and then to the Bishop of Meaux at the time of the conferences of Issy. These materials, collected by a redacteur still more mystical than herself, appeared at Cologne, 1720, in three vols. 12mo. The verses of Madame Guyon, or at least those which are attributed to her, were collected and published at Amsterdam, 1689, in five vols. 8vo, under the title of *Recueil de Poésies Spirituelles*. This lady is also believed to have been the author of *Cantiques Spirituels, ou Emblèmes sur l'Amour divin*, in five volumes; and *La Bible traduite en Français, avec des Explications et des Réflexions qui regarde la Vie intérieure*, Cologne, 1715, in twenty vols. 8vo. Her treatise on Spiritual Torrents, after having been long circulated in manuscript, was printed, for the first time, in her *Opuscules Spirituels*, Cologne, 1704, in 12mo, with a preface describing her person. Besides these, her *Lettres Spirituelles* form four vols. in 8vo; so that her works extend in all to thirty-nine volumes, which, however, are scarcely read now-a-days. (See FÉNÉLON.)

GUYTON DE MORVEAU, BARON LOUIS BERNARD, a celebrated chemist, and an advocate of great eminence, was the son of Antoine Guyton de Morveau and Marguérite de Saulle his wife, and was born at Dijon, Jan. 4, 1737.

His father was of a respectable family, and filled the situation of professor of the civil law in the University of Dijon. He was fond of building; and from the artificers who were frequently employed about his house, young Guyton appears to have derived, almost in his infancy, a taste for mechanical pursuits, which led to an astonishing development of premature talent. For when he was only seven years old, he prevailed on his father to purchase, for his amusement, a clock which was greatly out of repair, and, as is said, he actually put it together and remedied its defects, without any assistance, so effectually, that it continued to go extremely well for fifty or sixty years afterwards. The next year he was equally successful in cleaning and repairing a watch belonging to his mother. His education was conducted in the ordinary manner at a provincial school or college, which he left at sixteen. Upon his return home he applied, for a short time, to botany, and he was soon afterwards admitted as a student of law in the University of Dijon, where he remained for three years, and then removed to Paris, in order to continue his studies at the bar. In 1756, he paid a visit to Voltaire at Ferney; and he seems to have imbibed from this personage a taste for satirical poetry, which he soon afterwards displayed, upon the occurrence of a trifling accident, in a ceremony relating to a popular Jesuit of the day. Amongst his posthumous papers, he also left some unfinished sketches of tragedies, which are said not to have been deficient in poetical merit.

At the age of twenty-four, when he had made some progress in the practice of his profession as an advocate, his father procured for him, at the price of 40,000 francs, the appointment of advocate-general of the parliament at Dijon, so that he had no further solicitude for the acquisition of an income adequate to his competent subsistence. His health was then considered as delicate; but the fears which were entertained for it proved to be completely groundless.

In January 1764, he was made an honorary member of the Academy of Sciences at Dijon, then lately established under the patronage of the Prince of Condé. This occurrence seems to have had considerable influence on the pursuits which occupied his leisure hours; and he soon became by far the most distinguished ornament of the academy which had paid him this compliment. His particular application to chemistry arose in a great measure out of an accidental emulation with Dr Chardenon, who afterwards very liberally undertook to assist him in the cultivation of this branch of science. He studied the works of Macquer and of Beaumé, and he was furnished by the latter with the materials necessary for the establishment of a small laboratory for his own use.

With regard to the more general cultivation of literature and science, he displayed considerable talent in a memoir on public instruction, together with a plan for a college, which he presented to the parliament of Burgundy, insisting, with great force and success, in opposition to Diderot, on the importance of early education in modelling the character of the human mind. About the same time he also wrote a prize essay, an Encomium on Charles V. of France, surnamed the Wise, which was afterwards inserted in the collection of his *Discourses*, published in three volumes.

In July 1767 he visited Paris with a view to the advancement of his scientific pursuits, and excited the admiration of the most celebrated chemists of the day, by the facility which he had acquired in the manipulation of his experiments. He entered, after his return, into the investigation of the great question respecting the oxidation of metals, though he did not succeed in removing the difficulties which then embarrassed it. In 1769, he pronounced, at the opening of the parliament, an elegant oration upon morals. He was soon afterwards engaged in some experiments respecting the communication of heat to different substances, the results of which, though not published, were of some importance to the theory of temperature. At the request of his friend Dr Durande, he undertook to inquire into the nature of biliary calculi, which he found to be readily soluble in ether; and it appears that a combination of ether and oil of turpentine proved of advantage to several of Dr Durande's patients, who were suffering from these concretions.

In the year 1773 he was employed in an interesting investigation of the mutual adhesion of the surfaces of solids and fluids, a class of phenomena of which the mathematical theory was never at all understood, until the publication of an essay on the Cohesion of Fluids in the *Philosophical Transactions*, soon after the beginning of this century, in which the laws of capillary action are extended to a complete analogy with all the experiments of M. de Morveau, as well as those of Taylor and Achard of a similar nature. He succeeded, about the same time, in discovering a mode of destroying the contagious vapours of pestilential diseases, by fumigation with the muriatic acid gas; he afterwards found the oxymuriatic acid, or pure chlorine, still more effectual; and it does not appear that the nitric acid, since proposed in England, has any advantages over either of these substances.

M. de Morveau's anxious desire to co-operate in the promotion of chemical knowledge induced him to make a new exertion in its favour, by undertaking, in 1776, to deliver a public and gratuitous course of lectures as a regular professor of the science, authorized by the approbation and encouragement of his brother magistrates at Dijon. He soon afterwards wrote some essays on the peculiar characters of carbonic acid; and he strenuously combated the popular prejudice which prevailed against the introduction of conductors for preserving buildings from lightning. He established a large manufactory of nitre, which was afterwards conducted by M. Courtois, the father of the famous discoverer of iodine. From chemistry he naturally diverged into the study of mineralogy; in 1777 he made a tour through the province of Burgundy, with a view to the examination of all its productions; and he actually discovered a rich lead mine, though, for want of coal, it was impossible to derive much benefit from it. He also found a white variety of the emerald in the same province, as well as some combinations of baryta, and he invented a new method of obtaining the pure baryta from its sulphate.

He had long been intimately acquainted with the Count de Buffon and with Malesherbes, both persons distinguished by elegance of taste, the one in science, the other in general literature. In 1779 and 1780 he enlarged his connections among the men of letters resident at Paris; and he was induced by Panckoucke, the bookseller, to undertake the chemical department of the *Encyclopédie Méthodique;* but it was six years before the *Dictionary of Chemistry* appeared; the articles relating to pharmacy and metallurgy were supplied by Maret and Duhamel. In the progress of this work he found himself compelled to disbelieve the existence of phlogiston as a distinct principle of inflammability, though at the beginning he had defended the doctrines of the old school. But he soon became one of the most zealous advocates of the new theory; and he contributed very much to its general introduction by the active part which he took in the arrangement of a new nomenclature. His proposals were at first thought objectionable by many of the members of the Academy of Sciences; but they soon became generally adopted throughout Europe; and the system was without doubt of great use for a time, as far as it assisted the memory and the imagination in retaining the discoveries and comprehending the theories which had so much of novelty to make them interesting. Among the original matter contained in the Dictionary, were some researches on the nature of steel, which coincided in their results with those of Monge, Vandermonde, and Berthollet, made about the same time, but published somewhat earlier. The whole volume was received in the most flattering manner by all the lovers of chemistry; but it was not till 1791 that the author's ambition was gratified by the award of the Academy of Sciences, adjudging him a prize of 2000 francs, which had been allotted to the most useful work which should appear in the course of the year. The prize, however, he begged to offer to the exigencies of the state, which were then very urgent. The Dictionary was afterwards ably continued by M. de Fourcroy.

In the meantime he condescended to appear as the translator of the *Opuscula* of Bergman, which he illustrated by notes. The example was followed by Madame Picardet, and by others of his friends, who were zealous for the promotion of science; so that the French chemists were by these means speedily made acquainted with the labours of all their contemporaries in different parts of the world. In the year 1787 M. de Morveau applied his speculations to a practical purpose, in establishing a manufactory of soda from common salt, exposed to the atmosphere, with a large proportion of lime, the soda slowly efflorescing as a carbonate. It was in the same year that, having published his *Collection of Pleadings*, he finally resigned his office at the bar, in order that the whole of his time might be devoted to the pursuit of science.

His next undertaking was of a more adventurous nature; for, in April 1784, he ascended with the President de Virly in a balloon; and he repeated the experiment in the month of June, hoping to be able to direct his aërial course at pleasure. The balloon appears to have been about 30 feet in diameter; and, when we consider the action of the wind upon a surface of such extent, we must be aware that every attempt to oppose or modify it must have been perfectly futile. He was visited soon afterwards by the ingenious and lamented Mr Tennant, who went to Dijon purposely to become acquainted with him, and who had an opportunity of performing some original experiments in his laboratory. He was made a member of the Royal Academy of Medicine at Paris in 1786, as a compliment to the merits of his labours for the preservation of the public health. He received a visit, in the succeeding year, at once from Lavoisier, Berthollet, and Fourcroy, together with Monge and Vandermonde; and our countryman, Dr Beddoes, who was then travelling in France, had the good fortune to join this interesting party, all of them deeply engaged in the discussion of the great chemical questions which were then undecided. In April 1788, M. de Morveau was placed on the list of the foreign members of the Royal Society of London; and the same mark of respect was also paid him at different times by almost all the scientific societies of Europe.

In September 1791 he was unfortunately elected a member of the Legislative Body; and having also been made solicitor-general of his department, he could no longer continue the chemical lectures which he had delivered without intermission for fifteen years, and he resigned his chair to Dr Chausier. It must not be omitted by an impartial biographer, that, on the 16th of January 1793, he thought himself compelled to vote with the majority, for the death of the king; and it is a poor compensation for this fatal error that, in the same year, he resigned a pension of two thousand francs a year, in favour of that republic to which he had already sacrificed the best feelings of humanity. He afterwards became a commissary of the assembly and was attached to the army of the Netherlands. In this capacity, besides many other instances of personal courage, he is said to have rendered essential service to his countrymen, by the construction of a balloon, in which he ascended, together with some of the staff of General Jourdan, in order to observe the motions of the enemy during the battle of Fleurus. After his return to Paris he was appointed professor of chemistry in the *Ecole Polytechnique*, and he was an effective co-operator in the first establishment of that useful institution. In 1795 he was again chosen a member of the Council of Five Hundred; and he was appointed by the government one of the forty-eight members of the National Institute, then recently embodied. He had for some time been a correspondent, but was never a member, of the Academy of Sciences. His political engagements terminated in 1797, when he resolved once more to devote himself exclusively to science. In 1798, he fulfilled the duties of director of the *Ecole Polytechnique* during the absence of Monge, who was in Egypt, and for whom he insisted that the salary should be reserved. The following year, Bonaparte, then first consul, made him a general administrator of the mint. He received the cross of the Legion of Honour in 1803, and obtained, two years afterwards, still higher rank in the order, particularly as an acknowledgment for the public benefits which had been derived from his methods of fumigation. In 1811 he was elevated to the dignity of a baron of the French empire.

From 1798 to 1813, he continued his labours as professor of chemistry in the Polytechnic School; he then obtained leave to retire, but he survived only a few years, and died of a paralytic affection, or rather of a total decay of strength, the 21st of December 1815, at a period when the political changes in the kingdom would have exposed him to annoyances and perhaps hardships, which would have been very severely felt at so advanced an age. In stature he was rather below than above the middle size; his conversation was animated and copious, his manners courteous and obliging; he was full of anecdote, and always ready to communicate whatever information he possessed. He married, late in life, Madame Picardet, the widow of an academician of Dijon, whose tastes and pursuits were congenial with his own, and who had distinguished herself by translating several works of science and of literature from the different languages of the north of Europe. As to his numerous publications, a bare catalogue of these will be amply sufficient to show the extent of his researches and the variety of his pursuits. It is the more necessary to do justice to his diligence and perseverance, as we cannot easily point out any one important discovery or invention that can be considered as commensurate with the high promise of his early infancy. The article ACID of the *Dictionary*, and the *Methodical Nomenclature*, must be ranked as the best of his productions; but the character of both these is rather useful than splendid.

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GWALIOR, a strong and very celebrated fortress of Hindustan, in the dominions of Scindia, in an elevated situation on a hill, one mile and a half in length, but in few places exceeding 300 yards in breadth. At the north end the sides are so steep as to be nearly perpendicular, and its height is 342 feet. It has several reservoirs of good water, and a small river runs close past it. A stone parapet extends all round the slope of the hill, behind which are collected piles of round stones, which form an excellent defence, and it was judged unassailable until it was stormed in 1780 by Major Popham. The town, which stands at the bottom of the hill, is large and populous, and contains many good houses of stone, which is furnished in abundance by the neighbouring hills, that form an amphitheatre round the town and fort at the distance of from one to four miles. The town carries on an extensive trade with the Mahratta and British territories, and derives also considerable benefit from the Mohammedan pilgrims, who visit the tomb of Ghose al Alum, a celebrated religious person, who is interred within the fort. Gwalior is of such antiquity that its origin is lost in remote tradition. It must have been at all times a military post of great consequence, both from its central situation, and its peculiar position, which in the estimation of the natives rendered it impregnable. It is first mentioned in authentic history in the year 1023, when it was summoned by Sultan Mahmoud of Ghizni. It was taken by the Mohammedans in the year 1194, and was used as a state prison, in which several princes met their death from opium or the dagger. On the decline of the Mogul empire, it was taken by the Mahrattas, and afterwards by the British, as mentioned above, in 1780. It was subsequently taken possession of by Scindia; and during the war of 1804 it again surrendered to the British troops after a breach was made in the walls. It was not, however, taken possession of by them, and by the treaty with Scindia in 1805 it was ceded to that chief. Finally, in January 1844, after the battle of Maharajpoor, it was occupied by the Gwalior contingent, a military force commanded by British officers, and thus may be regarded as having been virtually placed within the power of the British government. The Gwalior territories, or the possessions of the family of Scindia, of which this town forms the capital, have a singularly irregular outline, and consist of several detached districts, the principal of which is bounded on the N.E. by the Chumbul, dividing it from the British districts of Agra and Etawah. The area of the whole territory extends over 33,119 square miles, and supports a population of upwards of three millions. The founder of the ruling family was Ranojee Scindia, who, from an humble station in the service of the Peishwa, rose to distinction and power, and became a chief of considerable importance. He was succeeded in 1750 by his natural son Madhajee Scindia, whose earlier feats in arms gave little promise of his future military successes. At the great battle of Paniput in 1761 his followers with difficulty escaped the general carnage, and their leader received a desperate wound which rendered him lame for life. From this period, however, his fortunes appear in the ascendant, and the growth of his power is thus described by Sir John Malcolm:—"Madhajee Scindia took full advantage of the dissensions that occurred at Poona, after the death of Ballajee (1761), to usurp as far as he could the rights and lands of the head of the empire to the north of the Nerbudda. The detail of the progress of this system of spoliation of both friend and foe is not necessary; suffice it to say, this able chief was the principal opposer of the English in the war they carried on in favour of Ragobah. He was the nominal slave, but the rigid master of the unfortunate Shah Allum, emperor of Delhi—the pretended friend, but the designing rival of the house of Holkar—the professed inferior in all matters of form, but the real superior and oppressor of the Rajpoot princes of Central India; and the proclaimed soldier, but the actual plunderer of the family of the Peishwa." In 1782 the British government recognized Madhajee as an independent sovereign; and at the period of his death in 1794, his dominions extended from the River Taptee on the S. to the northern limit of the district of Delhi, and from the Gulf of Cambay on the W. to the Ganges in the E., including Candeish, a portion of the Deccan, the greatest part of Malwa, the districts of Agra and Delhi, and the central and finest part of the Doab. He was succeeded in his possessions by his grand-nephew Dowlut Rao Scindia, then in the fifteenth year of his age. Dowlut Rao, joining his forces with those of the Rajah of Berar, the allied chiefs in 1803 invaded the territory of the Nizam, which was under the protection of the East India Company, and on the 23d September in that year the Mahratta army was surprised at Assye by a British force commanded by General Sir Arthur Wellesley, subsequently the illustrious Duke of Wellington, and after a prolonged and fiercely contested battle, was totally defeated. The overthrow of Scindia's military resources was completed by the subsequent defeat which the confederated Mahrattas received from Sir Arthur Wellesley at Argum, in Berar, and from Lord Lake at Allyghur, Delhi, and Laswaree, in

Northern Hindustan. At the close of the year 1803, Dowlut Rao acceded to a treaty dictated by the British government, ceding, on the left bank of the Jumna, all his forts, territories, and rights in the Doab; and on the right bank of the river, all his forts, territories, rights, and interests in the countries which are to the northward of those of the rajahs of Jeypore and Joudpore. Mugut Rao, the successor of Dowlut Rao Scindia, dying childless in 1843, was succeeded by Ali Jah Jyajee Scindia, who being a minor, the widow of the deceased prince became regent. A period of anarchy ensued, and disturbances took place, which, extending rapidly towards the adjacent territories, compelled the British government to resort to arms for the purpose of obtaining security for the future tranquility of the common frontier. On the 21st December 1843 the British army, led by Sir Hugh Gough, commander-in-chief, accompanied by Lord Ellenborough, governor-general, commenced crossing the Chumbul, near the town of Dholpore, and on the 29th came in front of the Mahratta army about 15 miles north-east of Gwalior, and in a position supported by the neighbouring villages of Maharajpoor and Chonda. After an obstinate engagement, in which the British suffered very severe loss from the well-served artillery directed against them, the Mahrattas were dislodged from all points of their position, and the survivors of the carnage retreated to Gwalior, having lost 56 pieces of artillery, and all their ammunition waggons. The total loss on the side of the British was 106 killed, 684 wounded, and 7 missing. The numbers engaged were nearly equal—about 14,000 on each side. Simultaneous with the march of the commander-in-chief from Dholpore was that of Major-General Grey with an army of about 8000 or 9000 men from Bundlecund. Crossing the River Sinde at Chandpore, this force marched to Puniaur, 12 miles S.W. of Gwalior, and there, on the same day, encountered a Mahratta army estimated at 12,000 strong, with 24 guns. The Mahrattas, after a severe struggle, were defeated with the loss of all their artillery, and a great number of men. The loss on the part of the British was 25 killed and 189 wounded. Shortly after a treaty was concluded, the main provisions of which related to the sequestration of a portion of Scindia's dominions for the maintenance of a contingent force, to be commanded by British officers, for the protection of the Gwalior territories. The young Rajah having attained his majority, assumed the reins of government in 1853. The town of Gwalior is in N. Lat. 26. 13., E. Long. 78. 15.

GYBING, the shifting of the boom of a fore-and-aft sail from one side of the mast to the other, either to alter the course of the vessel suddenly, or to accommodate the sail to a change of wind.

GYGES. See CANDAULES.

GYMNASIUM, in *Antiquity*, the name given to any place set apart for healthful or invigorating physical exercises. The gymnasium took its name from the fact that such as frequented it exercised either naked (γυμνοί) or clad only in a light tunic. The Greeks and Romans both attached much importance to the gymnasia, which formed an integral part of their systems of education; and the Greeks bestowed more time and attention on the gymnastic training of their youth than on all the other departments put together. There was no such thing as a Greek city of any size or importance which did not boast at least one gymnasium. Athens had three great public gymnasia—the Academia, Lyceum, and Cynosarges, besides numerous private ones on a smaller scale. Solon considered these institutions of so much importance as to draw up a special code of laws for their management. Their administration was entrusted to a gymnasiarch, whose duties were to watch and control the youth, place them under proper teachers, conduct the periodical games and festivals, and pay the athletes whom he trained for them. In Athens the number of gymnasiarchs appears to have been ten, but it is not known how they took duty, whether in rotation or otherwise. Inferior in station, but not in real importance to the gymnasiarchs, were the "Sophronistæ," or *teachers of wisdom*, who seem, however, to have watched over the moral rather than the physical development of the youth during their attendance at the gymnasium. Their number, like that of the gymnasiarchs, seems to have been also ten. Next in rank to them came the gymnastæ and pædotribæ, who had all the practical part of the teaching to do, and who assigned to the youth kinds of exercise adapted to the physical capabilities of each, which it was part of their business to study and know. The officers whose duty it was to prepare the youth for the day's exercise by anointing them with oil and then besprinkling them with dust, were called "aliptæ," or anointers. The exercises taught appear to have been pretty much the same over the whole of Greece, though they seem to have been carried out with somewhat different views. Thus the Spartans looked on them rather as a sort of initiation into the sterner realities of warfare, while the Athenians not only made them subserve this end, but also used them as a means for imparting grace to the action and movement of the limbs. The chief games of the gymnasium were foot races, jumping, leaping, quoits, wrestling, boxing, dancing, the pancratium, &c., while the younger pupils practised also with balls, tops, and a variety of other games similar to those in vogue among the youth of modern times.

Remains of gymnasia have been unearthed at Naples, Ephesus, and many other cities. From these, Vitruvius reconstructed his plan of the gymnasium, of which an engraving will be found in Newton's translation of that writer's works.

From these descriptions we learn that the Gymnasia were not single edifices, but a group of buildings capacious enough to contain many thousands of people, and consisting of twelve different parts, viz.—1. The exterior porticoes, where the philosophers, rhetoricians, mathematicians, physicians, and other virtuosi, read public lectures, and where they also disputed and rehearsed their performances; 2. The *ephebeum*, where the youth assembled very early, to learn their exercises in private, without any spectators; 3. The *coryceum*, *apodyterion*, or *gymnasterion*, a kind of ante-chamber, where they stripped, either to bathe or exercise; 4. The *elæothesium*, *alipterion*, or *unctuarium*, appointed for the anointings, which either preceded or followed the use of the bath, wrestling, pancratia, &c.; 5. The *conisterium*, or *conistra*, in which they covered themselves with sand or dust to dry up the oil or sweat; 6. The *palæstra*, properly so called, where they practised wrestling, boxing, pancratia, and other exercises; 7. The *sphæristerion* or tennis-court, reserved for exercises in which balls were used; 8. Large unpaved alleys, which comprehended the space between the porticoes and the walls with which the edifice was surrounded; 9. The *xysti*, or porticoes for the wrestlers in winter or bad weather; 10. Other *xysti* or open alleys, allotted for summer and fine weather, some of which were quite open, and others planted with trees; 11. The baths, consisting of several different apartments; and, 12. The *stadium*, a large space of a semicircular form, covered with sand, and surrounded with seats for the spectators.

GYMNASIUM, in its modern use, sometimes signifies a school for gymnastic exercises; but on the Continent, particularly in Prussia, the higher schools, intended to give immediate preparation for the universities, are called gymnasia.

GYMNASTICS, in the general acceptation of the term, denotes every exercise which tends to develope and invigorate the bodily powers; such as walking, running, riding, fencing, rowing, skating, dancing, and many others. In a narrower sense gymnastics includes those manly and healthful games which have been encouraged by all high-minded nations as calculated to improve the physical strength, and to keep alive the martial spirit of their inhabitants. In a yet more limited sense, the term gymnastics has been employed to denote that modern system of bodily exercises, some account of which will be given in this article.

The elements of a system of gymnastics are to be found in most nations from the earliest times. In the infancy of society, when the individual was valued according to his personal strength and prowess, it was only natural that the utmost care should be bestowed on those arts which most surely led to distinction. All education then consisted chiefly in the practice of such exercises as were best calculated to develop muscular strength, and make the tenure of life as secure as possible. Thus the first gymnastic exercises, both of those nations that have reached the highest civilization, and of those that are now dying out in their primitive barbarism, were the same, viz., running, leaping, swimming, and the throwing of missiles. These exercises were at a very remote period systematized and reduced to a science by the Greeks in the manner described in the article GYMNASIUM.

With the invention of gunpowder gymnastic exercises began to be neglected. Rosseau in his *Emile* was the first to call attention to the injurious consequences of such indifference; and it is in a large measure to his eloquent appeals that gymnastics have in recent times been made to constitute an integral part of school education. The good effects of this innovation have in no country been more strikingly exemplified than in Germany. When many parts of that country groaned under the iron yoke of Napoleon, Jahn and his followers, encouraged by the Prussian minister Stein, were establishing *turn-plätze* or gymnastic schools, from which issued the well-trained youth who in due time drove the French legions across the Rhine.

The propriety of employing training to develop the powers of the body is now almost as readily acknowledged in most countries as the necessity of education to cultivate the faculties of the mind. But nothing is privileged from abuse; and empiricism, which has brought so many other things into disrepute, has unluckily fastened upon gymnastics. In the *Encyclopédie Moderne* we find the subject divided into—1. *Gymnastique civile et industrielle*; 2. *Gymnastique militaire, terrestre et maritime*; 3. *Gymnastique médicale*; and, 4. *Gymnastique scénique ou funambulique.* Nor is this all. Each of these divisions is subdivided into four or five branches, as if the subject, forsooth, admitted of the most systematic arrangement. Thus, under the head of *Gymastique médicale*, are included, first, *Gymnastique hygiénique, ou prophylactique, pour conserver une santé robuste*; secondly, *Gymnastique thérapeutique, pour le traitement des maladies*; thirdly, *Gymnastique analeptique, ou des convalescens*; fourthly, *Gymnastique orthopédique, qui a pour but la guerison des déformités.* This affectation of method is exceedingly absurd, inasmuch as it confounds with the exercises themselves certain hypothetical uses, and assumes as the very basis of the classification results which have not been satisfactorily ascertained. But however this may be, the importance of gymnastics, in another point of view, cannot possibly be disputed. If persevered in, they are calculated to develop every muscle of the trunk, arms, and legs, to its utmost extent; they give the student the most perfect command of his whole bodily frame; they are the best preparatives for the elegant and manly accomplishment of fencing; and they afford excellent training for the amateurs of running, leaping, wrestling, and sparring. Nor are the advantages derived from such exercises confined to the soldier or the sailor; their usefulness is experienced in many other situations of life. But their importance can only be fully known when we are called upon in emergencies of unexpected danger—amidst fire, shipwreck, the destruction of bridges, or the fall of buildings—to evince the superiority resulting from that presence of mind and fertility of resources which are conferred by the consciousness of physical strength and nerve, and by the habit of acting and moving where other men would be instantly paralysed. Lastly, clear heads and light hearts, the natural concomitants of health, are the rewards of a judicious and moderate prosecution of gymnastics.

The elementary exercises in gymnastics are performed by means of the horizontal pole, the parallel bars, the masts or poles, the ropes, the triangle and trapezium, the ladder, the wooden horse, the inclined plane, and the flying course or giant's steps. The pupils, after being prepared by a course of comparatively gentle but active exertion, proceed to take lessons on the *horizontal pole*; the principal use of which is to develop the strength of the hands and arms, though many other exercises are performed on it. The *parallel bars* are usually made circular, and vary from six to eight feet in length, and from three to four inches in diameter; they are fixed about two feet apart, and placed at a height of from three to four feet from the ground. Captain Clias gives sixteen movements in this apparatus, and Colonel Amoros thirty-eight; but it is obvious that the lessons are susceptible of great variety, and that the interest may be increased by fixing the bars occasionally at the height of six or seven feet from the ground. The exercises on the *masts* or *poles* are varied by the latter being placed in different positions, either vertically or angularly, and by the introduction of rope-ladders or knotted ropes. The *ropes* are used sometimes plain, sometimes with large knots in them, and sometimes with a bar across. They are placed vertically, horizontally, and angularly, to give variety to the exercises, which is also increased by loosening and tightening them. The *triangle* and *trapezium* are two of the most amusing instruments in modern gymnasiums; and, from the lightness of their construction, and their being constantly in motion, give an appearance of ease and grace to all the evolutions performed on them. The invention of the triangle has been claimed by Captain Clias, though of right it belongs to the mountebanks of Italy, who employed it to amuse the public long before this celebrated gymnast was heard of; the trapezium owes its origin, or at least its introduction into the schools, to Colonel Amoros. The *wooden ladder* is usually fixed firmly between two walls, with the lower end just high enough for the pupils to reach it with both hands. Sometimes it is also placed perpendicularly with one end resting on the ground; but the exercises admit of more variety when it is placed in the position first described. The distance between the bars in the perpendicular ladder is commonly from eight to twelve inches; but when its position is inclined, the spaces should always be wide enough to admit of the pupil passing easily through them. The *rope ladder* is susceptible of still greater variety of position, and the bars are usually placed closer together, as few movements beyond the different modes of ascending and descending are practised upon them. The *wooden horse* is for exercise in vaulting and leaping, and may be raised or lowered upon its stand so as to suit the progress of the different classes. The *inclined plane* is ordinarily a deal plank of 25 or 30 feet in length, and about 2 feet in breadth; it admits of some highly useful exercises, tending to strengthen the hands, arms, chest, abdomen, legs, and feet. The *flying course*, or *giant's steps*, is an amusing exercise, but affords no advantages which are not attained by the apparatus already described. For the detail of the exercises performed, with figures illustrative of the different positions, we refer to the works of Clias, Amoros, and Roland.

Almost all the advantages which are generally supposed to result from gymnastic exercises, may be attained by the practice of our own national games, which, if not in every case British in their origin, are peculiarly so by their adoption and continued improvement. They merit notice, therefore, first, by reason of their nationality, and because, for the most part, they require in an eminent degree the union of strength, perseverance, and courage. 1st, *Wrestling*, though conspicuously introduced into all foreign works on the present system of gymnastics, is little more than theoretically known on the Continent; whereas, in some of the English counties, the practical wrestlers are unrivalled. We therefore claim this as one of our national games, and venture to affirm that its champions will not hesitate to enter into competition with any foreign gymnasium. 2d, *Boxing* is an exercise which brings the body into active and healthy exertion, increasing the elasticity of the limbs, improving the play of the lungs, and giving great firmness on the legs and power to the arms. Quickness of eye, and accuracy in measuring distances, are also acquired by the practice of boxing; by which, be it observed, we mean *sparring*, as practised by gentlemen, that graceful imitation battle, which differs as widely from the brutalizing exhibitions of prize-fighting, as the *cestus* with which Dares dashed out the teeth of Entellus differs from the well-stuffed gloves of a modern master. 3d, *Riding*, *walking*, and *running*, are exercises requiring strength, perseverance, and activity; and, as a nation, our recorded equestrian and pedestrian feats may challenge Europe. We have, indeed, heard of three Frenchmen, Gervois, Labat, and Stumon, who are said to have run a French league in ten minutes, an exploit which surpasses anything in our sporting annals; but the story is too improbable to be admitted without strong confirmation. 4th, *Archery*, one of our most ancient and manly recreations, is still kept up in many parts of England and Scotland; and although its champions would no doubt cut but a sorry figure in competition with the Lockesley of Ivanhoe, or even with him whose grandsire " drew a good bow at Hastings," yet the spirit of emulation has produced no mean degree of excellence in this graceful and healthy exercise. 5th, *Cricket* is so indisputably our own, that nothing need be said upon the subject, except that it is yearly becoming a greater favourite in Scotland, where formerly it was seldom played. 6th, *Singlestick* has now but a small number of admirers, and its professors are of course still more limited. 7th, *Putting the stone, and throwing the hammer*, fall more appropriately under the head of Scottish gymnastics. In the Highlands of Scotland there are instances of celebrity in throwing the hammer descending from father to son for generations, as a family characteristic. This is most graphically described in the account given by Sir Walter Scott of the contest between Norman nan Ord and Hal o' Wynd, who is represented as a perfect prince amongst the gymnasts of an age when such accomplishments were in the highest repute. It may be added that at the present day the Scottish national games are kept up with great spirit, and that clubs have been instituted in various parts of the country, for the purpose of encouraging them, by awarding medals, and other honorary distinctions, to such as excel in these pastimes. (J. B—E.)

GYMNOSOPHISTS, an appellation bestowed by the Greeks on the Indian philosophers in ancient times, because, according to tradition, they went naked, or nearly so. They were also called Βραχμαναί, that is, Brachmans or Brahmins. (See BRAHMINS, vol. v., p. 271.) They were of two parties, Indian and Ethiopian. The former dwelt in the woods, where they lived on the wild products of the earth. The Ethiopian Gymnosophists are said to have discharged the sacred functions in the manner of the Egyptian priests, and had colleges and disciples of different classes. The Gymnosophists were remarkable for their contempt of death, and are said to have practised suicide in the most deliberate manner, by casting themselves into the flames. It is probable, however, that this was an act of devotion with a view to merit immortality. In this way did Calanus sacrifice himself in the presence of Alexander the Great; and likewise did Xarimarus at Athens when Augustus was there. The little acquaintance of the ancients with the Indies gave rise to many wonderful stories respecting the Gymnosophists. They appear in general to have been wise and learned men, to judge from their maxims and discourses as recorded by historians. They kept up the dignity of their character to such a degree that they maintained an independent position even in the courts of their princes. They maintained the immortality and transmigration of the soul, and placed the chief happiness of man in a contempt of the gifts of fortune and of the pleasures of sense.

GYMNOTUS, a genus of fishes, of which one species is the electric eel. See index to ICHTHYOLOGY, and ELECTRICITY.

GYNÆCEUM, among the ancient Greeks, denoted the apartment of the women (always in the innermost part of the house), where they employed themselves in spinning, weaving, and needlework. At Rome, under the emperors, there was a particular establishment of gynæcea, which were a kind of manufactories in which women were employed to make clothes and furniture for the imperial household. Hence the term has sometimes been applied in modern times to silk factories and others where females are associated in considerable numbers.

GYONGYOS, a market-town of Hungary, county of Hevcs, at the foot of Mount Matra, 44 miles N.E. of Pesth. It has four Roman Catholic churches, a Franciscan monastery, and a gymnasium; manufactures of woollen cloth, leather, hats, brandy, &c., and an active trade in cattle and agricultural produce. Good wine is produced in the vicinity. Pop. 15,000.

GYPSIES, or GIPSIES, a remarkable race of Asiatic origin, found in almost every country of Europe, in most parts of Asia, and in the interior of Africa, and characterized for the most part by their vagabond course of life. The word *gypsy* is a corruption of *E-gypti-an*—the common designation of the vagrant race in old English statutes, in accordance with this prevalent belief, founded on their own assertion, that they came from Egypt. Their first appearance in Europe was about the year 1417; and though all evidence is opposed to their being of an Egyptian stock, it seems not improbable that some at least of this scattered race may have sojourned for a time in Egypt in their migration from the East. A very circumstantial and elaborate account of this singular race is given by Grellmann, in his *Histor. Versuch über die Zigeuner*, which has been translated into English by Mr Raper, under the title of *Dissertation on the Gipsies*, Lond. 1787, 4to. " The Egyptian descent of these people," says Grellmann, " is not only destitute of proofs, but the most positive evidence is found to contradict it. Their language differs entirely from the Coptic; and their customs are very different from those of the Egyptians. They are indeed to be found in Egypt; but they wander about there as strangers, and form a distinct people, as in other countries." He afterwards proceeds to show that they are sprung from the lowest class of Indians, namely, the degraded Pariahs; or, as they are called in Hindustan, *Sudras*. The emigration from their country he conjectures, with much apparent probability, to have been occasioned by the devastating expedition of Timour Beg, in the years 1408–9, when that savage conqueror ravaged India, destroying all who offered resistance to his arms; while those who fell into the enemy's hands were made slaves, of whom, however, 100,000 were put to death. In the universal panic occasioned by these cruelties, it is conjectured that a large number of the terrified inhabitants saved themselves by flight; but at this point Grellmann frankly acknowledges that he is unable to trace the route by which the fugitives passed from Hindustan to Europe.

The gypsies are variously designated in different countries: thus, in France they are called *Bohémiens*, as coming thither from Bohemia; in Spain, *Gitanos*—a designation expressive of their crafty character; in Portugal, *Ciganos*; in Germany, *Zigeuner*; by the Italians, the *Walachians*; and the Turks, *Zingari*, *Zigani*, or *Zingani*, and *Chinganéh*. These various appellations would appear to have, for the most part, a common origin; and this perhaps is to be found in the word *Tchingani*, the name of a tribe met with by Lieutenant Pottinger in Beloochistan, near the mouth of the Indus, and who are described as resembling the gypsies in many of their peculiar customs. The gypsies, too, call themselves *Pharaôn* or *Sinte*, which corresponds to *Sinde*, the Hindu name for the inhabitants of Hindustan.

The language of the gypsies, though a kind of lingua-franca, being formed out of fragments and corruptions of many tongues, has, nevertheless, a marked oriental cast. Most of the words are of Indian origin, and are found, in part, with little variation, in the Sanscrit, the Malabar, and the Bengal languages; and many words have been adopted from the different nations among whom they sojourn. Bishop Heber relates that he met with a camp of gypsies on the banks of the Ganges, who spoke the Hindu language as their mother tongue; and he also found the same people in Persia and Russia. Their persons and customs also bear a striking resemblance to those of the Hindus.

There can scarcely be a doubt that at one period a very considerable number of the gypsy race passed into Europe from Egypt; and, indeed, history informs us that when the Sultan Selim conquered Egypt, A.D. 1517, many of the inhabitants refused to submit to the Turkish yoke, and revolted under one Zinganeus (whence their Turkish appellation of *Zingani*); and being at length subdued and banished, they agreed to disperse in numerous small parties over different countries, where their supposed skill in the black art procured them a favourable reception in that age of general superstition. Their numbers were quickly multiplied by the accession of persons who imitated their language, manners, and complexion, and betook themselves to the practise of chiromancy, begging, and pilfering, so that the gypsy race came to be regarded as a nuisance in most of the states of Europe. Accordingly, they were expelled from France in the year 1560, and from Spain in 1591. But in 1531 they are described by statute 22d Henry VIII., c. 10, as "an outlandish people calling themselves Egyptians, using no craft nor feat of merchandise, who have come into this realm, and gone from shire to shire, and place to place, in great companies, and used great, subtle, and crafty means to deceive the people; bearing them in hand that they by palmistry could tell men's and women's fortunes; and so many times by craft and subtility have deceived the people of their money, and also have committed many heinous felonies and robberies." They are, therefore, directed to avoid the realm, and not to return under pain of imprisonment, and forfeiture of their goods and chattels; and it is further declared, that upon their trials for any felony which they may have committed, they shall not be entitled to a jury *de medietate linguæ*. It was afterwards enacted, by statutes 1st and 2d Philip and Mary, c. 4, and 5th Eliz. c. 20, that if any such persons shall be imported into the kingdom, the importer shall forfeit L.40. And if the Egyptians themselves remain one month in the kingdom, or if any person being fourteen years old, whether natural-born subject or stranger, who has been seen or found in the fellowship of such Egyptians, or having disguised him or herself like them, shall remain in the same one month at one or several times, it is felony without benefit of clergy. Sir Matthew Hale tells us that on one occasion at the Suffolk assizes, no less than thirteen persons were executed upon these statutes a few years before the Restoration. These are the latest instances of condemnation under these statutes; yet the last sanguinary act itself was not repealed till 23d Geo. III., c. 54.

In Scotland the gypsy tribe seem to have enjoyed some share of indulgence; for a writ of privy seal, dated 1594, supports John Faw, lord and earl of Little Egypt, in the execution of justice on his company and folk, conform to the laws of Egypt, and in punishing certain persons therein named, who had rebelled, robbed him, absconded, and refused to return home. James's subjects are commanded to assist in apprehending the fugitives, and in assisting Faw and his adherents to return to Egypt. There is another writ in his favour from Mary Queen of Scots, 1553; and in 1554 he obtained a pardon for the murder of Nunan Small; so that it appears he had remained long in Scotland, and perhaps spent some time in England. From him this kind of strolling people received in Scotland the name of the *Faw Gang*.

In the reigns of Henry VIII. and Elizabeth, the gypsy tribe were marked out for general persecution in England; yet their numbers do not appear to have diminished greatly in consequence. They are spread over all Europe; and about the year 1830, their total number was estimated at about three quarters of a million. It is in the south of Spain, however, that these strolling people appear in greatest numbers. They are also numerous in Hungary, Transylvania, and Moldavia; and are found in still greater numbers in Bessarabia, near Constantinople, and throughout Turkey. For nearly four centuries have these people wandered through the world; and in every region, and among every people, whether barbarous or civilized, they have continued equally unchanged by the lapse of time, the variety of climate, or the force of example. Their singular physiognomy, and their peculiar manners, are the same in every country; their complexion receives no darker shade from the burning sun of Africa, nor any fairer tincture from the temperate climes of Europe. As to religion they have none; though from motives of policy they generally profess the established faith of the country in which they live. Many attempts have been made to educate and civilize them; but they seem singularly unsusceptible of religious impressions. In the neighbourhood of civilized life they continue barbarous; are content to live in tents or in holes in the earth, and wander in companies from place to place as fugitives and vagabonds. In Transylvania the gypsies have a form of constitution, being in a manner governed by chiefs, whom they distinguish by the Sclavonian title of *waywode*. To this dignity every one is eligible who is of a family descended from a former waywode; but the preference is usually given to those who have the most wealth, or who are of a large stature, and not past the meridian of life.

In appearance, the gypsies are of a brownish or olive complexion, with jet black hair and dark eyes, and very white teeth. In Spain many of the gypsy girls are considered beauties,—a fact dependent not a little, it is probable, on the intermixture of Spanish blood. They are also noted for the symmetry of their limbs, which distinguishes even the men, whose general appearance, however, is shy and repulsive. Seldom tall or powerful in frame, they possess much elasticity and activity, and their physiognomy denotes carelessness and levity. In mild climates they dispense with tents, and congregate in companies in forests and deserts. In cold countries they find shelter in caves, or build huts sunk in the earth, and cover them with sods laid on poles. In Spain, and also in Hungary and Transylvania, there are some gypsies who follow trades. They are innkeepers, farriers, and dealers in horses; smiths, nail-makers, tinkers, and menders of old pots and kettles; makers of wooden spoons, spindles, &c.; and occasionally they engage in the labours of the field. They have a certain degree of natural talent for music, and are often respectable performers on the violin, flute, Jew's-harp, &c. Their skill in this art is confined to instrumental music, particularly of the dance kind. In many places the gypsies support themselves by rope-dancing and tricks of legerdemain; while the women find occupation in fortune-telling, the interpretation of dreams, and the like. In the earlier part of life, particularly in Spain, the women are dancers; and when they grow older, they invariably practise fortune-telling and chiromancy. In warm countries the gypsy children go perfectly naked for the first few years of their life, yet are objects of much solicitude to their parents, by whom they are carefully instructed in lying, thieving, and all kinds of knavery, and regarded with a degree of blind affection that seems to border on animal instinct. The gypsies have a passion for rings, trinkets, and all kinds of ornaments, and frequently adorn themselves in the most heterogeneous fashion. In England the females are generally distinguished by a cloak, gray or red, and a coloured kerchief tied around the head. Their domestic utensils are few, consisting usually of a pan, a dish, a kettle, and a silver cup. They frequently possess horses and pigs; and in England every gypsy company has one donkey or more for the conveyance of their effects. The gypsies, like the Pariahs, are very disgusting in many of their customs; such as, for instance, that of eating the flesh of animals that have died of disease. A murrain, accordingly, is to them a welcome event. They are fond of brandy; and both sexes are excessively addicted to the use of tobacco, which they regard as a luxury to be obtained at almost any sacrifice. There is no species of roguery they will not practise in order to obtain money: for instance, it is a common trick among the Transylvanian gypsies to have their children baptized repeatedly, at different places, for the sake of the present usually bestowed by the godfather on such occasions on the poor parents of the child. They marry very early: boys of fourteen and girls of twelve are often man and wife; nor is the closest propinquity any bar to their union. But in these matches the wily gypsy carefully avoids the legal forms that might prevent a separation in case he should tire of his mate—a thing of very common occurrence. They never marry any but of their own race. Such is their natural depravity, that they have a real enjoyment in cruelty; so that they were formerly employed in preference as executioners. At the same time their cowardice is notorious. They have occasionally been taken into the armies in Hungary and Transylvania, but have always been themselves very indifferent soldiers.

Besides Grellmann's work already cited, the reader may consult with advantage Mr Marsden's paper on the Gypsy Language, in vol. vii. of the *Archæologia;* Captain Richardson's paper on the Natas, in vol. vii. of the *Asiatic Researches;* Bischoff's *Deutsch-Zigeunerisches Wörterbuch*, of which the preface contains an excellent summary of the history and present state of this singular people; Hoyland's *Historical Survey of the Gypsies;* see also the graphic descriptions of gypsy life, as contained in Scott's *Guy Mannering*, and in Borrow's *Gypsies in Spain.*

GYPSUM, or SULPHATE OF LIME (γύψος of the Greeks; *Gypsum* of Pliny and Vitruvius), is an abundant mineral, in some of its forms, in many countries. It is known in Britain and other places by the name of *alabaster;* but this designation is also applied to a granular carbonate of lime, seemingly deposited from water, which, by way of distinction, is named *oriental alabaster*. The ἀλάβαστρον of the ancient Greeks, however, and the *alabastrum* of the Latins, was certainly sometimes applied to designate our gypsum, as may be seen in Theophrastus and in Pliny.

Gypsum occurs crystallized and amorphous. The purest sort is crystallized, and yields on analysis, sulphuric acid 46, lime 33, water 21 per cent. The primitive form of its crystals is a right oblique prism, which is variously modified. Its specific gravity is from 2·20 to 2·40. It is so soft as to be easily scratched by the nail.

Gypsum occurs in all the geological formations, especially in the secondary, and is found crystallized, granular, fibrous, compact, and earthy. When crystallized, it is distinctly foliated; and when the folia are large, it is termed selenite, from its reflecting a moon-like lustre.

Crystallized gypsum chiefly occurs at Bex in Switzerland; at Salzburg in the Tyrol; in New Castille, especially between Tembleque and Aranjuez; in Bohemia, France, New York, Nova Scotia; at Shotover in Oxfordshire, and at Chatley in Essex.

Granular and compact gypsum are the kinds used in sculpture, and occur snow-white near Volterra in Tuscany, in Spain, the Hartz, and other parts of Germany; in France, and in the salt formation of Cheshire. Fibrous gypsum is found at Ilfeld in the Hartz, in New Castille, Aragon; and in England in Cheshire and Derbyshire. Earthy gypsum occurs abundantly in New Castille and Aragon in Spain, at Salzburg, in Norway, and in various parts of North America. It is found in great quantity in the environs of Paris, along with a compact gypsum, in both of which the bones of the palæotherium, anoplotherium, and other extinct mammals were discovered by Cuvier. The gypsum beds of Paris contain 17 per cent. of carbonate of lime; and this sort has been named *Montmartrite*, from the locality where it occurs. This sort of gypsum forms the best *plaster of Paris*, as it resists the weather better than the purer gypsums.

There is another species of gypsum which contains no water of crystallization, and is therefore termed anhydrite. This mineral has a higher specific gravity than the common gypsum, and occasionally exhibits a fine pale blue colour. It occurs chiefly at Bex, at Sulz on the River Neckar, in Styria; at Bleyberg in Carinthia; in Upper Austria, and in Galicia.

Gypsum occurs in beds in gneiss and in mica-slate, and also in greywacke-slate; but its chief deposits are in the red clays of the secondary formation. It is found also in the tertiary formations; and even appears to be now forming, by the decomposition of iron-pyrites in contact with calcareous strata. It therefore must be considered as a member of all the great geological series of rocks.

Gypsum is important in an economical point of view. It is employed both in America and in Europe, as a top-dressing for meadow-lands with much advantage; but its principal use is for the formation of *plaster of Paris.* For this purpose it is burnt to expel its water of composition; and then when its powder is mixed with water, it forms a semi-liquid paste, that rapidly *sets* or dries by the absorption of the water; during which process a considerable heat is extricated, as was long ago remarked by Pliny. This extrication of heat is owing to the water giving out its latent heat on its condensation in the gypsum.

This property of rapid consolidation renders gypsum very available for taking casts of works of art, or objects of nature, as of sculptures, plants, and animals. It is much employed in architectural ornaments; and in Spain and France in the construction of vaults and floors. In smaller quantity it is employed in the glazing of porcelain; but its chief uses are for making casts, as a mortar, and in agriculture.

GYROMANCY, a kind of divination performed by walking or turning round in a ring or circle.

GYULA, a market-town of Hungary, county of Bekes, on the White Körös, which is here navigable, and divides the town into two portions—*Magyar* and *Nemelt*—in one of which only Hungarian, and in the other only German, is spoken. It has several oil mills, a castle, and an active trade in cattle and wine, which is extensively grown in the the districts. Pop. 15,000.

H.

H, the eighth letter of the English alphabet. It is properly a guttural aspirate semi-vowel, and indicates a breathing or forcible emission of the breath. Ben Johnson styles it "rarely other than an aspiration in power, though a letter in forme." By Bishop Wilkins, again, it is regarded as a *guttural vowel*, or sound formed in the throat by a full emission of the breath. Our H in *form* is the same as the uncial Greek *eta* (H); but it properly represents the ח of the Chaldee, Syriac, and Hebrew alphabets, which is also the eighth letter in each. H is sometimes mute in English, as in hour, honour, honest, hospital, &c.; or when united with *g*, as in right, fought, &c. H, as an old Latin numeral letter, denotes 200; and with a dash above it, ($\overline{H}$) 200,000. In Latin, as an abbreviation, H stands for *homo, hæres, hora, &c.;* thus, H. B. = *hæres bonorum;* HA. = Hadrianus; HH = *hæredes;* H. AQ. = *hic acquiescit.*

HAARLEM, Haerlem, or Harlem, a city of Holland, province of North Holland, on the Spaaren, 11 miles W. of Amsterdam, with which, as well as with Leyden, it communicates by railway. Haarlem was formerly a place of some strength. In 1572 it held out against a Spanish force, under the son of the Duke of Alva, for seven months, when terms of capitulation were offered to the besieged, and accepted. The Spaniards, however, had no sooner obtained possession of the town than they practised every species of cruelty upon the inhabitants, 2000 of whom were either put to the sword or tied in pairs and thrown into the lake. It was retaken by the Dutch in 1577. Part of the old fortifications still exist, including a venerable gateway on the high-road to Amsterdam. The town itself is well built and clean, but dull; and is traversed by numerous canals, which also connect it with all the principal towns of Holland. It has a fine market-place, round which are some of the finest buildings in the city. There are in all 15 churches belonging to various sects, including the cathedral of St Bavon, which is the largest church in Holland, and is celebrated for its organ, one of the largest and finest in the world. This instrument was built by C. Müller of Amsterdam in 1738, and has 8000 pipes and 60 stops. The Stadhuis and the Prinzenhof are among the finest edifices in the town. The latter has been converted into a museum of arts, antiquities, &c. In the market-place is a statue to Laurenz Janszoon Koster, whom the Dutch maintain to have been the inventor of printing. Haarlem is the headquarters of the Dutch establishment of national education, and the seat of the principal training seminary for schoolmasters in that kingdom. It has numerous literary and scientific institutions, including a botanic garden and public library. There are also extensive cotton factories and bleaching works, as well as manufactures of linen, silk, velvet, ribands, thread, &c. Excellent walks occupy the site of the ancient ramparts, and the neighbourhood is adorned with gardens and villas. In the S. outskirts of the town are famous nursery-gardens (*Bloemen Tuin*), where hyacinths, tulips, and other flowers, which constitute an important branch of trade in Haarlem, are reared. Pop. (1850) 25,778.

Haarlem Meer, or *Lake of Haarlem*, which has recently been drained, lay S.E. of the town, and was 14 miles long by 10 miles broad. It had been formed by an inundation in the end of the sixteenth century, which transformed four small lakes into one sheet of water, laid waste several villages, and destroyed much property. It continued gradually to gain upon the land, and in the beginning of the eighteenth century it covered an area of 45,000 acres. The people of Holland saw with much alarm the rapid extension of its boundaries, and at an expense of about L.33,000 succeeded in partially arresting its progress; but the annual cost of repairs to the works of defence had for a considerable period amounted to between L.3000 and L.4000. Various schemes had been proposed for the drainage of the lake, but it was not till 1839 that effectual means were taken for that object. On the 9th of November 1836 a furious hurricane from the west had driven the waters of the lake upon the city of Amsterdam, and inundated upwards of 10,000 acres of low land in the neighbourhood; and on the 25th of December following another hurricane impelled the water in the opposite direction upon the city of Leyden, the lower parts of which were submerged during 48 hours, and 19,000 acres of land covered with water. The enormous loss occasioned by these two storms determined the government on the drainage of the lake. The first business was to dig a canal round the lake for the reception of the water, and to accommodate the great traffic which had hitherto been carried on by means of it. This canal was made 38 miles in length, 130 feet wide on the west side, and 115 feet on the east side of the lake, and 9 feet deep. All the inlets into the lake were then closed by large earthen dams; and various works were executed to facilitate the flow of water into the sea. These preliminary works occupied till 1845. To give some idea of the magnitude of the undertaking, it may be mentioned that the area of water inclosed by the canal was rather more than 70 square miles, and the average depth of the lake was 13 feet 1·44 inches. The water had no natural outfall, being below the lowest possible point of sluiceage; and, including rain water, springs, &c., during the time of drainage, it was calculated that probably 1000 million tons would have to be raised by mechanical means. After drainage too, the site could only be kept dry by mechanical power, so that the annual drainage might amount to 54,000,000 tons, to be raised on an average 16 feet, and it might happen that as much as 35,000,000 tons of that amount would have to be raised in one month. A gigantic steam-engine of a peculiar construction, designed by Messrs J. Gibb and A. Dean of London, was erected and found to answer the highest expectations. It could raise 112 tons of water at each stroke, and was capable of discharging 1,000,000 tons in 25½ hours; while the consumption of fuel was only one-sixth part of the average consumption of ordinary draining engines. To describe this engine briefly;—it consists of two steam cylinders, one of 84 inches diameter placed within another of 144 inches diameter, both fitted with pistons, the outer being of course annular. The two pistons are united to a great cross head or cap, which is furnished with a guide rod or spindle—both pistons and cross-head being fitted with iron plates, and, together with parts of the engine attached, having an effective weight of nearly 90 tons. The engine-house is a circular tower, on the walls of which are arranged eleven large cast-iron balance-beams, which radiate from the centre of the engine. Their inner ends, furnished with rollers, are brought under the circular body of the great cap, and their outer ends are connected to the pistons of eleven pumps, each of 63 inches diameter; the stroke of both ends is 10 feet, and the discharge from the pumps is 66 tons of water per stroke. The action of the engine is very simple; it is on the high-pressure-expansive-condensing principle. The steam is admitted first beneath the small piston; and the dead weight of 90 tons is lifted, carrying with it the inner end of the pump balances, and of course allowing the pistons to descend in the pumps. The equilibrium valve then opens, and the steam in the cylinders passes round to the upper surface of the small and annular pistons, puts the former in a state of equilibrium, and presses with two-thirds of its force upon the annular piston, beneath which a vacuum is always maintained; thus the down stroke of the engine, and the elevation of the pump pistons and water, is produced by the joint action of the descending dead-weight in the cap and pistons, and the pressure of steam on the annular piston. The steam is expanded from six to eight times its original volume. The engine has two air-pumps of 40 inches diameter, and 5 feet stroke each. The total weight of iron employed for the engine-pumps, &c., is 640 tons; and the cost of the machinery and buildings was L.36,000. The water is lifted by the pumps into the canal, from which it passes off towards the sea-sluices. Two other engines of equal size and power were afterwards constructed by Messrs Harvey of Hayle and Messrs Fox and Co. of Perran, in Cornwall, the makers of the previous one. The pumping commenced in May 1848, and the lake was rendered dry by 1st July 1852. The first sale of the highest lands along the banks took place on 16th August 1853, when 784 hectares brought in 575,000 florins, or 733 florins per hectare. A second sale took place the same month, when 1273 hectares were sold for 742,450 florins, or 583 florins per hectare. Six sales have subsequently taken place, so that now 12,634 hectares (31,218 acres) have been sold for 5,973,953 florins (L.497,829). There are still (1856) 4200 hectares for sale, and 32 hectares reserved for villages; so that altogether 16,866 hectares, or 41,675 acres, have been reclaimed. The 12,643 hectares sold since 1853 have all this year produced their first or second crops.

The entire expense of drainage from 1839 to 31st December 1855 was 8,981,344 florins (L.748,445), which it is calculated will be entirely covered by the price of the reclaimed land.

HABAKKUK (*embraced* or *embracing*), one of the twelve minor prophets of the Old Testament. Of his history we have only apocryphal accounts; but from the designation (iii. 19) we may conclude that he was of the tribe of Levi, and officially connected with the musical service of the temple. The burden of his prophecy is in regard to the invasion of Palestine by the Chaldæans, which, though incredible when he wrote, was to happen in less than a generation after his time. Accordingly, his period may be fixed as between 650 and 627 B.C., not very long before the advent of Jeremiah, and at a still shorter interval before Zephaniah. His style is artistic, but, at the same time, pure. The canonicity of the book is undoubted. (Delitzsch, *Der Prophet Habakuk*, Leipzig, 1843.)

HABEAS CORPUS, in *English Law*, a celebrated writ, deriving its name, like other writs, from the formal words contained in it. This writ is used for various purposes; but the chief of these, being that which is always understood by *Habeas Corpus* without further explanation, is the release or bailing of a person who considers himself illegally imprisoned, or entitled to be discharged upon bail. Of the various other kinds made use of by the courts at Westminster, for removing prisoners from one court into another for the more easy administration of justice,—1st, The *habeas corpus ad respondendum* is issued when a man has a cause of action against one who is confined by the process of some inferior court, in order to remove the prisoner, and charge him with this new action in the court above; 2d, The *habeas corpus ad satisfaciendum* issues when a prisoner has had judgment against him in an action, and the plaintiff is desirous to bring him up to some superior court to charge him with the process of execution; 3d, The similar writs *ad prosequendum*, *testificandum*, *deliberandum*, &c., issue when it is necessary to remove a prisoner, in order to prosecute or bear testimony in any court, or to be tried in the proper jurisdiction in which the fact was committed; 4th, The common writ *ad faciendum et recipiendum*, issues out of any of the courts of Westminster Hall, when a person is sued in some inferior jurisdiction, and is desirous to remove the action into the superior court; commanding the inferior judges to produce the body of the defendant, together with the day and cause of his caption and detainer (whence the writ is frequently denominated a *habeas corpus cum causa*), to *do and receive* whatsoever the court shall consider in that behalf. But the great and efficacious writ, in all manner of illegal confinement, is that of *habeas corpus ad subjiciendum*, directed to the person detaining another, and commanding him to produce the body of the prisoner, with a specification of the day and cause of his caption and detention, *ad faciendum, subjiciendum, et recipiendum*, to do, submit to, and receive whatsoever the judge or court awarding such writ shall consider in that behalf. This is a high prerogative writ, and, therefore, by the common law, issues out of the Court of Queen's Bench, not only in term-time, but also during the vacation, by a fiat from the Chief-justice, or any other of the judges, and runs into all parts of the Queen's dominions except Scotland; for the sovereign is at all times entitled to have an account why the liberty of any subject is restrained, wherever that restraint may be inflicted. If it issues in vacation, it is usually returnable before the judge himself who awarded it, and he proceeds by himself thereon; unless the term should intervene, and then it may be returned in court. Indeed, if the party were privileged in the Courts of Common Pleas and Exchequer, as being an officer or suitor of the court, a *habeas corpus ad subjiciendum* might also have been awarded from thence; and if the cause of imprisonment were palpably illegal, they might have discharged him. But if he were committed for any criminal matter, they could only have remanded him, or taken bail for his appearance in the Court of King's Bench, which occasioned the Common Pleas to discountenance such applications. But since the mention of the King's Bench and Common Pleas as co-ordinate in this jurisdiction, by statute 16th Car. I., cap. 10, it has been held that every subject of the kingdom is equally entitled to the benefit of the common-law writ in either of those courts at his option. It has also been said, and by very respectable authorities, that the like *habeas corpus* may issue out of the Court of Chancery in vacation; but upon the famous application to Lord Nottingham by Jenks, notwithstanding the most diligent searches, no precedent could be found where the chancellor had issued such a writ in vacation, and therefore his lordship refused it.

In the Court of Queen's Bench it was, and still is, necessary to apply for it by motion to the court, as in the case of all other prerogative writs, such as *certiorari*, prohibition, *mandamus*, and the like, which do not issue as of mere course, without showing some probable cause why the extraordinary power of the crown is called in to the party's assistance. For, as it was argued by Lord Chief-Justice Vaughan, "it is granted on motion, because it cannot be had of course, and there is therefore no *necessity* to grant it; for the court ought to be satisfied that the party has a probable cause to be delivered." And this seems the more reasonable, because, when once granted, the person to whom it is directed can return no satisfactory excuse for not bringing up the body of the prisoner. So that, if it issued of mere course, without showing to the court or judge some reasonable ground for awarding it, a traitor or felon under sentence of death, a soldier or mariner in the service of the crown, a wife, a child, a relation, or a domestic, confined for insanity or other prudential reasons, might obtain a temporary enlargement by suing out a *habeas corpus*, though sure to be remanded as soon as brought up to the court. And therefore Sir Edward Coke, when Chief-justice, did not scruple (in 13 Jac. I.) to deny a *habeas corpus* to one confined by the Court of Admiralty for piracy, there appearing, upon his own showing, sufficient grounds to confine him. On the other hand, if a probable ground be shown that the party is imprisoned without just cause, and therefore has a right to be delivered, the right of *habeas corpus* is then a writ of right which "may not be denied, but ought to be granted to every man that is committed, or detained in prison, or otherwise restrained, though it be by the command of the king, the privy council, or any other."

Habeas Corpus Act is the famous act of 31st Car. II., cap. 2, which is frequently considered as another *magna charta* of the kingdom. It enacts—1. That on complaint and request in writing by or on behalf of any person committed and charged with any crime (unless committed for treason or felony expressed in the warrant), or as accessary, or on suspicion of being accessary, before the fact, to any petit-treason or felony, plainly expressed in the warrant, or unless he is convicted or charged in execution by legal process, the Lord Chancellor, or any of the twelve judges in vacation, upon viewing a copy of the warrant, or affidavit that a copy is denied, shall, unless the party has neglected for two terms to apply to any court for his enlargement, award a *habeas corpus* for such prisoner, returnable immediately before himself or any other of the judges; and, upon the return made, shall discharge the party, if bailable, upon giving security to appear and answer to the accusation in the proper court of judicature. 2. That such writs shall be indorsed, as granted in pursuance of this act, and signed by the person awarding them. 3. That the writ of *habeas corpus* shall be returned and the prisoner brought up, within a limited time according to the distance, not exceeding in any case twenty days. 4. That officers and keepers neglecting to make due returns, or not delivering to the prisoner or his agent, within six hours after demand, a copy of the warrant of commitment, or shifting the custody of a prisoner from one to another without sufficient reason or authority (specified in the act), shall, for the first offence, forfeit L.100, and for the second offence L.200, to the party grieved, and be disabled to hold his office. 5. That no person, once delivered by *habeas corpus*, shall be re-committed for the same offence, on penalty of L.500. 6. That every person committed for treason or felony shall, if he requires it the first week of the next term, or the first day of the next session of *oyer* and *terminer*, be indicted in that term or session, or else admitted to bail, unless the crown witnesses cannot be produced at that time; and if acquitted, or if not indicted and tried in the second term or session, he shall be discharged from his imprisonment for such imputed offence; but that no person, after the assizes shall be opened for the county in which he is detained, shall be removed by *habeas corpus* until after the assizes are ended, but shall be left to the justice of the judges of assize. 7. That any such prisoner may move for and obtain his *habeas corpus* as well out of the Chancery or Exchequer as out of the King's Bench or Common Pleas; and the Lord Chancellor or judges denying the same, on sight of the warrant, shall, on oath that the same is refused, forfeit severally to the party grieved the sum of L.500. 8. That the writ of *habeas corpus* shall run into the counties palatine, cinque ports, and other privileged places, and the islands of Jersey and Guernsey. 9. That no inhabitant of England, except persons contracting, or convicts praying to be transported, or having committed some capital offence in the place to which they are sent, shall be sent prisoners to Scotland, Ireland, Jersey, Guernsey, or any places beyond the seas, within or without the British dominions, on pain that the party committing, his advisers, aiders, and assistants, shall forfeit to the party grieved a sum not less than L.500, to be recovered with treble costs, shall be disabled from holding any office of trust or profit, shall incur the penalties of *præmunire*, and shall be incapable of the royal pardon.

This is the substance of that great and important statute, which extends only to the case of commitments for such criminal charges as can produce no inconvenience to public justice by a temporary enlargement of the prisoner; all other cases of unjust imprisonment being left to the *habeas corpus* at common law. But even upon writs at the common law it is expected by the court, agreeably to ancient precedents and the spirit of the act of parliament, that the writ should be immediately obeyed, without waiting for any *alias* or *pluries;* otherwise an attachment will issue. By these admirable regulations, judicial as well as parliamentary, the remedy is now complete for removing the injury of unjust and illegal confinement; a remedy the more necessary, because the oppression does not always arise designedly, but sometimes from the mere inattention of government. For it frequently happens in foreign countries, and has happened in England during the temporary suspension of the statute, that persons apprehended upon suspicion have suffered a long imprisonment merely because they were forgotten.

In *Scots Law*, the form corresponding to the *habeas corpus* is called "Running Letters."

HABERDASHER, a dealer in such wares as silks, ribbons, cotton and woollen fabrics, &c. The word has ingeniously been derived from the Saxon *hab vihr das, i.e.,* Will you buy this? but its etymology is very doubtful.

HABERGEON, a coat of mail, or piece of defensive armour, descending from the neck to the middle, and formed of little iron rings linked into each other. It is also written *haberge, hauberge, haubere, haubert, hautber, hautbert,* and *hauberk.* Spelman derives it from the ancient French *hault,* high, and *berg,* armour or covering; Du Cange and Skinner from the Belgic *hals,* or Teutonic *haltz,* neck, and *bergen,* to defend.

HACHETTE, Jean Nicolas Pierre, an eminent French geometer, was born at Mézières, May 6, 1769 or 1770. His father was a barber, and without the means of educating his son. The genius of the youth, however, was speedily recognised by Monge, then living at Mézières. By his kindness the young Hachette was sent to the university of Reims, where he studied so successfully, that at the age of twenty-three he defeated all his fellow candidates in the *concours* for the professorship of hydrography at Collioure and Port-Vendre. When the polytechnic school was opened in 1794, Hachette was attached to the professional staff, with the department of descriptive geometry, and trained some of the very best geometers of his age and country, such as Poisson, Arago, Fresnel, and many others. He held this office till the restoration of the Bourbons, who deprived him of it and expelled him from the Institute. The Revolution of 1830 reinstated him in his offices and honours, of which he retained peaceful possession till his death, four years later, Jan. 16, 1834. Hachette's character as a man stood as high as his scientific fame. His personal worth was of that solid and unostentatious kind, more common in England than in France, though appreciated quite as fully in the latter as in the former country. His high sense of duty, his simplicity, and his quiet benevolence, endeared him to all who enjoyed the privilege either of his instructions or of his private friendship. His services to science lay chiefly in the field of descriptive geometry, with which he was profoundly acquainted, both in its theory and its practical application to the arts, especially in the construction of machinery. To him is due the merit of having given to machinery that impulse, in virtue of which France has in that department advanced so rapidly and so far since his day.

Hachette's principal works are his *Deux Suppléments à la Géométrie Descriptive de Monge*, 1811 and 1818 respectively; *Elémens de Géométrie à Trois Dimensions*, Paris, 1817; *Collection des Epures de Géométrie à Trois Dimensions*, &c., 1795 and 1817; *Applications de Géométrie Descriptive*, Paris, 1817; *Traité de Géométrie Descriptive*, &c., Paris, 1822; *Traité Elémentaire des Machines*, Paris, 1811; *Correspondance sur l'Ecole Polytechnique*, 1804–1815. Hachette also contributed many valuable papers to the leading scientific journals of the day.

HACKET, John, D.D. (1592–1670), bishop of Lichfield and Coventry, was educated first at Westminster and afterwards at Trinity College, Cambridge. In the civil war he espoused the royal cause with an indiscreet zeal that got him into trouble when victory sided with the parliament. At the Restoration, however, he was promoted to the bishopric of Lichfield and Coventry, which he held till his death. Hacket's name will be long remembered in the history of church architecture in Britain. He restored, with skill and success, the cathedral of Lichfield, which had been seriously damaged in the iconoclastic fury of the Puritans. With indefatigable zeal he set himself to collect subscriptions for its repair, which seems to have cost about L.20,000. Of this sum he contributed himself nearly one-tenth. As an author, Hacket is only known to have written *Loyola*, a comedy which was twice acted before James II. After his death appeared a *Century of Sermons on several remarkable subjects,* and a *Life of Archbishop Williams.* All these works are now forgotten.

HACKNEY, a suburb of London, parish of St John, Hackney. See LONDON.

HACKNEY *Coaches.* See COACH. The term is derived from the French *haquenée*, a strong kind of horse formerly lent out on hire for short journeys in France, and afterwards employed to draw a plain vehicle for the accommodation of several travellers together. This vehicle was called *coche-à-haquenée*, whence the term hackney-coach.

HACQUETON, a stuffed jerkin, generally of leather, formerly worn under armour.

HADDINGTON, a royal burgh of Scotland, and county town of Haddingtonshire, or East Lothian. It stands on the left bank of the Tyne, about 17 miles from Edinburgh, on the post road between that capital and Berwick-upon-Tweed. Haddington is a town of great antiquity, but the exact date of its origin is unknown. It is first mentioned in the records of the 12th century as part of the demesne of the Scottish king. It was created a burgh by David I., who held it, along with a church and mill, and other appurtenances of a manor. Ada, wife of Henry the son and heir of this monarch, received this burgh as her dower, and was very attentive to its interests. In 1178 she founded here a convent of Cistercian nuns, and endowed it with the lands of Clerkington. After her death, the burgh became the property of her son, William the Lion, whose son, Alexander II., was born here in 1198. In 1216 Haddington was burnt, along with the neighbouring burgh of Dunbar, by an invading army under John, king of England. Being rebuilt with wood, it was again burnt to the ground in 1244. Some attributed the fire to the work of an incendiary, for it was remarked that six other Scottish towns were burnt on the same night. In 1355, it was reduced to ashes for the third time by Edward III. of England, and the monastery of Haddington, with the splendid church of the Franciscans or Grey Friars, destroyed. The choir of this church, from its great elegance, and from the number of lights kept constantly burning in it, was commonly called the Lamp of Lothian (*Lucerna Laudoniæ*). The year after the battle of Pinkie, 1548, Haddington was seized and strongly fortified by the English. An allied army of Scotch and French laid siege to it, and, after a memorable defence, it was evacuated by the English in October 1549. In 1598 this town was again consumed by fire; but in this instance the fire was entirely accidental.

Haddington, being built on low ground, little above the level of the Tyne, has repeatedly suffered from inundations of that river. In 1358, in 1421, and in 1673, the Tyne rose to a great height, and did much damage to the town and neighbourhood. But the greatest inundation took place on the 4th of October 1775, when the river rose 17 feet above its usual level, overwhelmed the suburb of Nungate on the east bank, and laid a great part of the town under water. Had the highest flood occurred during the night, the loss of life would have been very great. A tablet, recording the providential deliverance of the town, is still to be seen on one of the corners of the main street.

The ancient walls and fortifications of Haddington have now quite disappeared. Some of the old houses possessed by the nobility when Haddington was a royal residence, still exist, but in a very dilapidated state. The palace of the Scottish kings is said to have stood near the West Port, on the spot now occupied by the new county buildings, erected in 1833. The town consists of a Main or High Street, stretching from east to west, and forming a portion of the post road to Berwick. It is a spacious and handsome street, and possesses some elegant buildings. Parallel to it, on the north, runs the Back Street, having two cross streets at its eastern extremity. The town-house is a respectable and commodious fabric, with a fine spire 150 feet high, built in 1831. A few years ago, a large new prison for the town and county, on the most approved principles, was built on ground closely adjoining the county buildings; the old premises, which were connected with the town-house, having been found quite insufficient.

There are two bridges over the Tyne, one, of great antiquity, connecting the town with the suburb of the Nungate; and the other, called Waterloo Bridge, built in 1817, on the south of the town, giving access to the Bolton and Salton road. In the Nungate the ruins of an ancient chapel dedicated to St Martin still exist. The ancient and splendid monastery of the Franciscans was long the chief architectural glory of Haddington. It was 210 feet in length, and was surmounted by a noble square tower 90 feet high. The tower and principal parts of the building still stand, though partly in ruins. In 1811, the chancel or west end of the cross was repaired, and now forms the present parish church. For 200 years Haddington has been a collegiate charge, and has possessed the services of two ministers of the Established church. It has also two Free churches, two churches of the United Presbyterians, an Independent church, and an Episcopal chapel.

Haddington being in the centre of a highly cultivated district has long possessed an excellent weekly corn market, which is held on Friday. It is one of the ruling markets for grain in Scotland, and is resorted to by dealers from all parts of the country. A large and commodious corn exchange has been lately opened for the transaction of business. Several woollen manufactories have been tried in Haddington, but without success. There are several tanneries and breweries, and a few other branches of business, such as are usually found in a county town. The following banks have branches in Haddington:—Bank of Scotland, British Linen Company, Western Bank of Scotland, and City of Glasgow Bank.

Under the late Burgh Reform Acts, the government of Haddington is vested in a provost, three bailies, a dean of guild, a treasurer, and twelve councillors. The ordinary sheriff court during session meets every Monday and Thursday. The Small-Debt Court is also held on Thursday. Monthly Justice of Peace Courts are also held on the second Tuesday of each month. The Quarter Sessions are held on the first Tuesdays of March, May, August, and October.

The Burgh or Grammar Schools of Haddington, under the patronage of the magistrates, have usually enjoyed a high reputation. The celebrated Edward Irving was once one of its masters. There are four good libraries in the town, one of which was founded about the year 1717. Mr Samuel Brown, a native of the town, was the means of instituting in 1817 "The East Lothian Itinerating Libraries," which have done much good throughout the county. There is also a good reading-room, a savings bank, several branch banks, a town mission, and an infant-school. The United East Lothian Agricultural Society and the East Lothian Horticultural Society have their seats in Haddington. The population of the burgh and parish amounted in 1821 to 5255, in 1831 to 5883, in 1841 to 5452, and in 1851 to 5525. Haddington unites with Dunbar, North Berwick, Jedburgh, and Lauder, in sending a member to parliament. Its electors in 1855 amounted to 205.

Haddington claims the honour of being the birthplace of John Knox; but it will, perhaps, be always disputed whether that great reformer was born in the Giffordgate of Haddington, or in the village of Gifford, 4 miles to the S. of the town. It is certain, however, that he spent his early life in Haddington, and was educated at its Grammar School. The Rev. John Brown, author of the *Dictionary of the Bible,* and other popular religious works, was a dissenting minister in Haddington, and there spent the greater part of his useful and laborious life. It may also be mentioned that

Alexander II., king of Scotland, was born here in 1198. Andrew Maitaland, a native of Haddington, was married in 1657, and had nine children, whose united ages amount to 738 years.

Haddington gives the title of earl to the Hamiltons of Byres and Tyninghame.

The quantity and value of grain sold in the Haddington grain market, from September 22, 1854, to September 21, 1855, were as follows :—

	Qrs.	Value.			Highest Average.	
Wheat...........	26,923	L.97,127	9	5	85*s*.	10*d*.
Barley...........	24,419	42,357	1	2	39	1
Oats...............	20,548	32,237	6	5	35	6
Beans............	4,889	11,543	3	6	54	1

For the ancient and modern history of Haddington, see *The Lamp of Lothian*, by James Miller, author of *St Baldred of the Bass*, and the *History of Dunbar*.

HADDINGTONSHIRE, or East Lothian, a county in Scotland, lying between N. Lat. 55. 47. and 56. 5., and W. Long. 2. 25. and 3. 2. It is bounded on the N. and E. by the Firth of Forth and German Ocean, S. by Berwickshire, and W. by Edinburghshire, or Mid-Lothian. Its boundaries are somewhat irregular, but its extreme length from W. to E. may be about 25 miles, and its extreme breadth about 17. According to the ordnance survey of this county recently completed, its area is as follows :—Land, 173,298 acres; water, 190; links, 149; foreshore, 5505—total, 179,142 acres, or 280 square miles. Of the "land" portion fully four-fifths are considered to be arable, and even under cultivation. The remaining portion, which is only fit for pasture, is almost exclusively composed of the Lammermoor district, which bounds the county from Soutra on the S.W. to Cockburnspath on the N.E. With the exception of this hilly district on the S., the whole county is highly cultivated, as there is no considerable forest, marsh, or heath, to resist the plough. Few counties in Scotland present such a fair and unbroken picture of agricultural wealth and activity.

When viewed from the ridge of the Lammermoors, Haddingtonshire appears to slope gradually to the Firth of Forth and the German Ocean ; but, upon a nearer survey the declivity is found to consist of nearly parallel ridges, running from W. to E., and most of them extending nearly the whole length of the county. Towards the termination of these ridges on the E. there is an extensive and very fertile plain, stretching northwards along the sea-coast. In the low country, North Berwick Law, and Traprain Law, near the centre of the county, are very conspicuous objects, from their regular cone-like appearance. The Garlton Hills, a range of moderate height to the north of the town of Haddington, although not picturesque in themselves, command some of the finest views in the county.

The soil of Haddingtonshire is very varied, but clay and loam, nearly in equal proportions, though of various qualities, extend over about two-thirds of the county. A great deal of both descriptions is not naturally very fertile, much of the clay, in particular, being shallow, and lying on a wet bottom. Tracts of moorish soil are also found in some districts, as in the parish of Gladsmuir. Yet, on the whole, the soil of this county is highly favourable for agricultural purposes. What part of it is naturally not good is very susceptible of improvement, and has actually been greatly improved by judicious drainage, and a superior style of agriculture.

The climate of Haddingtonshire is undoubtedly one of the best in Scotland, especially for the production of grain crops. In point of dryness it is much above the average ; and from the absence of swamps or morasses, and the extensive agricultural drainage, it is remarkably free from fogs and noxious exhalations. In certain districts where ague was once very common, that disease is now unknown, and the salubrity of the air has greatly increased. The amount of rain that falls in the lower parts of the county, especially around Dunbar, is considerably less than in most other counties of Scotland ; and to this cause is ascribed the superior quality of the wheat and other kinds of grain. The harvest in the eastern districts, and along the coast northward, is in general early, and is often ended before the harvest in the higher tracts is well begun. Snow, which sometimes lies for months in the Lammermoors, seldom lies long in the lower grounds, and near the coast disappears for the most part as rapidly as it falls. In the winter and spring months the prevailing winds are from the N. and E. ; in summer, when the weather is dry, from the E. ; and in autumn from W. to S. and S.E. The N.W. wind brings storms in winter, and from that quarter, as well as from the S.W., come the high gales which are sometimes so injurious to the standing corn in autumn.

The streams in Haddingtonshire are inconsiderable in number and extent. The Tyne, which is the largest, rises in Mid-Lothian, and enters this county on the W. near Ormiston, passes Haddington, and falls into the sea at Tyninghame, between Dunbar and North Berwick. There are also the Whitadder, the Dye, the Fasney, the Moneynut, and Bothwell Water, all flowing in a south-easterly direction. The only lake of any importance in this county is Pressmenan, in the parish of Stenton, and that is an artificial one. It is about a mile and a half in length, and is very narrow ; but it is surrounded with beautiful woods, and affords excellent fishing.

Coal is found in great abundance and of fair quality in five of the western parishes of this county, namely, Prestonpans, Pencaitland, Ormiston, Tranent, and Gladsmuir. It appears from old charters that the monks of Newbattle wrought coal in the parish of Prestonpans so early as the first part of the thirteenth century. This is understood to be the first recorded instance of coal being wrought in Scotland. Limestone is also very abundant, and is more equally diffused over the county. Marl is found at Salton and other places, but its use is superseded by the application of lime. Sandstone, or freestone, well adapted for building purposes, is quarried in Garvald, Pencaitland, Tranent, and many other places. Ironstone has been found in the parishes of Humbie, Oldhamstocks, and Tranent ; but it is only of late that iron has been manufactured in this county with any success. A furnace for the smelting of iron ore has been recently erected at West Bank, parish of Gladsmuir, and the iron manufactured has proved to be of excellent quality.

In the Lammermoors, near the junction of the Fasney with the Whitadder, granitic rocks appear ; but the prevalent rocks over the county are those of a secondary character. Old red sandstone appears on the northern slope of the Lammermoors. Traprain Law, in the centre of the county, is composed, at its base, of a slaty clinkstone, and towards the summit, of a greenstone, slightly granulated with hornblende. North Berwick Law, a conical hill, rising immediately above the town of North Berwick to the height of 612 feet, is another of those bold eminences of the trap order, which break the monotony of the East Lothian landscape. The Bass Rock presents a singular specimen of a mass of trap rock rising up abrupt and perpendicular 350 feet from the surface of the sea. This trap rock, according to the continental geologist M. A. Boué, is a compact clinkstone, and according to Mr J. Nicol, "a fine granular greenstone or clinkstone." Hugh Miller pronounces it to be "of an intermediate hybrid species," partaking of the character both of clinkstone and greenstone. (See *The Bass Rock, its Civic and Ecclesiastical History, Geology*, &c. &c.)

According to the recent trigonometrical survey the heights of the principal eminences in this county are as follows :—Lammerlaw 1732 ft., Lammermin 1692, Spartleton 1500, Doon Hill 583, Traprain Law 586, Garlton Hill 573.

These measurements, some of them materially differing from those given by the ordinary authorities, must be held to be correct.

The British antiquities of Haddingtonshire are neither very numerous nor very important. In various parts of the Lammermoors, stone circles of Druidical origin are found. The remains of hill forts and circular camps are also found at Garvald, Carfrae, Priestlaw, Spott, and other places. Urns composed of clay, and supposed to be of a funereal character, are not unfrequently discovered on the higher grounds. Tall upright single stones are to be seen standing in various places. There is one, for example, in a field near Linton, and another at Broomhouse, near Spott. The battle-field of Dunbar, where Cromwell defeated the Covenanting army, under General Leslie, in 1650; and the battle-field of Prestonpans, where the royal forces were defeated by the Highland army in 1745, are the only spots of historical interest.

Haddingtonshire contains some fine ruins of ancient castles. The castle of Dunbar, perched upon two bold rocks that overhang the sea, is now a complete ruin, but it still forcibly speaks to the eye of the warlike character of former ages. Tantallon Castle, in the parish of North Berwick, is also close upon the sea, and with its immense piles of masonry still standing, undoubtedly forms one of the most magnificent ruins in Scotland. Dirleton Castle, near the beautiful village of that name; Hailes Castle, in the parish of Prestonkirk, on the south bank of the Tyne, famed in the history of Queen Mary; and Innerwick Castle, four miles east of Dunbar, are also interesting ruins.

There are many seats of the nobility and gentry in East Lothian. Of these, the principal are Yester House, the seat of the Marquis of Tweeddale; Gosford House and Amisfield, seats of the Earl of Wemyss; Tyninghame House, the seat of the Earl of Haddington; Ormiston Hall, a seat of the Earl of Hopetoun; Saltoun Hall, the residence of Andrew Fletcher, Esq., a descendant of the celebrated patriot; Archerfield and Beil, seats of Mr and Lady Mary Hamilton-Nisbet; and Whittingham House, the seat of James M. Balfour, Esq.

This county has long enjoyed the benefit of excellent roads and other means of transport; while its small but useful seaports have been of great service to its agriculture. The first Scottish turnpike act was obtained in 1750 for the formation of a road through the county. In an agricultural point of view East Lothian occupies an important position among the other counties of Scotland. There are very few small farms, and, except in the hill districts, the largest seldom exceed 500 imperial acres. On land of a medium quality, a farm of 300 acres is considered to be of an average size. Farms are commonly held on leases of 19 or of 21 years, and these leases are generally of a fair and equitable character. In some instances of late the tenant has the power to kill game on his farm, a privilege which is attended with the best consequences. In the article AGRICULTURE, Appendix A, vol. ii., p. 368, will be found a detailed account of the agricultural condition and prospects of this county.

At various periods attempts have been made to introduce different manufactures into Haddingtonshire, but with no permanent success. At the present time no manufactures of importance are carried on in the county; and various attempts made to introduce the manufacture of cotton, muslin, &c., have proved entirely abortive. The breweries of Prestonpans and Belhaven are still famous; but the once extensive potteries of the former place have now dwindled away. The principal towns are Haddington the county town, Dunbar, North Berwick, Tranent, and Prestonpans. These are described under their respective names.

Haddingtonshire has given birth to not a few eminent men, and is associated with the history of many more. It is well known that John Knox, the renowned Scottish Reformer, was a native of this county, being born, according to some authorities, at Haddington; or, according to others including his distinguished biographer, Dr M‘Crie, at Gifford, a village four miles to the south of Haddington. Dr Witherspoon and the Rev. Marcus Dods were natives of Gifford. Fletcher of Salton, and Lord Belhaven, who distinguished themselves at the period of the Union, are East Lothian celebrities. George Heriot, the founder of Heriot's Hospital in Edinburgh, was a native of the parish of Gladsmuir. Dunbar, the poet, is said to have been born at Salton in 1465; and Gilbert Burnet, afterwards Bishop of Salisbury, was minister of the same parish from 1665 to 1669. Principal Robertson was for several years minister of Gladsmuir, where he wrote his *History of Scotland*. Blair, the author of *The Grave*, and John Home, the author of *Douglas*, were successively ministers of Athelstaneford. Skirving, the painter, was also a native of Athelstaneford. The pious Colonel Gardiner, who fell in the Battle of Prestonpans, 1745, near his own mansion, Bankton House, was buried in Tranent Churchyard. A handsome obelisk has lately been erected to his memory, near the spot where he fell, which is within a few yards of the North British Railway.

The county is divided into twenty-five parishes, which are all ecclesiastically embraced in the presbyteries of Haddington and Dunbar, except Ormiston and Fala, which belong to that of Dalkeith. The poor are supported by assessment under the recent act, and the rate seldom exceeds in any parish a shilling in the pound. In 1853 the expenditure on the poor in the twenty assessed parishes amounted to L.8127; the total expenditure in the whole county was L.9360. In 1854 the total expenditure was L.9999.

The charitable educational foundations in this county are the following:—Schaw's Hospital, in the parish of Prestonpans, founded by James Schaw of Preston, for the education and maintenance of poor boys, and opened in 1789, now admitting 24 boys; Stiell's Hospital, in the parish of Tranent, founded by George Stiell, builder in Edinburgh, which maintains a few boys and girls as boarders, and gives free education to 140 day scholars, the revenue amounting at present to L.900 a year; an endowment of 20,000 merks bequeathed by Bishop Burnet to his old parish of Salton, towards the enlargement and support of a library for the use of the minister, also for clothing and educating thirty poor children, and otherwise relieving the necessities of the parochial poor.

The following tables—compiled from the returns lately procured through the agency of the Highland and Agricultural Society of Scotland—will show the present state of the agriculture of Haddingtonshire:—

Acres in Tillage.

Year.	Average.*	Wheat.	Barley.	Oats.	Beans and Peas.	Potatoes.	Turnips.
1853	107,269	15,339	12,809	16,802	4,809	4,246	
1854	98,977	16,881	12,086	15,668	3,956	6,442	15,342
1855	101,528	17,472	10,856	16,692	4,100	6,451	16,063

* This average merely represents the gross number of acres in tillage, or arable, returned by the enumeration.

Stock of various kinds.

Year.	Horses.	Milk Cows.	Other Cattle.	Ewes, Gimmers, and Hogs.	Tups, Wethers, and Wether Hogs.	Swine.
1853	4450	2377	7576	36,979	29,597	5580
1854	4171	2130	5390	42,551	33,881	5702
1855	4481	2069	5508	† 86,853		4676

† Returns differently made in 1855.

Gross Produce.

Year.	Wheat.	Barley.	Oats.	Beans and Peas.	Turnips.	Potatoes.
	qrs.	qrs.	qrs.	qrs.	tons.	tons.
1853	50,341	67,079	94,823	16,734	203,154	23,976
1854	67,525	70,629	94,990	13,011	228,599	33,821
1855	61,427	55,382	95,592	15,283	245,370	43,306

Number of Steam, Water, and Horse Engines applied to Agricultural purposes in the county in 1853.

Engines.	Number.	Horse-power.
Steam-engines	185	1053
Water-engines	81	436
Horse-engines..................	107	499
Total...............	373	1988

The following are the statistics of religious worship and education in Haddingtonshire, as ascertained by the government census of 1851. Pop. of county, 36,386.

Religious Worship.

Denominations.	Places of Worship.	Sittings.	Attendance, March 30, 1851.	
			Morning.	Afternoon.
Established Church.	16	7,718	4305	790
U. P. Church.........	7	3,205	1805	1729
Free Church	15	5,837	3570	1461
Episcopal Church...	1	...	120	50
Independents.........	1	300	92	100
Latter Day Saints...	1	100	44	44
Total.........	41	17,160	9936	4174

Education.

Schools.	No. of Schools.	Belonging to the Schools.		
		Both Sexes.	M.	F.
Public Day Schools....	52	4009	2264	1745
Private Day Schools ...	18	837	439	398
Total.........	70	4846	2703	2143

Sabbath Schools supported by	No. of Schools.	Belonging to the Schools.		
		Both Sexes.	M.	F.
Established Church	23	1261	606	655
U. P. Church	5	290	159	131
Free Church	20	1139	532	607
Other Bodies	2	74	45	29
Total	50	2764	1343	1422

(See Somerville's *Survey of East Lothian;* Hepburn's *View of the Agriculture of East Lothian* (1794); *Beauties of Scotland*, vol. i; *General Report of Scotland;* Playfair's *Description of Scotland*, vol. i.; Chalmers' *Caledonia*, vol. ii.; *The Bass Rock; its History, Geology, &c.*, Edinr. 1848; Miller's *Lamp of Lothian, or History of Haddington;* Miller's *History of Dunbar*.)

HADDOCK. See index to ICHTHYOLOGY.

HADELN, a district of the kingdom of Hanover, comprising about 110 square miles of rich marsh land, near the mouth of the Elbe. It contains two market-towns and twelve parishes, with about 20,000 inhabitants. It is chiefly remarkable for the privileges it enjoys of a very slight fixed taxation, and a freedom from the quartering of troops, which have been granted on account of the great expenditure incurred by erecting and keeping up dikes, to prevent the irruption of the sea. It produces abundant crops of corn, beans, rapeseed, flax, and garden fruits, and fattens many oxen. The chief town is Altenbruck, which contains 2500 inhabitants.

HADERSLEBEN, Danish *Haderslev*, a seaport-town of Denmark, duchy of Schleswig, and 48 miles north of the town of that name. It stands in a pleasant valley on the Hadersleben Fiord, which is about 9 miles in length, and communicates with the Little Belt. It has three churches, a gymnasium, and some trade, but the harbour is accessible only to small vessels. Pop. 6156.

HADES, in *Grecian Mythology*, the lower world or kingdom of the dead. Etymologically, the word signifies the unseen or invisible world. The older Greek authors originally used the word to signify the king of this region, whom they afterwards called by the more euphemistic name of Pluto. This latter name was adopted by the Romans, and identified by them with Dis, Orcus, &c. Hades as Pluto was the son of Saturn, and the brother of Jupiter and Neptune. When the three brothers were parcelling out the world into three kingdoms, that of the invisible world fell to the lot of Pluto, who is always described as the most terrible of the gods. He was as inexorable as the Fates, and as cruel; and no shade that entered his portals ever escaped from them. In accordance with these gloomy attributes, the victims offered in his honour were always black, and the worshipper in sacrificing them always turned away his head. There are few legends in the old mythology whose interest centres in this deity, if we except those of the rape of Proserpine, and the helmet which made the god invisible, and from which perhaps he got his name.

HADHRAMAUT, a province of Arabia. See vol. iii., p. 356.

HADLEIGH, a market-town of England, county of Suffolk, on the Bret, a tributary of the Stour, 9 miles W.S.W. of Ipswich. It was formerly a corporate town, and a place of considerable trade, but it has lost its charter; and its trade, which was chiefly in cloth, has declined. Silk-spinning is carried on to some extent, but the inhabitants are chiefly employed in agriculture. The church is a large and handsome building, with a tower and spire. Dr Rowland Taylor, rector of Hadleigh, was burned here in the reign of Queen Mary, the spot being marked by a stone with this inscription,—"1555. Dr Taylor, in defending that was good, at this plas left his blode." Market-day, Monday. Pop. (1851) 3338.

HADLEY, JOHN (—— 1744), a distinguished English astronomer, of the details of whose life almost nothing is known. He was a member and afterwards a vice-president of the Royal Society, to whose *Transactions* he made some valuable contributions. He was the inventor of the sextant which bears his name, or at least the first who made it practically useful at sea; for the idea had been long before struck out by Hooke and perfected by Newton. Some important changes and improvements have since been made upon it by Mayer and Borda.

HADRIANOPOLIS, in *Ancient Geography*, the name of several cities founded by the Emperor Hadrian, by whose name they were called. The largest and most important of these was that in Thrace, at the confluence of the Hebrus and Tonzus, which seems to have occupied the site of the more ancient city of Uscudama. It stood in the midst of a country of remarkable fertility, and its commerce and manufactures soon raised it to great importance. Its arms were noted over the East. It was besieged by the Goths in 378, but it soon recovered the shock, and was for many centuries the largest city in the Eastern Empire after the capital. (For its modern history, see ADRIANOPLE.) There were three other minor towns of this name, one in Bithynia, another in Phrygia, and a third in Illyricum, half-way between Nicopolis and Apollonia. The name of the last was changed into Justinopolis by the Emperor Justinian, who fortified and repaired it.

HADRIANUS, P. Olius, was born at Rome, A.D. 76; died at Baiæ, A.D. 138. He succeeded Trajan as Emperor of Rome in A.D. 117, and reigned for twenty-one years. See Roman History.

HADRUMETUM, or Adrumetum, and Adrumetus, in *Ancient Geography*, a city and seaport on the coast of Africa Propria. It was a Phenician colony of more ancient date than Carthage itself, to which it afterwards became subject. The adjoining country was of amazing fertility, and was sheltered from the sands of the desert by an amphitheatre of hills. The town itself was strongly fortified. Hannibal, when recalled from Italy, passed through it on his way to the scene of his last battle at Zama. Like most cities of Northern Africa, Hadrumetum suffered severely at the hands of the Vandals, but it was afterwards restored by Justinian, in whose honour it was called Justiniana or Justinianopolis. Considerable doubts have been entertained as to its site, but modern geographers have identified it with Susa, where extensive and splendid ruins were seen and described by the Arab geographer, Abu Behri of Cordova. Traces of these ruins were observed by the African traveller Barth, who describes them in his *Wanderings among the Coastlands of Carthage and Cyrene.* See also *Shaw's Travels in Barbary.*

HÆMOPTYSIS (αἷμα, blood, πτύειν, to spit), the coughing up of blood from the lungs. Its florid colour, frothiness, and comparatively small quantity, serve to distinguish it from blood coming from the stomach, which is generally darkened by admixture with the gastric juice, &c.

HÆMORRHAGE, or Hæmorrhagy (from αἷμα, blood, and ῥήγνυμι, to burst), a flux of blood arising from the rupture of a bloodvessel. The Greeks restricted the use of this term to a discharge of blood from the nose; but in modern use it is extended to a flux of blood from the nose, lungs, intestines, &c. The word is often spelled *hemorrhage.*

HÆMUS, the ancient name of the Thracian mountain range now known as the Emineh Dagh, or Balkan. See Balkan.

HÆRETICO Comburendo, a writ which anciently lay against an heretic, who, having once been convicted of heresy by his bishop, and having abjured it, but afterwards falling into it again, or into some other, is thereupon committed to the secular power. See Heresy.

HAERLEBEKE, or Harlebeke, a town of Belgium, province of West Flanders, and arrondissement of Courtrai, on the Lys, and on the railway between Courtrai and Ghent, 3 miles N.E. of the former town. It has some woollen manufactures. Pop. (1851) 4677.

HAFF, or Stettin Haff, a lagoon in the Prussian province of Pomerania, lying N. of Stettin, and communicating with the Baltic by several mouths. It is about 30 miles in length from E. to W., by about 12 miles in breadth; and is divided into the Great and Little Haff. It receives the Oder, Ihna, Ucher, and Peene rivers.

HAFIZ, Shems Eddin Mohammed, one of the most elegant and popular poets of Persia, was born at Shiraz about the beginning of the fourteenth century. Neither the date of his birth nor that of his death is accurately known. He was carefully trained in law and the doctrines of the Koran, but he seems to have devoted the better part of his life to the service of the muses. A pleasant tradition describes how he first donned their livery. There is a place called Pirisebz, at a little distance from Shiraz; and it was a popular belief that a youth who should pass forty consecutive nights there without sleep would become an eminent poet. Hafiz made the experiment, and on the morning after the fortieth night an old man in a green mantle (who was no other than Khizr in person) came forward, and, presenting him with a brimming cup of nectar, rewarded his perseverance with an inspiring draught. From this time he devoted himself to poetry, and with such success, that the Sultan of Bagdad hearing of his fame, invited him to his court. The poet, however, does not seem to have accepted the invitation, or, if he did, it was only for a short time. When Shiraz fell into the hands of Tamerlane, the poet was summoned into the presence of the conqueror. In one of his lyrics the poet had said—

> "O pride of Shiraz, nymph divine,
> Accept my heart, and yield me thine;
> Then were its price all Samarcand,
> The wealth Bokhara's walls command,
> That pretty mole of dusky dye
> Thy cheek displays, I'd gladly buy."

Tamerlane, believing that the poet meant to cast a slight on the chief cities of his empire, reproached him with his promise to exchange Samarcand and Bokhara for the favours of his mistress. "It is that very generosity," said the poet, "that has made me so poor as you now see me." The date of Hafiz's death is variously given. Daulet-Shah places it in 1389. The poet was suspected of having been an unbeliever, and even at heart a Christian; and it was only with considerable difficulty that his friends obtained a decent burial for his body. A splendid monument over his grave is inscribed with a half-enigmatical legend which seems to confirm the testimony of Daulet-Shah as to the date of his death.

Hafiz is the Anacreon of Persia. His poetry, which is wholly lyrical, is devoted to the praises of wine and flowers, and nightingales and female beauties, for all of which Shiraz was famous. From these themes, however, he passes with startling rapidity to the gravest moralizing on the chances and changes of life, and the instability of all human things. The more strict of his co-religionists regard his works as, on the whole, dangerous in their tendency; while those who defend the poet maintain that they are not to be interpreted in a literal, but in an allegorical sense. The probability is that both are right; and that the poet—by turns a devotee and a debauchee—gave to the ode the cast of thought that happened to prevail at the moment when it was written. Sir William Jones, who strongly advocates the allegorical method, confesses that many of the odes can only be interpreted in a literal sense. The sect of the Sufis, with whom Hafiz had identified himself towards the close of his life, refuse to make even this concession; and some of their best commentators have striven elaborately to prove their point. The best of the Turkish critics, Ferydoun and Soudy, have taken the same view.

The works of Hafiz were collected after his death. This collection, called the *Dyvan*, was undertaken by Seid-Kacem-Anvary, himself a distinguished author. According to the best MSS. the *Dyvan* contains 571 odes or ghazels. The edition of Hafiz published at Calcutta in 1791, however, only contains 557 of these ghazels, and seven *Kassydehs*, or Elegies. The first European who called attention to the poetry of Hafiz was the celebrated orientalist Hyde, in his *Syntagma Dissertationum.* But it was not till Rewaski and Sir William Jones almost simultaneously published, the former his *Specimen Poeseos Asiaticæ*, &c., at Vienna in 1771, and the latter his *Commentarii Poeseos Asiaticæ*, that the curiosity of the scholars of the West was fairly roused. The whole *Dyvan* has since been translated into German by Von Hammer, Tübingen, 1812. Richardson, the author of the Persian Dictionary, published *A Specimen of Persian Poetry, or Odes of Hafiz*, with an English translation and paraphrase, chiefly from the *Specimen Poeseos Asiaticæ* of Baron Rewaski; Lond. 1774. Nott has published *Select Odes of Hafiz, translated into English verse;* Lond. 1787: and Hindley a somewhat similar work in 1800. (*Biograph. Univers.;* Ersch. and Gruber's *Encyclopädie.* Wilken's *Chrestomathia Persica*, Leipzig, 1805, contains the life of Hafiz by Daulet-Shah; which is also to be found in Silvestre de Sacy's *Notices et Extraits des Manuscrits* *de la Bibliothèque du Roi*, vol. iv. Much valuable information on the life and writings of Hafiz is to be found in the pages of the *Asiatic Journal, passim.*)

HAGARENES, or HAGARITES, the descendants of Ishmael the son of Hagar. They were also called Ishmaelites; but these appellations have in later times been lost in the general one of Saracens, or Arabians. They dwelt, according to Pliny, in Arabia Felix; Strabo places them in Arabia Deserta; while other writers have assigned them to Arabia Petræa. (Comp. Psalm lxxxiii.; 1 Chron. v. 10.) See ARABIA, vol. iii., p. 361.

HAGEN, a town of Prussia, capital of a cognominal circle in the Arensberg government, Westphalia, 26 miles from Arensberg. It has manufactures of woollen, linen, and cotton stuffs; leather, paper, hats, and iron ware. In the vicinity is an alabaster quarry. Pop. (1849) 5238.

HAGERSTOWN, a town in the United States of North America, capital of Washington county, state of Maryland, near the W. bank of the Antietam Creek, 9 miles from the Potomac River, and 65 miles W.N.W. of Baltimore. It is the southern terminus of the Franklin railway, is well built, and a place of considerable trade. Pop. (1850) 3884. There are several villages of this name in the United States.

HAGGAI, one of the minor prophets, whose history is unknown. He was the first of the three prophets who prophesied in Palestine after the Captivity, and, as Ewald conjectures, it is probable that he had seen the first temple. His style is rather prosaic, with a somewhat artificial rhythm and frequent use of interrogation.

HAGIOGRAPHA (*sacred writings*), a term applied to designate those books of Scripture, which, according to the Jewish classification, held the lowest rank in regard to inspiration. These are the books of Ruth, Psalms, Job, Proverbs, Ecclesiastes, Song of Solomon, Lamentations, Daniel, Esther, Ezra, and Chronicles. This is the common order, but not universally followed. There are few if any traces of this division till after the Christian era.

HAGUE, THE (Dutch *'s Gravenhage*, French *La Haye*), a large and beautiful city of Holland, the usual residence of the court, and the seat of the States-General, or Dutch parliament. It is the capital of the province of South Holland, standing 2 miles from the sea, 37 miles S.W. of Amsterdam, and 13 miles N.W. of Rotterdam, and connected by railway with both of these cities. The Hague originated in a hunting seat, which, as early as 1250, became a palace of the Counts of Holland. It takes its name 'sGravenhage (Counts' Hedge) from the house originally forming part of the inclosure surrounding the Counts' Park. It became the seat of the government and continued so till the erection of Holland into a kingdom by Bonaparte when Amsterdam was substituted. On the return of the Prince of Orange in 1813 it was restored to its former position. Though it was thus early a place of importance, yet it was only a mere village, having neither walls nor corporation till Louis Bonaparte, in the early part of this century, conferred on it the rank and privileges of a city. It is still unfortified, being surrounded only by a moat crossed by drawbridges. The streets are regular and spacious, and several of them are traversed by canals and planted with rows of trees. The houses are large and stately; and altogether the Hague is considered one of the finest cities in Holland. It is neither a trading nor manufacturing town, the inhabitants being chiefly people of means, or dependent on the court and government establishments. The principal streets are the Voorhout—lined with trees and bordered with handsome hotels—the Prinssengracht, Kneuterdijk, and Noord Einde. The Vijverberg (hill of the fish ponds) is a square or place with avenues of trees forming a shady promenade on the one side, and on the other a spacious basin of water. On one side of the Vijverberg stands the Binnenhof, an irregular building of various dates, with a handsome Gothic hall, the only remaining portion of the original residence of the Counts of Holland. The States-General hold their meetings in the Binnenhof, part of which is also occupied by the government offices. The National Museum occupies the former palace of Prince Maurice, an elegant building of the seventeenth century. In the lower story of the building is the Royal Cabinet of Curiosities, several apartments being entirely occupied with objects of curiosity from China, Japan, and the Dutch colonies—those from Japan being peculiarly interesting and varied. One division is devoted to historical relics of distinguished persons. The picture-gallery in the same building is almost entirely confined to the works of the Dutch masters, but it contains some of the finest of these. The Royal Library contains about 100,000 vols., and has also an extensive and valuable collection of medals and gems. The royal palace is an unpretending building in the Grecian style, consisting of a centre and two wings forming three sides of a square. The palace of the Prince of Orange is a large but plain edifice. The splendid collection of pictures belonging to the late king was sold by auction in 1850. There are many valuable private collections of pictures at the Hague, and numerous learned and benevolent associations. It has also fourteen churches, two synagogues, orphan asylum, theatre, and state prison. In the neighbourhood of the town are numerous elegant villas. The summer palace of the royal family, known as the House in the Wood, stands in a finely wooded park in the outskirts of the town. The water in the canals at the Hague is more stagnant than in almost any other part of Holland, and hence frequently arise offensive smells. Huygens, the inventor of the pendulum clock, and William III. of England, were natives of this town. Pop. (1850) 72,467.

HAGUENAU, a town of France, department of Rhin-Bas, and arrondissement of Strasbourg on the Moder, 15 miles N. of Strasbourg. It was originally fortified by Frederick Barbarossa, and is still surrounded by old walls and a ditch. Its principal edifice is a fine old Gothic church. It has a cavalry barrack, civil and military hospitals, a synagogue, and a female penitentiary; manufactures of woollen cloth, earthen-ware, soap, &c.; and oil, madder, and cotton mills. Pop. 10,500. The adjacent forest of Haguenau is one of the largest in France.

HAHNEMANN, SAMUEL, the founder of Homœopathy. See HOMŒOPATHY.

HAICTITES, a Mussulman sect, who attempt to unite their faith with the religion of Christ, and expect his second coming to judge the world; quoting from the Koran these words—"O Mohammed, thou shalt see thy Lord, who will come in the clouds."

HAIL, the natural phenomenon of vapour condensed and congealed by sudden and intense cold in the higher regions of the atmosphere. See ELECTRICITY, vol. viii., p. 586, and PHYSICAL GEOGRAPHY.

HAILSHAM, a small market-town of England, county of Sussex, 58 miles S. by E. of London. It has a large church, with an embattled stone tower, and a market is held every alternate Wednesday. Pop. of parish (1851) 1825.

HAINAN, a large island in the Chinese Sea, lying S. of the province of Canton, to which it is annexed, and separating the Gulf of Tonquin from the Chinese Sea. It is separated from the southern extremity of the province of Canton by the strait of Luichan, 15 or 16 miles wide, and lies between N. Lat. 18. 10. and 20. 54., and E. Long. 108. 25. and 111. It is about 150 miles in length by 100 in breadth, and has an area of above 12,000 square miles. The interior of the island is mountainous: some parts of it rise above the snow line, and it is inhabited by aboriginal tribes. The Chinese inhabitants are mostly descendants of emigrants from Fokien, and are agricultural, trading, or piratical in their vocation, according to circumstances. The soil is mostly sandy, but some of the plains, particularly on the W. coast, are of great fertility. Timber constitutes its most valuable product, the sides of the mountains being covered with extensive forests of sandal, rose, braziletto, ebony, and other trees. Its other products are chiefly rice, sugar, tobacco, indigo, cotton, sweet potatoes, and various fruits. Wax also forms an important article of export; it is produced by an insect called the pelatchung, or white wax insect, when laying its eggs. Hainan is divided into 13 districts. The capital Kiungchanfu is a very populous town, at the mouth of the Limu River, on the Luichan, and has an excellent harbour. Several of the other towns are very populous. The island is said to contain about 1,500,000 inhabitants.

HAINAULT, or HAINAUT (German *Hennegau*), a frontier province of Belgium. See BELGIUM.

HAINBURG, or HAIMBURG, a town of Austria, on the right bank of the Danube, 27 miles E.S.E. of Vienna. It is a place of some trade, and has the largest imperial tobacco manufactory in Austria. Pop. about 4000.

HAINICHEN, a town of Saxony, circle of Leipzig and bailiwick of Nossen, on the Little Striegitz, 40 miles S.E. of Leipzig. The inhabitants are chiefly engaged in the manufacture of woollen and cotton stuffs and in bleaching. The poet Gellert was born here. Pop. (1849) 5855.

HAIR, the delicate filamentous processes which constitute the covering of the skin in mammals generally; and which likewise appear in animals of the lower orders, indeed in all animals that have a true epidermis. It is distinctly developed in the soft-skinned insects, such as butterflies and caterpillars, spiders, bees, &c.; and occurs in tufts in certain parts of the crustaceous animals, as on the feet, jaws, &c. Hair, in its mechanical nature, may be regarded as a condensed form of cuticle. The feathers of birds may be considered as analogous to hair; while the only two classes of animals that are wholly devoid of any kind of hair are the fishes and reptiles. The variety in the conformation of hair is very great, ranging from the finest wool to the quills of the porcupine, or the horn of the rhinoceros, which last is nothing more than an assemblage of many hairs in one compact mass.

But it is to hair, commonly so called, and more particularly to that of man, that we would now direct attention. The human skin is entirely covered with hairs of different degrees of fineness, except on the palms of the hands and the soles of the feet. Each hair originates in the cellular membrane of the skin, from a small bulbous root, which, by the intervention of its vessels, connects it with the *corion* in which it is imbedded. A small portion of the lower end of the hair is hollow, and contains a pulpy matter which is intended for its nutrition; but this cavity never, in common hairs, extends as far as the external surface of the skin. The hair, in a healthy state, is insensible; the pain which is felt on its extraction arising from the nerves which surround the root; yet when in the abnormal condition of what is called *plica polonica*, it becomes sensitive to a high degree, and even bleeds when cut. Among many of the lower animals the hair (though insensible in itself) serves as a very delicate medium of sensation. The slightest touch, even that produced by a human hair, is sufficient to make such animals as cats contract their skin, and by a tremulous motion of their bodies rid themselves of anything adhering to it.

The form of the human hair is rarely cylindrical. It appears to be so only in the straight hairs. In curled hair the transverse section is elliptical; and occasionally it exhibits a bean-like form, arising from a furrow that passes lengthwise down one side of the hair. The flattened form seems in general to be necessary to the curling of the hairs, while the cylindrical figure is opposed to it. In the crisp woolly hair of the negro a very marked flattening is observed, the hairs being sometimes as much as two-thirds broader in one direction than in the other. In the wool of the sheep, which appears to approach the cylindrical form, the phenomenon of curling is probably due to the transverse inequalities with which the surface of the hairs is furrowed. Human hair possesses a very remarkable degree of strength, compared with its small diameter, is considerably extensile, and highly elastic. Saussure found that a human hair, when freed from grease by maceration in an alkaline solution, formed a very delicate hygrometer, from its property of elongating on absorbing moisture. The colouring matter of the hair appears to reside in an oily fluid, analogous in its nature to that which is contained in the *rete mucosum* of the skin; and according to its colour arises the diversity of black, brown, fair, and red hair, and their several shades. Grayness is induced by a deficiency of this fluid, whether arising from age, sickness, or excessive mental emotion, such as grief, or sudden terror. The hair of the head, in particular instances, has been known to attain a length of seven or eight feet. Though hair, in a healthy state, grows only on the external parts of the body, instances have occurred in which it has been formed inside the body in diseased parts. It is also a curious fact that hair will sometimes continue to grow for a certain period after death.

As the hair is a very conspicuous object, and susceptible of much graceful adornment, its arrangement has always been one of the most important duties of the toilet. In scarcely anything has the caprice of fashion been more strikingly displayed than in the various forms which the tastes of different nations and ages have prescribed for disposing this natural covering of the head. The ancient Greeks allowed their hair to grow to a great length; and their natural fondness for this attribute of beauty has been perpetuated by their poets and sculptors alike. The early Egyptians again, who were proverbial for their habits of cleanliness, removed the hair as an incumbrance. All classes among that people, including the foreign slaves, were required to submit to this custom (Gen. xli. 14); and in place of nature's covering they made use of wigs, the reticulated texture of the ground-work on which the hair was fastened allowing free ventilation, while the hair effectually protected the head from the sun (Wilkinson, *Anc. Egyptians*, iii. 354). The Hebrews, on the other hand, esteemed fine hair as a great beauty, and particularly deprecated baldness. Though among the males it was usually kept short, the Hebrew women gloried in their luxuriant tresses, plaiting them and adorning their heads with ornaments of gold and silver and precious stones (Isaiah iii.) The misfortune of Absalom shows that men sometimes indulged in the effeminacy of long hair; and Josephus relates (*Antiq.* viii. 7), that Solomon's horse-guards daily strewed their heads with gold dust, which glittered in the sun. Artificial hair was used not only by the Egyptians, but also by the Greeks, the Carthaginians, and especially by the Romans, among whom the sale of human hair, particularly the blond hair of Germany, was an ordinary species of traffic. Dyeing the hair, too, was much practised by the Romans; and a kind of gold dust was used by ladies who did not adopt borrowed locks. The Roman ladies (as inferior in this respect to the Greeks as in all matters of taste) delighted to pile up the hair tower-like on the top of the head, while they had several rows of curls arranged formally round the sides, and sometimes pendant curls in addition. Fashion also regulated the style of wearing the hair among men in the later times of Rome. A boy's hair, for instance, was cut for the first time at seven years of age, and again at fourteen. On the introduction of Christianity, the apostles and fathers of the church launched severe invectives against the vanity and extravagance displayed in the dressing of the hair, upon which all the resources of ingenuity and art were exhausted to set it off to advantage, and load it with the most dazzling finery. The mimic skill of the *friseur* was frequently called into requisition to represent fanciful devices, such as diadems, harps, wreaths, emblems of public temples and conquered cities, or to plait it into an incredible number of tresses, which were often lengthened by ribands so as to reach to the feet, and loaded with pearls and clasps of gold.

From the great value attached to a fine head of hair, there arose a variety of superstitious and emblematical observances—such as shaving parts of the head, or cropping it in a particular form; parents dedicating the hair of infants to the gods; young women theirs at their marriage; warriors after a successful campaign; sailors after deliverance from a storm; hanging it on consecrated trees, or depositing it in temples; burying it in the tombs of friends, as Achilles did at the funeral of Patroclus; besides shaving, cutting off, or plucking it out, or allowing it to grow in sordid negligence, in token of affliction or calamity.

Among the northern nations, as the Danes, Gauls, and Anglo-Saxons, long and flowing hair was held in great estimation; and the cutting it off was inflicted as a punishment for various offences. Pope Anicetus (A.D. 155) forbade the clergy to wear long hair—an injunction obeyed not without much reluctance on the part of many. Long and flowing hair was so universally esteemed that the tonsure of the clergy was regarded as an act of mortification and self-denial. Some of them who affected the reputation of superior sanctity, inveighed with great bitterness against the long hair of the laity; and this continued long to be a topic of declamation among the clergy, who even represented it as one of the greatest crimes, and a certain mark of reprobation. Anselm, archbishop of Canterbury, went so far as to pronounce sentence of excommunication against all who wore long hair. Serlo, a Norman bishop, acquired great honour by a sermon he preached before Henry I., A.D. 1104, against long and curled hair, by which the king and all his courtiers were so deeply affected that they consented to resign their flowing ringlets, of which they had been so vain. The prudent prelate gave them no time to change their minds, but immediately pulled a pair of shears out of his sleeve and performed the operation with his own hand.

When Julius Cæsar vanquished the Gauls he made them cut off their hair in token of subjection, the cropped head being the badge of slavery. Among the Frankish kings it was long, says Gregory of Tours, the peculiar privilege of the blood royal to have flowing locks; while for all other persons there were gradations in the length and peculiar cut of the hair according to rank, from the noble down to the close-cropped slave. When a prince was excluded from the right of succession to the crown, his long locks were shorn to denote that he was reduced to the condition of a subject. From the time of Clovis the French nobility wore the hair short; but as they grew less martial they allowed it to grow longer. Long hair was the prevailing fashion at the court of Francis I., when that king, proud of the wound on his head, appeared with short hair, and thereupon that style became general. Long hair again came into vogue in the reign of Louis XIII.; and as curling was found inconvenient, wigs became fashionable. Then followed the reign of hair-powder, periwigs, and perukes of enormous dimensions, which, together with many other things no less preposterous, were swept away in the tide of the great French Revolution.

Hair manufactures.—The various uses to which hair is applied are familiar to every one. The most valuable kind is human hair. It is procured chiefly from the north of France, Belgium, and Germany. The lighter coloured hair, which bears the highest value, is the production of Germany; the darker shades are imported from France, where a peasant girl will sell the hair off her head without any sense of degradation; whereas in England this traffic is resorted to only by females of the lowest class. Indeed so common is the practice in France, that agents are employed to traverse certain districts annually at a particular season for the purpose of collecting the crops of human hair which are assiduously cultivated for the sake of the purchase-money, or its equivalent in gewgaws. The wholesale price of human hair varies from 30s. to 60s. per lb., and occasional specimens are of much higher value. A head of hair, such as is bought of the peasant girls in the districts above named, weighs from $1\frac{1}{2}$ to $1\frac{3}{4}$ pounds.

The hair used for weaving consists of the long hair from horses' tails. It is procured principally from South America and from Russia. All the black and grey hair is dyed for the manufacture of black hair-cloth for covering furniture. The white is reserved for dyeing of the brighter hues, such as green, claret, crimson, &c. The quality of the cloth, as well as the brilliancy and permanency of the colours, depend in a great degree on the nature of the warp, which may be either of cotton, linen, or worsted. In the manufacture of hair-cloth, either plain or damasked, the weaver uses a sort of hook-shuttle, which he passes between the threads of the warp, or shed, towards his left hand; the assistant, or "server," places a single hair over the end of the hook, and the weaver draws it through the warp. The placing of the hairs one by one renders this a tedious operation, and one that does not admit of the application of machinery, which is so advantageously employed in fabrics where the shot or weft consists of a continuous thread.

Hair or *Down* of plants. See Botany, vol. v., p. 75.

Hair-Powder, a substance used to whiten the hair, consists generally of pulverised starch, with the addition of some perfume. This mode of disguising the colour of the hair has fallen into almost complete desuetude, yet the old tax of L.1, 3s. 6d. a-year is still exacted from every one using hair-powder.

HAKE, a kind of fish, the *Gadus merluccius*, common in the English seas and the Mediterranean, and often prepared as stock-fish. See index to Ichthyology.

HAKLUYT, Richard, a celebrated naval historian, descended from an ancient family at Eton or Yetton, in Herefordshire, is supposed to have been born in London about 1553. He was educated at Westminster School; and thence, in 1570, he removed to Christ Church College, Oxford, where he applied himself particularly to the study of cosmography, and read public lectures in that science. When Sir Edward Stafford was sent ambassador to France in 1583, Hakluyt attended him, probably in the capacity of chaplain. He was at this time master of arts and professor of divinity. In 1585 he obtained the royal mandate for the next vacant prebend of Bristol, to which preferment he succeeded during his residence at Paris. Constantly attentive to his favourite cosmographical inquiries, Hakluyt, in searching the French libraries found a valuable manuscript history of Florida, which had been discovered about twenty years before by Captain Laudonière and others; and this he caused to be published in the French language at his own expense. Soon afterwards he revised and published Peter Martyr's book *De Orbe Novo*, with marginal notes, a comprehensive index, and a map of New England and America. After five years' residence in France, Hakluyt returned to England in 1588; and in 1605 he was appointed prebendary of Westminster, which, with the rectory of Wetheringset in the county of Suffolk, seems to have been the summit of his preferment. He died in 1616, and was buried in Westminster Abbey. Hakluyt was an indefatigable and faithful historian, and his various collections are curious, instructive, and interesting, and now command very high prices. His works are—*A Collection of Voyages and Discoveries*, in one small volume; *History of Florida; The principal Navigations, Voyages, and Discoveries of the English Nation, made by Sea or over Land* *to the farthest distant Quarters of the Earth, at any time within the compass of these* 1500 *years*, in three vols. folio; *The Discoveries of the World, from the first Original to the year* 1555, *written in the Portugal tongue by Antonio Galvano, corrected, much amended, and translated into English, by Richard Hakluyt; Virginia richly valued, by the Description of the Main Land of Florida, her next neighbour, written by a Portugal gentleman of Elvas, and translated by Richard Hakluyt.* Besides these, he left several manuscripts which were printed in Purchas's collection.

HAL, a town of Belgium, province of South Brabant, on the Senne and the Charleroi Canal, 10 miles S.S.W. of Brussels. It has a fine old Gothic church of the fourteenth century, with a famous miracle-working image of the Virgin. The high altar of sculptured marble is said to be unequalled in the Netherlands. Pop. (1851) 7392.

HALAS, a market-town of Hungary, district of Little Cumania, on Lake Halasto, 80 miles S.S.E. of Pesth. It has a considerable trade in corn, wine, and cattle, and about 10,000 inhabitants.

HALBERSTADT, a town in the Prussian province of Saxony, government of Magdeburg, and capital of a circle of the same name, on the Holzemme, a tributary of the Bode, 29 miles S.W. of Magdeburg, with which it communicates by railway. This is a very ancient town, and was the seat of a bishop as early as 814. The cathedral is a remarkable edifice, chiefly in the pointed Gothic style, erected between 1235 and 1491, except the lower part or the west front, which is older. It contains some valuable paintings and antiquities; and the collection of episcopal and priestly robes, from the twelfth to the sixteenth century, is perhaps the finest in northern Europe. The church of Our Lady is a building in the Byzantine style, dating from the beginning of the eleventh century, and has recently been restored. The town proper is surrounded by walls, outside of which are several suburbs. It has in general an antique appearance, and contains some old curiously ornamented timber-framed houses. Halberstadt is the seat of a superior court of justice, and has a gymnasium, normal school, school of obstetrics, deaf-mute institution, orphan asylum, public library, theatre, &c. It carries on a considerable trade, and has manufactures of woollen cloths, gloves, carpets, leather, starch, tobacco, and beer. Pop. (1849) 19,840.

HALBERT, or HALBERD, an ancient military weapon now rarely to be seen except in armouries, or on ceremonial occasions. It was designed both for cutting and thrusting, being a kind of combination of the spear and battle-axe, with great variety in the shape of the head, but always terminating in a point or blade, and having a shaft five or six feet in length. The halbert was formerly borne by sergeants of foot and artillery, and by the guards of the great officers of the army; and there were also companies of halberdiers to protect the colours. This weapon was likewise known as the *Danish axe;* having passed from the Danes to the Scots, and from them to the English Saxons, from whom it passed to the Normans; though Meyrick (*Hist. of Anc. Arm.*) supposes it to have been a Swiss invention, borrowed by the French under Louis XI., and first used by the English in the reign of Henry VIII. This apparent discrepancy, however, may perhaps be annulled on the supposition of the use of weapons not very dissimilar at different periods under other names. The word *halbert* is formed from the Teutonic *hal*, hall, and *bard*, a hatchet, as being the weapon appropriated to warders. Vossius fancifully derives it from the German *hallebaert*, a compound of *hel*, clarus, splendens, and *baert*, axe.

HALCYON, the ancient name of the alcedo or kingfisher.

HALCYON DAYS, in *Antiquity*, a name given to seven days before and as many after the winter solstice; because at this season the halcyon, invited by the calmness of the weather, laid its eggs in nests built close by the brink of the sea; and hence the phrase *halcyon days* is expressive of times of peace and tranquillity.

> "As late they love: their nuptial faiths they show.
> Now little birds ingender, parents grow:
> Seven winter dayes with peacefull calme possest,
> *Alcyon* sits upon her floating nest."—Sandy's *Ovid. Met.* b. xi.

HALDANE, ROBERT and JAMES ALEXANDER, were the sons of Captain James Haldane of Airthrey, and Katherine, daughter of Alexander Duncan, Esq. of Lundie, and sister of Lord Duncan, the hero of Camperdown. Robert was born in 1764, and his brother in 1768. Two weeks before the birth of the latter their father died, and they did not long enjoy the benefits of a mother's care. In 1774 she also was removed; but during the short period in which she was allowed to exercise her maternal duties, she discharged them with admirable fidelity and tenderness; and her pious instructions made a deep and indelible impression on their youthful minds. The charge of the orphans now devolved upon their maternal grandmother and uncles, who did all they could to supply a mother's place. Under their direction, the education of the boys was carried on first at Dundee, and subsequently at the High School and University of Edinburgh, where they proved themselves to be possessed of excellent abilities, and made respectable progress in their studies. At the age of seventeen both Robert and James went to sea, and from this point we shall notice the leading events of their lives separately. In 1780 Robert entered the royal navy, served in the Foudroyant under Captain Jervis, afterwards Earl St Vincent; and during the memorable night engagement with the Pégase, distinguished himself so much by his ability, energy, and intrepidity, that Captain Jervis wrote his uncle a letter of congratulation, predicting the eminence of his nephew. At the peace in 1783 Robert retired from the navy. He was then in his twentieth year. In 1785 he married Katherine Cochran Oswald, second daughter of the late George Oswald, Esq. of Scotstown, and soon after settled on his beautiful estate of Airthrey, in the neighbourhood of Stirling, in the improvement of which he spent the most of his time for several years. The stirring events of the French Revolution also occupied much of his attention. He disapproved of the war with France in which Britain was engaged, and gained himself many enemies by stating this boldly at a meeting of the freeholders of the county of Stirling. He was afterwards often charged with holding the most violent and democratic views; but these charges were wholly without foundation. It is true, however, that he did sympathize with the revolutionary movements of the French, and expected benefits to flow from them which were never realized. And he tells us that the disappointment he felt on this account contributed in no small degree to hasten and mature a vital change that was going on in his own mind, and led him to confess and submit to that Supreme Power by whose influence alone individuals and nations can be regenerated. The forms of religion he had indeed never cast off; but it was not till now that he was awakened to a clear perception of its impressive and momentous realities. No sooner were these opened to his view than he, with characteristic energy, devoted himself to the pursuit of truth, sincerely desirous to find and follow it wherever it led him. He read much, and thought deeply, on the evidences of Christianity, and carefully studied the records of divine revelation. The issue of his studies was a profound conviction that the Christian religion was from above. He now resolved to consecrate his time, talents, and wealth to the advancement of Christianity. His motto was, "Christianity is everything or nothing. If it be true, it warrants and commands every sacrifice to promote its influence.

If it be not, then let us lay aside the hypocrisy of professing to believe it." A report of the Baptist missions which fell into his hands, excited his sympathy toward the heathen population of India. A vast missionary scheme was formed on their behalf, several eminent missionaries were appointed, and this staff was to be supplemented by catechists and schoolmasters, and provided with a printing establishment. The entire expense was undertaken by Mr Haldane; and in order to supply the requisite means, and be ready to depart without delay, his fine estate was sold. But the East India Company refused to sanction the scheme, and he was therefore obliged most reluctantly to abandon it. Other fields of usefulness, however, were open to him, and to these he turned. At his expense many chapels were hired, and many erected, throughout Scotland; and many pious young men supported and educated for the ministry. Nor was the exercise of his Christian philanthropy confined to his own country. In 1816 he visited the Continent for the same end; and first at Geneva, and then at Montauban, was occupied night and day in expounding the gospel to all who would listen, and especially to those who either were ministers or were under training for that profession. These pious labours were attended with remarkable success. After a sojourn on the Continent of nearly three years Mr Haldane returned to Scotland, and spent the remainder of his days either in Edinburgh or on his estate of Auchengray, which he had purchased in 1809. In all good works he continued to the last to manifest unwearied zeal and undiminished liberality; and from whatever quarter divine truth was assailed, it always found in him an able and uncompromising champion. In December 1842 this good man rested from his labours. His writings were numerous; the chief are—his work on the *Evidences and Authority of Divine Revelation*, and his *Commentary on the Epistle to the Romans*.—We now resume the narrative of James Haldane's life. In 1785 he went to sea, and entered the East India Company's service, with which his family had been connected for several generations. He was an enthusiast in his profession, and became an intrepid and skilful seaman. After the completion of his fourth voyage in 1793 he was appointed captain of the Melville Castle, and had the sure prospect of soon acquiring an ample fortune. In the same year he married the only daughter and child of Major Joass of Culleonard in Banffshire. Instead of putting to sea immediately as was intended, the Melville Castle was unexpectedly detained for months. Meanwhile he was led to study the Bible more carefully than he had ever done before. He then, under deep religious impressions, threw up his naval command with all the worldly advantages which it promised, and settled in Edinburgh. Like his brother, whatever he did, he did with all his might. The low state of religion in his own land, and the prevalence of error and immorality, he most earnestly began to counteract. They distributed tracts, opened Sabbath-schools, and proclaimed the Word of God to all who would hear them, first in the neighbourhood of Edinburgh, and then throughout all Scotland. As a preacher James Haldane met with the greatest success. He attracted large audiences wherever he went; and there were few towns, or even villages, of his native country to which his missionary labours did not extend. In churches or halls, when accessible, or, if not, in the market-place or adjoining field, and often in the face of obloquy, derision, and under the most violent threats and opposition, he calmly and resolutely persevered in his work. Besides these itinerant labours, he discharged gratuitously the duties of pastor to a congregation in Edinburgh, to which he was ordained in 1799. This charge he held till his death. As a minister he was a bright example of fidelity and zeal, and always ready to lend his aid in the promotion of every good work. But his labours were not confined to one locality. With James Haldane, as with his brother Robert, the field to be cultivated was the world; and wherever a door of usefulness was open, his voice and pen were ready to be employed. His zeal and activity remained undiminished; and when above fourscore he still preached to his congregation with great regularity. In 1849, the jubilee of his pastorate was celebrated. In 1851 he rested from his labours. Though Baptists from conviction, the Haldanes gave no unseasonable or exaggerated prominence to the peculiarities of their denominational views; but, both by example and precept, made the great fundamental truths of the gospel the grand centre of union among all true Christians. The record of their lives is one of the most interesting of Christian biographies, and, if its lessons and example have their due influence, may be one of the most profitable. (W. B.)

HALDE, Jean Baptiste du, was born at Paris, Feb. 1, 1674, and having entered into the society of Jesus, he was at length appointed to succeed Father Legobien, who had been intrusted with the duty of arranging the letters they received from different quarters of the globe. He was also for some time secretary to the famous Father Letellier, confessor to the king of France. He died Aug. 18, 1743. Du Halde is represented as a man of mild and amiable character, and as remarkable alike for his unaffected piety and unwearied industry. He was the author of some Latin poems of no great value; but is still remembered for the following works:—*Lettres Edifiantes et Curieuses écrites des Missions Etrangères*, which he edited with great ability from the ninth to the twenty-sixth volume inclusive, and which have been translated into English and German. *Description Géographique, Historique, Chronologique, Politique, et Physique, de l'Empire de la Chine et de la Tartarie Chinoise*, Paris, 1735, in four volumes large folio, with figures and an atlas by D'Anville. This work, the first in which China is described with so much exactness and detail, is at the same time a beautiful monument of French typography. The description contained in this work and in the *Lettres Edifiantes* has furnished materials to almost all the modern writers who have treated of that vast empire, and has contributed materially to advance the science of geography. (J. B—E.)

HALE, Sir Matthew, Lord Chief-Justice of England, was born on the 1st of November 1609, at Alderley in Gloucestershire. His father had been a barrister, but having retired from practice, resided upon a small estate he had purchased there. His paternal ancestors appear to have been in the middle rank of life, his grandfather having been a clothier at Wotton-under-Edge; but on his mother's side he was connected with the noble family of the Poyntzes of Acton. The future chief-justice having had the misfortune to lose his parents when he was only in his fifth year, was placed by his guardian under the care of the Rev. Mr Staunton, vicar of Wotton-under-Edge, by whose tuition he became strongly embued with the religious principles of the Puritans. At school he was distinguished by great diligence, and acquired, it is probable, those habits of sedulous application to study, which in subsequent years secured his reputation and advancement. Having acquired a considerable stock of classical learning he was sent to the University of Oxford at the age of sixteen, and became a student of Magdalen Hall under the tuition of Obadiah Sedgwick, a classical scholar of high attainments, and whose religious sentiments were in accordance with those of his former instructor. Here he devoted himself with great steadiness for several terms to the study of the philosophy of Aristotle and the theology of Calvin, with a view to holy orders. Suddenly, however, the diligent and devout student, of whose future eminence in the church his friends had formed the highest anticipations, became smitten with a love of military glory, and resolved to abandon the peaceable profession he had apparently chosen for that of arms. From this purpose he was happily diverted by an unexpected incident. Before proceeding to the Low Countries to take service under the Prince of Orange, he found himself involved in a legal action which threatened to deprive him of his patrimony. It became requisite for him to proceed to London, in order before his departure to give instructions for the defence of his rights. His leading counsel was the celebrated Sergeant Wilde, one of the ablest advocates then at the bar, and this great lawyer must have perceived in the acuteness and sagacity of his youthful client a peculiar fitness for the legal profession; for, understanding that he was bent upon a military career, he laboured with great earnestness to induce him to renounce his purpose and devote himself to the study of law. In this he was at length successful, and Hale became a member of the honourable society of Lincoln's-Inn on the 8th of November 1629.

No sooner did the future chief-justice make choice of the profession on which his talents and character were one day to reflect so great a lustre, than he resumed his habits of intense application. Day after day, month after month, for the long period of eight years he underwent an amount of intellectual labour almost incredible. The rules which he laid down for himself, and which are still extant in his handwriting, prescribe sixteen hours a-day of close application, and prove not only the great mental power, but the extraordinary physical strength he must have possessed, and for which, indeed, during his residence at the university, he had been remarkable. Some idea of his ardour in the acquisition of knowledge may be formed from the fact that, during the period allotted to his preliminary studies, he not only read over and over again all the year-books, reports, and law treatises in print, but at the Tower of London and other antiquarian repositories, examined and carefully studied the records from the earliest period to his own time, in order to acquire a familiar acquaintance with the history, the principles, and the practice of English jurisprudence during every reign since the foundation of the monarchy. Even the *Common-place Book*, which he composed as the result of his study and research, may, according to Lord Campbell, "be considered a *corpus juris*, embracing and methodizing all that an English lawyer on any emergency could desire to know." But Hale did not confine himself to the law alone, although the manner in which he devoted himself to that study might well have occupied his whole time. It was his maxim, that to be master in any profession is impossible without an acquaintance with other sciences. He dedicated, therefore, no small portion of his time to the study of pure mathematics, to investigations in physics and chemistry, and even to anatomy and architecture; and there can be no doubt that the value of many of his decisions arose not more from his legal knowledge than from his extraordinary proficiency in other departments of human learning.

The high character Hale acquired while a law student produced the result which was to be expected. No sooner was he called to the bar than he found himself in full practice; and so completely did he justify the expectations of his friends that in a very few years he was at the top of his profession. The period at which he entered on public life was to be in many respects the most eventful in the history of the English nation, and occurrences were to take place which should result in the establishment of those great political principles on which the liberty and prosperity of the people depend. Hale rose in reputation amid the struggle of parties whose obstinacy could not fail sooner or later to lead to a violent collision; and as he had not openly espoused either side, both were eager to obtain his support. He declared himself neutral, however, resolved to follow the example of Pomponius Atticus, by so acting as to retain the esteem of all parties without being exclusively devoted to any. This line of conduct has been censured by Hale's biographer, Lord Campbell, as "cowardly and selfish;" but a little consideration will readily prove that the censure is not merely too severe, but that it is undeserved. Hale felt that his strength lay not in being a political partizan, but an interpreter of the laws of his country. He was too good a historian, and too sagacious a philosopher not to foresee the necessary result of the impending conflict; and thus in becoming neutral, he probably felt that he adopted a course which enabled him to do the largest amount of good to his country, as well as escape a struggle wholly adverse to his favourite pursuits, and in which he could not engage so as to benefit the party he should attempt to support. Perhaps, too, it may have appeared to him that to keep free from those violent prejudices so apt to distort and confuse the judgment would render him more likely to be useful either as an advocate or a judge.

Hale was counsel in some of the most celebrated trials recorded in English history. It has been said—although not with certainty—that he was engaged for the Earl of Strafford; but he was certainly counsel for Archbishop Laud, Lord Maguire, Christopher Love, the Duke of Hamilton, and others. He was ready to plead on the side of Charles I. when that king was brought to trial before his people; but he was not called upon to do so—his majesty having, by Hale's advice, refused to submit to the court.

The parliament having gained the ascendancy, Hale signed the Solemn League and Covenant, and was a member of the famous Assembly of Divines at Westminster in 1644. His early education, it may be presumed, rendered the views of that assembly by no means disagreeable to him; but he was, nevertheless, moderate in his opinions as to church government; and although he would undoubtedly have preferred a Presbyterian form, he had no serious objection to the system of modified Episcopacy proposed by Archbishop Usher.

Consistently with his desire to remain neutral, Hale took the engagement to the Commonwealth as he had done to the king, and in 1653, having been already elevated to the rank of sergeant, became a judge in the Court of Common Pleas. Two years afterwards he sat in Cromwell's parliament as one of the members for Gloucestershire. After the death of the Protector, however, he declined to act as a judge under Richard Cromwell, although he represented Oxford in Richard's parliament.

Immediately upon the restoration of Charles II., Hale proceeded to Whitehall, and was graciously received by the king. Very soon afterwards he was appointed Chief Baron of the Exchequer; and, owing to his extreme humility, received, with great reluctance, the honour of knighthood at the hands of his sovereign. After holding the office of Chief Baron for eleven years, he was raised to the higher dignity of Lord Chief-Justice. Many interesting anecdotes are related of him which place his character in a most amiable light, and exhibit his marvellous fitness for the difficult office he so worthily filled. On an impartial review of his life, indeed, it is not surprising that Lord Campbell should thus refer to him—"He is certainly to be considered the most eminent judge who ever filled the office (of Chief Baron); and being promoted to be Chief-Justice of England, he gave new dignity to the supreme magistracy which had been illustrated by Gascoigne, by Fortescue, and by Coke." Nor are evidences wanting of the sterling piety by which he was animated. During his long laborious career he never forgot the duties of religion, or failed to illustrate, wherever he had an opportunity by his conduct and conversation, the great principles of Christianity. He was the intimate friend of those great ornaments of the Established Church, Barrow, Tillotson, Wilkins, and Stillingfleet, as well as of the venerable and learned Baxter, the great leader of the Nonconformists; while to all of them, and indeed to all the great

Hales.

and good men of his day, he was the object of love and veneration.

On attaining his sixty-seventh year, the venerable chief-justice found his health so indifferent that he resigned his office; and in Feb. 1676 bade a final adieu to London, betaking himself to his native place, and making his progress thither by easy journeys. On arriving at Alderley, the air of the country and the scenes of his early life for a while revived him, but the relief was only temporary. His disease assumed an aggravated form, and he died on the 25th of Dec. in the same year, having endured his lingering illness with the faith and patience of a saint. He had been twice married, and had outlived all his children but his eldest daughter and his youngest son.

Lord Hale was the author of several works on philosophical and religious or devotional subjects, but (as is much to be regretted) not upon law—the subject on which he was above all his contemporaries capable of writing. In 1673 he published an essay on the *Gravitation of Fluid Bodies;* this was followed soon after by a treatise on the *Torricellian Experiment and the Weight of the Air.* He had likewise printed two volumes of *Contemplations,* consisting of a variety of papers of a religious character; and ultimately he sent to the press his work on *The Origination of Mankind.* This latter work was not published till after his death. He likewise attempted to write poetry, but, it must be admitted, with little success. The studies of a great lawyer are not those that favour the imaginative faculty, so valuable to the votary of the muses. (R. W. F.)

HALES, Stephen, D.D., a distinguished physiologist, was born in 1667 at Beckesbourn in Kent. He was educated at Bennet College, Cambridge, of which, in 1702, he became a fellow. In 1710 he was made perpetual curate of Teddington, near Twickenham, then rector of Porlock in Somersetshire, and afterwards of Faringdon in Hampshire. Despite these preferments, however, he continued to reside at Teddington. In 1718 he became a member of the Royal Society, to whose *Transactions* he contributed a large number of ingenious and valuable papers. In 1753, on the death of Sir Hans Sloane, he was chosen foreign associate of the French Académie des Sciences. He died at Teddington in 1761.

Soon after his election into the Royal Society, Hales published his *Vegetable Statics, or an Account of some Statical Experiments on the Sap in Vegetables,* and has thus the honour of having made the first discoveries in what has since become the great science of vegetable physiology. The work was soon translated into French, Italian, German, and other continental languages, and is still an authority on the subject which it treats. In 1733 he published, under the title of *Hæmastatics,* a similar essay on the circulation of the blood. But the most important services which he rendered to his country were rather those of a practical philanthropist than of a merely scientific observer. One of the most useful of his inventions was his "ventilator," with which he solved the difficult problem of introducing abundant supplies of pure and fresh air into jails, hospitals, mines, and the holds of ships. In 1749 one of these ventilators was fairly tested in the Savoy prison, where the annual average of mortality had been from fifty to a hundred victims. From 1749 till 1752 inclusive, however, only four persons died within the jail, though in 1750 the number of prisoners was 240. Of these four, one died of small-pox and another of delirium tremens. The advantages of Hales' ventilators were thus so fully established that they were immediately adopted by the French government, and applied with success in a far greater number of cases than the inventor had ever contemplated. In 1752 another of these machines was fitted up in Newgate, and the mortality immediately fell in the proportion of 7 to 16. Hales' other inventions were all of an equally practical and useful character. They had reference chiefly to such objects as preserving meats for long sea-voyages, distilling sea-water, cleaning and preserving corn, &c. He also gained the Copley gold medal for his essay on the medicines for dissolving the stone in the bladder.

Halesowen || Halicarnassus.

HALESOWEN, a market-town of England, county of Worcester, in a pleasant valley 7 miles W.S.W. of Birmingham. It consists chiefly of one main street, crossed by several inferior ones. The parish church is a fine building, surmounted by a beautiful spire, and containing several interesting monuments, one in memory of Shenstone the poet, who is buried in the adjacent cemetery. The inhabitants are chiefly employed in the manufacture of nails and the coarser kinds of hardware. Market-day, Monday. In the vicinity is Leasowes, the birthplace and residence of Shenstone. Halesowen was formerly celebrated for its monastery, of which some remains still exist. Pop. (1851) 2412.

HALESWORTH, a market-town of England, county of Suffolk, 100 miles N.N.E. of London. By means of the Blyth and a navigable canal it communicates with the sea at Southwold, about 9 miles distant. It carries on a considerable trade in agricultural produce; hemp is largely grown in the vicinity; and the inhabitants are chiefly employed in spinning yarn, or as maltsters. Market-day, Tuesday. Pop. (1851) 2529.

HALF-PAY. See Commission, *Military;* and Navy.

HALIBUT. See *Holibut,* index to Ichthyology.

HALICARNASSUS, a city of Caria, on the coast of Asia Minor, opposite to the island of Cos, founded by a colony of Trœzenians (Strabo), who were joined by a party of Argeians under the command of Melas and Arvanias (Vitruv. ii. 8). We are told by Herodotus (i. 144), that it originally belonged to the Dorian Hexapolis, and that it lost this privilege because Agasicles, one of its citizens, carried off the tripod, which had been adjudged to him in the games in honour of the Triopian Apollo, instead of dedicating it to the god, as had always been the custom. The other cities, indignant at this breach of the law, met and declared Halicarnassus unworthy of participating in their privileges; and from that time the Dorian confederacy consisted of five cities, and was called Pentapolis. We have no means of discovering at what period this event took place; but about the year 500 B.C. we find Halicarnassus subject to Lygdamis, whose daughter Artemisia commanded a squadron of ships in the fleet of Xerxes, and behaved so nobly in the battle of Salamis, 480 B.C. (Herod. viii. 87.) It was probably during the reign of her son, called Lygdamis, that Herodotus, unwilling to witness the tyrannical acts of a despot, abandoned his native city and retired to Samos. A considerable period now elapses, in which we know nothing of the history of Halicarnassus; but about 350 B.C. we find it under princes of Carian extraction. Hecatomnus is mentioned by Strabo (xiv. 656) as king of the Carians; and he left three sons, Mausolus, Hidrieus, and Pixodarus, and two daughters, Artemisia and Ada, who were married to the two elder brothers. On the death of Mausolus, his wife and sister became queen. She is best known in history as the builder of that celebrated monument in honour of her husband, which she called from him mausoleum, and which was reckoned one of the seven wonders of the world. She was succeeded by her second brother Hidrieus, whose sister and wife Ada was driven from the kingdom by her brother Pixodarus. At this period Alexander the Great arrived with his forces in Caria, and having razed Halicarnassus to the ground, restored Ada to the sovereignty of Caria. It seems to have been rebuilt, but never to have regained its former degree of splendour. Cicero speaks of his brother restoring Halicarnassus (ad. Q. Fr. i. 8), and Tacitus (Ann. iv. 55) tells us that the people of this place were anxious to erect a temple to Tiberius. It was the birthplace of Herodotus, and of Dionysius, author of the Roman Antiquities. Its ruins are still found at Boudroun. The course of the old walls is still pointed out, and traces of the mausoleum are yet to be seen. (See Hamilton's *Researches*, &c.)

HALIEUTICS ('Αλιευτικα, from ἁλιευς, a *fisherman*), the name given to treatises on fishing, or the art of fishing; as the *Halieutics* of Oppian.

HALIFAX, a municipal and parliamentary borough and market-town of England, West Riding of Yorkshire, 36 miles W.S.W. of York. It stands on a gentle acclivity rising from the Hebble, a tributary of the Calder, and is almost entirely surrounded by hills. Though in some parts the streets are narrow and irregular, the improvements of late years have been so great that the town generally presents a new and handsome appearance. A few old plaster houses with carved oak framework, of the reign of Henry VIII., still remain, otherwise the buildings are of stone supplied from quarries in the neighbourhood. The town is well-paved and lighted with gas, and is plentifully supplied with water. It has a number of elegant buildings, principally of modern date. The parish church of St John is a large and handsome edifice of Gothic architecture, erected at different dates, and surmounted by a highly ornamented tower 117 feet in height. Trinity Church, erected in 1795, is a handsome Grecian building with Ionic pilasters, and an elegant tower with dome at its west end. St James's, built in 1831, is in the pseudo-Gothic style, with turrets at the west end. Besides the Episcopal places of worship there are chapels belonging to the Independents, Baptists, Wesleyan and other branches of Methodists, Quakers, Unitarians, and Roman Catholics. It has a number of day, evening, and Sunday schools, including a national, Lancasterian, and a grammar school. There are a number of literary and scientific as well as of charitable institutions. The infirmary is a large and elegant building, with excellent accommodation, and affording medical and surgical aid to outdoor as well as indoor patients. There are also public baths, assembly-rooms, theatre, savings bank, and mechanics' institute. The Piece Hall is a magnificent quadrangular structure occupying more than two acres of ground, and having 315 rooms for the lodgment of goods which are open for sales once a-week.

Halifax derives its importance from the manufacture of cloth, which was commenced here in the beginning of the 15th century. It now ranks next to Leeds and Bradford as a seat of the woollen and worsted manufactures. The principal staples are shalloons, camlets, figured vestings, moreens, bombazines, crapes, russets, serges, baizes, coatings, broad and narrow cloths, kerseys, cottons, and silks. A considerable number of persons are employed in making machinery. The situation of Halifax is also favourable to the development of its industry, having canal communication with the River Calder and the Rochdale Canal, and being connected by railway with Manchester and Leeds. According to an old law, the magistrates of Halifax were invested with the power of inflicting capital punishment on any thief taken "hand-habend," "back-berend," or "confessand," to the value of 13½d. The execution took place on the first market-day after conviction, by means of an instrument somewhat resembling the guillotine. Halifax is governed by a mayor, ten aldermen, and thirty councillors, and returns two members to Parliament. The parish of Halifax is one of the largest in the kingdom, having an area of 75,740 acres, and containing (1851) 149,257 inhabitants. Pop. (1851) of borough, 33,582. Registered electors, 1200.

HALIFAX, a city and seaport of British North America, on the S.E. coast of Nova Scotia, of which it is the capital. It stands on the declivity of a hill about 250 feet in height, and rises gradually from the S.W. side of a deep inlet of the sea, called Halifax Harbour. It is about two miles in length by nearly a mile in breadth, and consists mostly of wide and regular streets. "The appearance of Halifax from the water, or from the opposite shore, is prepossessing and animated. The front of the town is lined by wharfs, alongside which vessels of all sizes, and variously rigged, are incessantly loading or discharging their cargoes. Warehouses rise over the wharfs, as well as in different parts of the town; and dwelling-houses and public buildings rear their heads over each other as they stretch along and up the sides of the hill. The spires of different churches, the building above the town in which the town-clock is fixed, a rotunda-built church, the signal-posts of Citadel Hill, the different batteries, the variety of style in which the houses are built, some of which are painted white, some blue, and some red; rows of trees showing themselves in different parts of the town; the ships moored opposite the dockyard; the establishments and tall sheers of the latter; the merchant vessels under sail, at anchor, or alongside the wharfs; the wooded and rocky scenery of the background; with the islands, and the small town of Dartmouth, on the E. shore,—are all objects which strike most forcibly on the view of a stranger." (M'Gregor's *Brit. America*, i. 325.) The houses are mostly of wood plastered or stuccoed, and have, in many cases, an imposing and elegant appearance; but a number of the private houses and the public buildings are of stone. The government house is a solid, sombre-looking structure at the south end of the town, and the admiral's house is a plain stone building at the north end. The province building, near the centre of the town, is a magnificent structure, 140 feet long by 70 broad and 45 high, with a fine Ionic colonnade. It comprises chambers for the council and legislative assembly, the supreme court, and the various provincial offices. The dockyard is one of the largest and best stored in the British colonies, and covers an area of 14 acres. The harbour extends inland from the Atlantic for 15 miles, terminating in a beautiful land-locked expanse of water called the Bedford Basin, and capable of accommodating the whole British navy. The entrance to Halifax harbour is well lighted, and buoys are placed upon all the shoals. A fine deep channel stretches up behind Halifax, called the Northwest Arm, which renders the site of the city a peninsula. On the west side of the entrance to the harbour, on a small island off Sambro Cape, is Sambro Lighthouse, with a fixed light 210 feet high. A detachment of artillery, with two 24-pounders, is stationed here for firing at regular intervals during the dense fogs which are prevalent on this coast. After passing Sambro light, the course for large vessels is between the mainland on the W. and Macnab's Island on the E.; on a point projecting from the latter a lighthouse has recently been constructed. Opposite the town the harbour is rather more than a mile in width, whence it gradually narrows to about one-fourth of that width, and then suddenly expands into a magnificent basin. The harbour is accessible at all times, and is rarely impeded by ice. It is defended by forts and batteries. Halifax is the seat of a considerable fishery. Its principal trade is with Great Britain, the British colonies, and the United States. In 1852 the total exports from Halifax valued L.588,206, of which L.20,167 went to Britain, L.144,480 to British West Indies, L.234,842 to British North America, L.119,385 to United States, and L.69,332 to other countries; the total imports during that period valued L.939,864, of which L.399,277 came from Britain, L.11,496 from British West Indies, L.162,955 from British North America, L.218,817 from United States, and L.147,319 from other countries. The imports are chiefly British manufactures and native products of the West Indies and United States; the exports, dried and pickled fish, timber, cattle, agricultural and dairy produce, fur, whale and seal oil, &c. Mail-steamers run every alternate week between Liverpool, Halifax, and Boston, and there is regular communication, by steamers and sailing vessels, with all the great ports of the United States, British America, and the West Indies. A canal has been cut across the country from Halifax to the basin of Minas at the bottom of the Bay of Fundy. In 1790 Halifax contained only 700 houses and 4000 inhabitants. In 1817 it was declared a free port, and had then 1200 houses. In 1844 it had 22,000 inhabitants, and in 1852, 26,000.

HALIFAX, MARQUIS OF. See SAVILE, *Sir George*.

HALIMASS (Saxon, *halig*, holy, and *mass*), the feast of All Souls. See HALLOWMASS.

HALL, a town in the Austrian province of Tyrol, circle of the Lower Inn, on the left bank of that river, by means of which it communicates with Vienna. It occupies a picturesque situation between two mountains, is surrounded by walls, and has a fine old Gothic church. It has very extensive salt-works, with some linen and cotton factories. Pop. about 5000. There are several smaller towns in Germany of this name.

HALL, or *Suabian Hall*, a town of Würtemberg, circle of Jaxt, on the Kocher, 35 miles N.E. of Stuttgard. It was formerly a free imperial city, and is surrounded by strong walls, defended by towers and ditches. It has a town-hall, seven churches, a gymnasium, and two public libraries. It is chiefly famous for its extensive salt-works, supplied from saline springs in the vicinity. Sugar, soap, starch, are its other products. It has also a large trade in cattle. Including the three suburbs, it has about 6500 inhabitants.

HALL, in *Architecture*, a large apartment at the entrance of a house or palace.

HALL is also applied to an edifice where courts of justice are held, as Westminster Hall, in connection with which are the courts of Queen's Bench, Chancery, Common Pleas, Exchequer, the Rolls Court, and the Vice-Chancellor's two courts.

HALL, CAPTAIN BASIL, a distinguished British traveller and miscellaneous writer, was born at Edinburgh in 1788. His father was Sir James Hall of Dunglast, a man still remembered for his Essay on the *Origin, Principles, and History of Gothic Architecture*, and for his ingenious researches into geology, with a view of establishing the theory of Hutton in opposition to that of Werner. Basil Hall entered the navy in 1802, and rose gradually to be post-captain in 1817. In the course of his many voyages, he set himself to observe the manners and customs of the peoples whom he visited, as well as the physical peculiarities of the countries which they inhabited, and in this way collected the materials for a very large number of scientific papers which he contributed to various journals and encyclopædias. Perhaps the most interesting of his works is his *Voyage of Discovery to the Western Coast of Corea and the Great Loo-Choo Island, in the Japan Sea*, which had a very wide and rapid circulation. His *Travels in North America* were equally popular, less through their intrinsic merits, than from the violence with which they were assailed by the American press for their very partial and unfriendly view of American society. Various other works of travel followed these from Captain Hall's pen, but of inferior interest and merit. His last, which appeared in 1841 under the title of *Patchwork*, had not been long published when its author was seized with insanity, from which he was only relieved by death in 1844.

HALL, *Edward*, the author of the *Chronicle* known by his name, was born in London about the close of the fifteenth century. He was educated at Cambridge, and became a fellow of King's College there, but afterwards removed to Oxford. He then studied law at Gray's Inn, and became first a common serjeant, and finally under-sheriff of London. Before his death, which happened in 1547, he had been appointed one of the judges of the sheriff's court.

Hall's *Chronicle*, first printed by Berthelette in 1542, is now extremely rare. It is entitled, "The Union of the two Noble and Illustrate Families of Lancaster and York," and was dedicated to Henry VIII. Grafton continued the work from the point at which Hall had broken it off, and brought it down to the end of the reign of Henry VIII., and published two editions of it during his life. Another appeared in London in 1809 among the *English Chronicles*. Though the work is mentioned approvingly by Peck, Hearne, and other antiquaries, its intrinsic value does not appear to be very great.

HALL, *Joseph*, the learned and pious Bishop of Norwich, was born in 1574 at Ashby-de-la-Zouch in Leicestershire. He was educated at Emmanuel College, Cambridge, of which he afterwards became a fellow. Entering the church, he was, in 1617, appointed dean of Worcester; in the following year took part in the synod of Dort as one of the English deputies; nine years later was promoted to the see of Exeter; and in 1641 translated to that of Norwich. The latter years of Hall's life were spent in misery and gloom. His fervent piety and zeal seemed to identify him with the Puritan movement, though there was not then living a more ardent upholder of Episcopacy than he. He had given practical proof of that zeal and devotion by his able defences of the liturgy and discipline of the Church; but he had held out against the Arminianism of Laud, and thus exposed himself to the malignant and wanton attacks of that primate and his crew. "I plainly told the Archbishop of Canterbury," he said, "that rather than I would be obnoxious to those slanderous tongues of his misinformers, I would cast up my rocket. I knew I went right ways and would not endure to live under undeserved suspicions." In the January of 1642, Hall having joined the prelates who protested against the validity of all laws made during their forced absence from parliament, was committed to the Tower. It was proposed to prosecute them all for high treason, and the impeachment was actually begun, but the prosecution was finally dropped, and Hall was set at liberty, though only after finding bail for L.5000. On returning to Norwich he enjoyed comparative quiet for a short time; but in the following year his revenues were sequestrated, and even his personal property destroyed or pillaged. In 1647 he retired to Higham, near Norwich, where he rented a small farm, and passed his remaining years in the exercise of such charity and hospitality as his scanty means allowed. He died there in 1656, in the eighty-second year of his age.

Bishop Hall's works have been published in various forms, folio, quarto, and octavo. The last complete edition, that of Pratt, appeared in 1808 in 10 vols. 8vo. The great bulk of these writings is controversial, and therefore of a merely temporary interest. Some of them, however, and those probably to which the author himself attached least importance, well deserve consideration, if not perusal. Of these may be mentioned his Satires, written partly when he was a student at College, and afterwards republished under the title of *Virgidemiarum Sixe Bookes*, i. e., six books of bundles of rods. These satires are described by Warton as marked by a classical precision to which English poetry had yet rarely attained. "They are replete with animation of style and sentiment. The characters are delineated in strong and lively colouring, and their discriminations are touched with the masterly traces of genuine humour. The versification is equally energetic and elegant, and the fabric of the couplets approaches to the modern standard. His chief fault is obscurity, arising from a remote phraseology, constrained combinations, unfamiliar allusions, elliptical apostrophes, and abruptness of expression." Of Hall's prose works, the best are those on practical religion, such as his *Contemplations*, his *Art of Divine Meditation*, and his *Enochismus or Treatise on the Mode of Walking with God*. All these works exhibit originality of thought, exercised clearly and systematically on the highest truths, which are never thrown into the back ground, however, by the wonderfully fine images employed to illustrate them. His appeals are all plain, direct, and practical; and his knowledge of human nature was great, for he had studied it at a time when it took little pains to disguise its worst features. He loved to condense his shrewd observations into pithy apophthegms which alternate in strange though pleasant contrast, with trains of seer-like meditation and bursts of fervent prayer and thanksgiving. His friend Sir Henry Wotton thought to compliment him when he called him the "English Seneca," unconscious that he was associating the name of Hall with that of a man to whom he was in all respects immeasurably superior.

HALL, *Robert*, one of the most celebrated writers and preachers England has produced, was born at Arnsby, near Leicester, May 2, 1764. His father was the minister of the Baptist congregation in that place, and the author of several religious publications, one of which obtained considerable popularity. His character has been sketched by his more celebrated son, from whose testimony, as well as that of less partial witnesses, he appears to have been a man of no little ability and worth. Nor was Robert Hall less happy in his other parent—his mother being a woman of excellent sense and eminent piety. He lost her when he was but twelve years of age (1776); his father lived to rejoice in his son's dawning fame. He died in 1791.

Robert was the youngest of fourteen children. His infancy, like that of Newton, Locke, and Pascal, in whom the flame of life flickered as if it would go out almost as soon as kindled, while in the two last it but flickered all their days—was extremely sickly, and for some years there was hardly any hope of rearing him. As if to remind us how little we can anticipate the course of life, a full proportion of the great minds that have astonished and adorned the world, have come into it as if under sentence of immediately quitting it, with the worst possible promise of the great things they were destined to achieve.

Robert Hall's childhood was (as we shall presently see) unusually precocious—far more so than even that of most of the sons of genius; nor was the promise of the bright dawn, so often delusive, clouded as the day went on. It is said that he learned to talk and to read almost at the same time; his letters were assuredly learned in a strange school and from strange books, that is, in a graveyard, and from tombstones. The grave-yard was adjacent to his father's house, and thither his nurse used to carry him for "air" and "exercise." Whether a cemetery be the best place for childhood to take its "airings" in, or epitaphs the best spelling-book, may be doubted; but it was at all events a singular introduction to literature.

Even at the dame's school, where he received his first formal instructions, he betrayed his passion for books, and was often found, when school was over, in the above favourite but solemn "study"—the churchyard—engaged in solitary reading, though no longer poring over the tombstones. He pursued the same extra-official course of reading at his next school, which was kept by a Mr Simmons, at a village four miles from Arnsby. He used to procure, it appears, from his father's library, books for these play-hour readings, and, doubtless, got more from his self-prompted studies than from any of his regular lessons. But the *character* of this "select library for the young" may well surprise us, and, if the fact were not well authenticated, his choice of favourite authors would seem incredible. Jonathan Edwards' *Treatise on the Freedom of the Will*, and Butler's *Analogy*, were, it seems, among these amusing "solatia" of his leisure hours; and Dr Gregory assures us that it is "an ascertained fact," that when he was about nine or ten, he had read and re-read these works with "an intense interest." Before he was ten, another incident evinced the tendencies of his mind to literature; he had composed, it seems, many little essays, and often "invited his brother and sisters to hear him preach." Similarly, when he was once disposing in imagination (as children sometimes will) of his father's "goods and chattels" before the worthy man's death, he willingly agreed that his brother should have "the cows, sheep, and pigs," but "all the *books*" were to come to *him*.

His early promise of eloquence, conjoined with religious sensibility, seemed to point to the sacred office; and, in fact, his father indulged at a very early period some anticipations that the pulpit was his destination. At eleven he was removed to a school at Kettering, where the same brilliant talents were evinced, but not very wisely developed. His master, flattered by having such a prodigy, sometimes invited him to display his precocious powers of *oratory* before a "select audience,"—a folly which the sound judgment of Robert Hall loudly and justly condemned in after life. From this school he was removed to another of greater note at Northampton, kept by the Rev. John Ryland, a man of eccentric, but, like many others of the same family, of unusually vigorous intellect. The energy of Mr Ryland's character, and his original and impressive modes of teaching, seem to have given him a remarkable ascendancy over the minds of his pupils,—and there can be no doubt that Robert Hall's intellect was greatly and healthfully stimulated under his judicious training. Here he remained about a year and a half, and then, having decidedly expressed his predilections for the ministry, and pursued some preparatory theological studies under his father's roof, he repaired to the Baptist Academy at Bristol. This was in 1778, when only in his fifteenth year.

During his stay at Bristol he seems to have made rapid progress in all the studies which constituted the academic curriculum. His attention to the principles and practice of composition was very marked, though, as Dr Gregory observes, the few remains of his juvenile compositions exhibit "more of the tumultuary flourish of the orator than he would have approved after his twentieth year." This is a common case; for a severe taste is, even in the highest genius, of slow growth, though in Robert Hall perhaps as rapid as it ever was in any man.

His *debut* as a public speaker gave but little promise of the brilliant career which awaited him. On being appointed to deliver an address (as the students were accustomed to do in rotation) at the vestry of Broadmead Chapel, he, after a brief but fluent exordium which excited the expectations of his auditors, suddenly, but completely lost his self-possession, and covering his face in an agony of shame, exclaimed, "Oh! I have lost all my ideas." His tutor confident (as Sheridan said after his own ignominious first appearance), that it was *in* him, and determined, as was Sheridan, that it should come *out* of him, appointed him to deliver the *same* address the following week; not very judiciously, perhaps, considering the laws of association, and how apt is a sensitive mind, like a spirited horse, to *shy* and falter at the same spot. Sad to say, he again failed, and failed completely. Yet the incident was of value to him. While there was little fear lest a transient mortification like this should permanently depress a powerful mind, fully conscious of its powers,—indeed, such minds are generally stimulated rather than depressed by obstacles,—it had a salutary effect on his moral nature. In relation to the sacred office he seems at this time, as Dr Gregory observes, to have been too little sensible of its higher purposes, and too ambitious of achieving intellectual eminence; perhaps also too conscious of his powers to achieve it. Some feeling of this kind is indicated by his own words, uttered after his *second* failure,—"If *this* does not humble me, the devil must have me!" Many other young orators who have afterwards attained eminence, have encountered similar disaster in their first attempts. The singularity in Robert

Hall's case is that he had not been hardened to self-possession by his previous juvenile appearances before those "select audiences," which his injudicious schoolmaster had so early taught the young Roscius to confront.

In the autumn of 1781, after staying three years at the Academy, he went, as an exhibitioner under Dr Ward's will, to King's College, Aberdeen, where he remained till 1785. Several of the professors there were men of note, especially Gerard and Leslie, while Marischal College could boast of the prelections of Campbell and Beattie. Hall pursued his studies in the departments of classics, philosophy, and mathematics, with like distinguished success; being the first man of his year in all the classes. But the great charm of his residence at Aberdeen was the society of Macintosh, who, though a year younger, had entered college a year earlier. The friendship which ensued, and which only death dissolved, was equally beneficial to both parties. With some points of dissimilarity there were more of resemblance. The instant regards of Mackintosh, according to his own statement to Dr Gregory, were strongly attracted by Hall's ingenuous frankness of countenance, the mingled vivacity and sincerity of his manner, and the obvious signs of great intellectual vigour. He says he first became attached to Hall "because he could not help it." But daily intercourse, in which they studied together without rivalry, and incessantly disputed without anger,—a true test of genuine attachment,—cemented their first casual predilections into a lasting friendship. "After having sharpened their weapons by reading, they often repaired to the spacious sands upon the sea shore, and still more frequently to the picturesque scenery on the banks of the Don, above the old town, to discuss with eagerness the various subjects to which their attention had been directed. There was scarcely an important position in Berkeley's *Minute Philosopher*, in Butler's *Analogy*, or in Edwards *On the Will*, over which they had not thus debated with the utmost intensity. Night after night, nay, month after month for two sessions, they met only to study or to dispute, yet no unkindly feeling ensued. The process seemed rather—like blows in that of welding iron—to knit them closer together."[1] Though they both, doubtless, often fought for victory, they yet always thought at the time that it was for truth; and as Sir James strikingly said, "Never, so far as he could then judge, did either make a voluntary sacrifice of truth, or stoop to draw to and fro the *serra* λογομαχίας, as is too often the case with ordinary controvertists." From these "discussions, and from subsequent meditation upon them," Sir James declared that he had "learned more *as to principles* than from all the books he ever read."[2]

In addition to their discussions over Berkeley, Edwards, Butler, and other philosophers, they read large portions of the best Greek authors together—especially Plato. Such complete intercommunion of minds in the same studies—such mutual reflection of lights and constant collision of argument—must have been of incalculable benefit to both. By this sort of student-partnership, when, as in this case, minds are congenial, the results of reading may be more than doubled. During the last years of Hall's academic course, his friend was no longer at college, and his mind sought no "new mate." He spent the time in solitary study, and, as appears by his own confession, was much engaged in devotion and religious meditation. He took his degree of A.M. in 1785.

The six months' vacation of the two last sessions at Aberdeen had been spent in assisting Dr Evans at Broadmead Chapel, Bristol. He now formally entered on the office of assistant-preacher, and about the same time was appointed to the classical tutorship in the Bristol Academy. This office, assumed at the early age of twenty-one, he discharged with great credit to himself and benefit to his pupils for more than five years.

Of his preaching at this early period, an interesting account is given by Dr Gregory, to which we can only refer the reader. His favourite model for a short time was the original but eccentric Robinson of Cambridge, and, fascinated with his manner, he resolved, not very judiciously, to imitate it. One so original was little fitted to be an *imitator* of any body, and his good sense soon reclaimed him from his error. The account he gave to Dr Gregory of the mode in which he was cured of this folly is characteristic. "I was," he says, "too proud to *remain* an imitator. After my second trial, as I was walking home, I heard one of the congregation say to another, 'Really Mr Hall *did remind* us of Mr Robinson!' That, sir, was a knock-down-blow to my vanity; and I at once resolved that if ever I *did* acquire reputation it should be my own reputation, belong to my own character, and not be that of a *likeness*. Besides, sir, if I had not been a foolish young man, I should have seen how ridiculous it was to imitate such a preacher as Mr Robinson. He had a musical voice, and was master of all its intonations. He had wonderful self-possession, and could say *what* he pleased, *when* he pleased, and *how* he pleased; while my voice and manner were naturally bad; and, far from having self-command, I never entered the pulpit without omitting to say something that I wished to say, and saying something that I wished unsaid: and, beside all this, I ought to have known that for me *to speak slow was ruin*." "Why so?" "I wonder that you, a student of philosophy, should ask such a question. You know, sir, that force or momentum is conjointly as the body and velocity; therefore, as my voice is feeble, what is wanted in body must be made up in velocity, or there will not be, cannot be, any impression."[3]

It seems that he sometime afterwards met Robinson in London, and young as he was, opposed in a public company some of the heresies which Robinson had then embraced. This he did so successfully that the latter, provoked out of his temper and good breeding, spoke with disdain of "juvenile defenders of the faith." Hall was tempted to reply that "if *he* ever rode into the field of controversy he would at least not borrow Dr Abbadie's boots,"—a sarcasm in which there was a double sting, inasmuch as Robinson had at this time abandoned the very views which he had once "borrowed" Abbadie's arguments to defend.

An unhappy misunderstanding with his colleague in 1789, and which threatened the peace of the church at Broadmead, led to Hall's leaving Bristol. Before the close of his connection with that congregation, suspicions of heterodoxy on some points had been excited; and in reply to certain inquiries he gave a frank and explicit statement of his views. To one or two singularities of opinion, which he afterwards abandoned, he pleaded guilty. He avows he was at this time a "materialist," but declares that his sentiments did not affect his *theology*, and that he wished his materialism "to be considered a mere metaphysical speculation." It may be observed that in the same document, in which he fully avows his belief in the divinity of Christ, he makes no mention of his belief in the *personality* of the Holy Spirit—a doctrine of which at this time he was not convinced. His *materialism* he altogether abandoned in 1790;—to the ordinary Trinitarian views he did not give his unqualified adhesion till some years later (1800).

From Bristol Mr Hall went (1790) to Cambridge, to the congregation over which Robinson formerly presided. After a twelvemonth's trial of the place, he was invited to the pastorate, and accepted it. As no small portion of the congregation had been in various degrees infected with the errors of their former minister, it has been well conjectured by Dr Gregory that the very immaturity of Hall's sentiments on certain points was an advantage rather than otherwise. They listened to him when they would not have listened to a man of more strongly marked orthodoxy. As Hall gradually approximated to the sentiments generally held by his co-religionists, he led his congregation with him; and at length, by the force of his preaching, the influence of his splendid reputation, and the still better influence of his persuasive life and character, overcame all opposition to his ministry, and thoroughly weeded out the errors that had infested his flock.

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[1] Gregory's *Memoir*, p. 15.

[2] *Ibid.*, p. 15.

[3] *Ibid.*, pp. 21, 22.

In 1793 he published his celebrated *Apology for the Freedom of the Press.* The account of its origin is amusing. It seems that on this occasion he was "importuned into controversy," which, in spite of his unrivalled polemical powers, he ever avoided if possible. "And so, in an evil hour," says he, "I yielded. I went home to my lodgings and began to write immediately; sat up all night; and, wonderful for me, kept up the intellectual ferment for almost a month; and then the thing was done. I revised it a little as it went through the press, but I have ever since regretted that I wrote so hastily and superficially upon some subjects brought forward, which required touching with a master hand, and exploring to their very foundations."[1] The estimate he formed of the production was, it must be confessed, sufficiently modest; for, as an exhibition of intellectual vigour, it is certainly equal to almost anything he ever produced. It may be conjectured, indeed, from the more cautious political tone in his later publications, and the far different terms in which, like his friend Sir James, he learned to speak of the French Revolution, that, had he written at a later period, he would have modified some of his statements, though he always declared his adhesion to the "essential principles" asserted. The reasons he assigns in the above extract, but, still more, his ingenuously expressed regret for the "asperities" in which he had occasionally indulged in this piece, would not permit him in his later years to consent to its republication, till the booksellers left him no alternative. An earlier tract, entitled *Christianity Consistent with the Love of Freedom*, was impudently pirated, on paper which bore the *watermark* of 1818, with a title-page which bore the year 1791! It was, as Dr Gregory says, "a very skilful imitation in paper, type, and date."

An anecdote here may be worth relating, as showing how completely at this time he had resiled from Socinianism, into which it had been once suspected he was fast lapsing. His spirited eulogium on Dr Priestley rekindled the hopes of some of that gentleman's partisans, and rendered on some occasions Mr Hall's "denial" of any of the imputed tendencies "imperative." "On one of these occasions," says Dr Gregory, "Mr Hall having in his usual terms panegyrized Dr Priestley, a gentleman who held the doctor's theological opinions, tapping Mr Hall upon the shoulder, said, 'Ah! sir, we shall have *you* among us soon I see.' Mr Hall, startled and offended by the rude tone of exultation in which this was uttered, hastily replied, '*Me* amongst *you*, sir! *Me* amongst *you!* Why, if that were the case, I should deserve to be tied to the tail of the great red dragon, and whipped round the nethermost regions to all eternity.'"[2]

In 1801 appeared one of the most eloquent and original of all his productions—the sermon on *Modern Infidelity.* A curious account of its preparation for the press is given by Dr Gregory. Like most of Hall's sermons, it was delivered almost entirely unwritten, though the matter, of course, had been profoundly meditated. The torture to which composition exposed him from the mysterious disease in his back, quite indisposed the preacher to undertake the labour of preparing the sermon for the press. It was therefore procured in fragments from his dictation as he lay on the floor (a few paragraphs or pages at a time), and passed through the press, as his biographer assures us, without the author's having seen a line of it. Of its merits it is superfluous to speak; as a luminous defence of some of the first principles of all religion, and a philosophical *exposé* of the anti-social tendencies of infidelity, it has never been surpassed. It raised Hall's reputation to the highest pitch; excited the admiration of men of all ranks and opinions; conciliated the esteem of those who had been offended with the *Apology;* crowded his chapel with throngs of university students; and, perhaps a still better proof of its success, exposed him to the rabid attacks of atheism and its champions.

Two other discourses of surpassing excellence appeared in the course of the great struggle with France. One was entitled *Reflections on War*, preached on occasion of the "general thanksgiving," at the transient peace of Amiens (1802). This, as Dr Gregory surmises, was the only sermon Hall ever delivered *memoriter*, and the embarrassment he felt in some passages was sufficient to prevent him from ever repeating the attempt. The other was delivered on the renewal of the war (1803), and was entitled *Sentiments proper to the present crisis.* In spite of one or two rhetorical flights, scarcely admissible in a Christian pulpit, it is deservedly considered one of the most extraordinary effusions of his eloquence.

During the latter years of his residence at Cambridge this powerful and brilliant mind was more than once transiently eclipsed. These accesses of mental disease were doubtless attributable to many causes; partly to solitude, partly to excessive study, partly to the severe and harassing suffering in his back and the sleepless nights which it occasioned, partly to a severe disappointment, but principally, no doubt, to that which exacerbated all other causes of mischief—the exquisitely strung and sensitive mind which is too often, as Dryden long ago observed,

> . . . . "to madness near allied,
> And thin partitions do their bounds divide."

Just before his first attack (Nov. 1804) his severe sufferings from his old complaint induced his medical advisers to recommend his living a few miles from Cambridge, and using horse exercise. Equestrian exercise would seem a questionable remedy, considering the local symptoms of his mysterious disease, though country air might doubtless be beneficial. But whatever advantage this might secure was more than counterbalanced, it is to be feared, by the solitude to which his secluded residence doomed him, and which probably much contributed to his mental attack. The retreat chosen for him was at Shelford, four miles from Cambridge. There he was engaged in solitary study and meditation during the whole day, and often deep into the night. The first melancholy attack took place in Nov. 1804.

To the delight of his congregation, who had proved, by their provident care of him, their attachment to his ministry, he was able to resume his public functions in April 1805. As it was feared that the associations of Shelford might prove prejudicial, he was recommended to change his residence, and, most injudiciously as it seems to us, he was again advised to reside in a remote village. He took a house at Foulmire, nine miles from Cambridge. Solitude once more proved his bane, and another attack soon supervened. After a year spent under judicious medical care at Bristol, he recovered sufficiently to engage in occasional village preaching, and to apply moderately to study. But it was thought prudent that he should quit Cambridge altogether, and he accordingly sent in his resignation.

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[1] Gregory's *Memoir*, p. 33.

[2] *Ibid.*, p. 35.

Mr Hall spent about fifteen years at Cambridge. Of his residence there—his studies, his modes of preparation for the pulpit, his social habits—an interesting account will be found in Dr Gregory's *Memoir*, to which only a reference can here be made. His biographer naturally dwells with partial minuteness on this period of Hall's history, as that in which he became intimate with him, and enjoyed unrestricted daily intercourse. It was that period also in which Mr Hall achieved his great public reputation, and produced his most brilliant, if not his most useful, publications.

Leicester was the next scene of Hall's labours, whither he removed in the year 1806, and where he resided nearly twenty years, longer by some years than at any other place. In the limits of this brief article there is no space for details, nor is it necessary. He lived as retired as his reputation would allow him to be. If fame came, it came unsought; if the world intruded upon him, as it often did, and often inconveniently, he gave it a courteous welcome, but was still better pleased when it left him to his studies and his flock. But much as he loved privacy, privacy for him was no longer solitude; in 1808, after a somewhat singular courtship, he married, and, as it turned out, most happily. This event largely contributed to his welfare; and it is observable that no symptoms of mental disease afterwards appeared. In relation to what he himself would consider the *great* purpose of his life,—the successful prosecution of his ministry,—the years spent at Leicester were the best of his life. However obscure might seem his lot, it was yet most happy; for he was eminently useful, and universally beloved. His chapel was twice enlarged to accommodate the increasing crowds who thronged to hear him. Occupying a central spot in the kingdom, he was frequently importuned to preach, on public occasions, in all directions of the compass; and, so far as his incessant and painful maladies permitted, he complied with such requests ungrudgingly. From time to time, and quite as frequently as the same physical infirmities allowed, he also gave the public the benefit of his pen. Besides several reviews, tracts, and other pieces, he published, during his residence at Leicester, some of his most celebrated sermons; two of them—on the *Discouragements and Supports of the Christian Minister*, and on the lamented *Death of the Princess Charlotte*—are among the most striking efforts of his eloquence. He here also published the largest, and in some respects most valuable of his writings—those on the *Terms of Communion*. These treatises are equally distinguished by acuteness of logic and catholicity of sentiment. It has been sometimes lamented that he should not have given his consummate logical powers a more ample theme. But, in fact, his genius has made the theme ampler than it seems. Not only have these pieces exerted a wide influence in liberalizing the opinions and practice of his own denomination, but they abound in reasonings and sentiments of practical application to every church in Christendom, and cannot be read by any thoughtful Christian without making him feel something of that noble expansion of soul which animated their author; without making him sigh for the day when "every middle wall of partition," which jealous bigotry has interposed to the inter-communion of those who reciprocally acknowledge each other to be Christians, may be "broken down."

On Dr Ryland's death (1825), Mr Hall was invited to Bristol, and, after a severe struggle, consented. It is scarcely a figure to say that he tore himself away from his congregation at Leicester. On the last occasion of celebrating the Lord's Supper, he sat down, overcome with his emotions, and, covering his face with his hands, "wept aloud." To see the "strong man thus bowed," dissolved the people also in tears;—and so they parted; his flock, as the Ephesian elders from Paul, "sorrowing most of all for the words that he spake, that they should see his face no more."

Mr Hall was in his sixty-second year when he removed to Bristol, and it was his last change; thus terminating his labours where he began them. He was fast approaching the close of his career. The mysterious and intractable malady which had so long tormented him, which had rendered his days and nights so "wearisome," became more urgent, and doses of opium almost fabulous produced little effect. The indirect effects of his complaint,—forbidding exercise, inducing plethora, and impeding the circulation,—produced that diseased condition of the heart which was the immediate cause of his death. The close of his life was a scene of frightful tortures, the sum of which, added to the almost constant pain in which his life was passed, must have been tantamount to many martyrdoms. The pages in Dr Gregory's "Life" which depict his last sufferings, and the triumph of patience over them, form some of the most sorrowful, and yet also some of the brightest, in the records of Christian biography. Deep were the clouds which gathered round his sunset, but they were all penetrated and transfigured by the glory of the descending luminary; and even he who doubts whether Christianity be true, can surely hardly read the closing scenes of this great and good man's life without feeling, that since humanity is thus subject to suffering, it is much to have such consolations. His death took place, February 21, 1831. After detailing the appearances presented by the *post-mortem* examination, the eminent physician, Dr Prichard, adds,—"*Probably no man ever went through more physical suffering than Mr Hall*;[1] he was a fine example of the triumph of the higher powers of mind, exalted by religion, over the infirmities of the body. His loss will long be felt in this place, not only by persons of his own communion, but by all that have any esteem for what is truly great and good."[2]

The mind of Robert Hall was of that select order which are equally distinguished by power and symmetry; where each single faculty is of imposing dimensions, yet none out of proportion to the rest. His intellect was eminently acute and comprehensive; his imagination prompt, vivid, and affluent. This latter faculty, indeed, was not so exuberant (as Foster justly remarks) as that of a Burke or a Jeremy Taylor; nor could it have been so, without marring the harmony just mentioned. His reasoning was close as that of almost any controvertist of any age, but expressed in all the charms of a most chaste and polished style;—severe logic clothed in the most tasteful rhetoric. His talents for the successful prosecution of abstract science—especially metaphysical and ethical—were of a very high order; but they were conjoined with strong practical sense, keen powers of observation, and a vivid sensibility. His memory was tenacious, and his aptitudes for the acquisition of knowledge, generally, far beyond the ordinary measure; but in him, as in all very vigorous minds, diversified Knowledge was but the material and aliment of original thought, and was subordinated to that Wisdom which insists that it shall be the handmaid, not the mistress of intellect. His sense of the beautiful and the ludicrous seemed nearly equally vivid; and graceful imagery and pointed wit animated alike his writings and his conversation. His style is the very impress of all this amplitude and variety of endowments. It is masculine and compact, for a robust logic and strong sense form the basis of it; energetic and vivacious, for it is animated by imagination and sensibility; polished and elegant, for taste, exquisite, sometimes even to a morbid fastidiousness, presided over it.

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[1] No wonder; for, to say nothing of the agonies of the closing scene, it was found that the "right kidney was *entirely filled* with a large rough-pointed calculus;" and this Dr Prichard justly concludes to have been the cause of the dreadful torture that had harassed Mr Hall through life.

[2] Gregory's *Memoir*, p. 134.

On the whole, minds of greater power in several given directions, or of more absolute originality in some one, may be readily pointed out; some too more strongly characterized either by rugged strength or imaginative exuberance; but seldom indeed has a mind appeared so variously dowered with all the choicest gifts of strength and grace in happy unison.

It has been well said of his style by a critic in the *Quarterly Review*, that it is "constructed after no model; it is more massive than Addison's, more easy and unconstrained than Johnson's, more sober than Burke's." This is, in fact, one of its surpassing excellencies; it is eminently beautiful, but for that reason has no predominant features; it is the just image of the happy conjunction and equilibrium of the author's powers;—music in which no excess in any of the parts mars the harmony.

If his more elaborate productions have a fault at all, it is the result of that very sensitiveness of taste to which reference has been made. In polishing to an extreme of fastidious elegance, he has perhaps here and there pared away a little of the energy of his style. For this reason it has even been conjectured that some of his strictly extemporaneous effusions—extemporaneous as to the *language*—to which he gave utterance in the all but preternatural dilation of mind, which sometimes characterized his eloquence in its prime, transcended in force and beauty his most deliberate compositions, produced as these always were amidst bodily sufferings little favourable to the free action of his faculties. In truth, his extemporaneous command of all the resources of language (equally seen in the pulpit and in conversation) was one of his most extraordinary endowments, and perhaps, to the degree in which he possessed it, almost unique. Some may have been as copious in their diction, others as precise; but he conjoined both excellencies in equal measure, and added to them, what is more rare, an astonishing command of *construction;* so that he could throw the rapid and voluble words, which seemed to come at will, into the most apt and elegant collocations.

This singular gift of extemporaneous speech put the copestone on all his other excellencies as an orator. The general structure of his mind, his robust reasoning faculties, his vigorous though ever ministering imagination, his keen sensibility, and his vehement passions, pointed in the same direction, and fitted him to be a great public speaker. Such he would have become under any circumstances; but it was his rare gift of extemporaneous language which enabled him to combine the immense advantages of unwritten composition with a freedom from all its usual defects; to clothe, not extemporaneous thoughts indeed,—on which no man should reckon, though after careful preparation such thoughts may come unbidden,—but carefully meditated matter, in all the graces of the most eloquent language. His usual mode of preparation for the pulpit is thus described by Dr Gregory:—"The grand divisions of thought—the heads of a sermon for example—he would trace out with the most prominent lines of demarcation; and these, for some years, supplied all the hints that he needed in the pulpit, except on extraordinary occasions. To these grand divisions he referred, and upon them suspended all the subordinate trains of thought. The latter, again, appear to have been of two classes, altogether distinct; outline trains of thought, and trains into which much of the detail was interwoven. In the outline train the whole plan was carried out and completed as to the argument; in that of detail the illustrations, images, and subordinate proofs were selected and classified; and in those instances where the force of an argument or the probable success of a general application would mainly depend upon the language, even that was selected and appropriated, sometimes to the precise collocation of the words. Of some sermons, no portions whatever were wrought out thus minutely; the language employed in preaching being that which spontaneously occurred at the time: of others, this minute attention was paid to the verbal structure of nearly half: of a *few*, the entire train of preparation, almost from the beginning to the end, extended to the very sentences. Yet the marked peculiarity consisted in this, that the process, even when thus directed to minutiæ in his more elaborate efforts, did not require the use of the pen, at least at the time to which these remarks principally apply."[1]

So perfect was the form in which he could give expression to a train of thought, that (as already intimated) it may even be surmised that his spoken style often surpassed, in all the essential excellencies of eloquence, that of the most admired and elaborate of his published discourses; the former having all the advantages of a more idiomatic diction and more colloquial construction, yet without the sacrifice of the precision and elegance which distinguish the latter. His frequent paroxysms of pain must at all events have tended continually to distract his mind, and diminish the glow of feeling when in the act of composition; and hence the extreme reluctance with which he undertook the task. On the other hand, under the excitement of public speaking, the consciousness of painful sensations was less vivid, and sometimes vanished, as appears from one of his own curious but most sad confessions. He tells us that he did not know that he was ever perfectly free from the consciousness of distressing sensations in his back except now and then *for a few minutes in the pulpit.*

The same felicities of extemporaneous speech which marked his pulpit efforts were observable in private. His conversation possessed a vivacity, affluence, and elegance very rarely equalled. His repartees were particularly happy, and, as has been well remarked, strongly remind one of the manner of Johnson. Some of the pungent sayings, full of mingled wit and wisdom, which Dr Gregory has recorded, make one regret that some Boswell was not always at hand to preserve those brilliant but evanescent effusions of his genius.

Many have lamented that he did so little (compared with some other men) by his pen. In truth, however, considering his constant sufferings and the dreadful toil which composition imposed upon him, his six octavos entitle him to be considered even a *voluminous* writer.

Though, like most other men of powerful minds, he was fonder of thinking than reading, his acquisitions were various, and, in several branches of study, profound. It may be added that his ardour in the pursuit of knowledge followed him to the last, of which Dr Gregory gives us a singular example. He says that he found him one morning, in the closing years of his life, lying on the floor with an Italian grammar and dictionary, deep in the study of that language. To this he had been stimulated by an article in the *Edinburgh Review*, in which an elaborate parallel had been instituted between the genius of Dante and that of Milton. With this critique he had been, he said, much delighted, and wished to judge for himself of the accuracy of the views propounded. Among the many triumphs achieved by Mr Macaulay's genius, it may be doubted whether any was ever more signal than that nearly his first "Essay" induced a mind like that of Robert Hall to study a new language at the age of threescore, just to verify the justice of the criticisms.

It has been justly remarked by Mr Foster, in his admirable critique on Robert Hall as a "preacher" (well worthy of universal perusal), that his eloquence in later years lost somewhat of the fire which characterized the oratory of his youth and manhood. But what was lost in this respect was gained in tenderness and pathos, in elevation of Christian sentiment and depth of Christian feeling.

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[1] Gregory's *Memoir*, pp. 57, 58.

It is the crowning glory of Robert Hall that all his great powers were consecrated to the noblest purposes; subordinated to objects better worth living for than intellectual power or intellectual fame. His sacred ambition was for the formation, in himself and others, of the Christian character. To moral self-culture he sought, as all ought to do, but so few really do, to consecrate every endowment of his intellect. Of the possession of high powers he could not but be conscious; and of the temptations they involved he was also profoundly sensible. His life shows us that he had learned how to make them keep their place. Naturally impetuous, impatient, choleric, he sedulously watched over these infirmities in temper, and became remarkable for humility and simplicity; full of ambition, he submitted to cast down "every proud imagination;" in his youth fiery and pugnacious, he learned in his later years to hate controversy, and exercised in an eminent degree that charity towards all good men of all parties, which made him say in one of his sermons, "He who is good enough for Christ is good enough for me." In his manners he was as unsophisticated as a child, and in his conduct full of generosity and benevolence. His patience and fortitude were eminently displayed in the uncomplaining endurance of those frightful sufferings which made his life a perpetual martyrdom; while his faith and humility were evinced no less in his admission that none of those pangs could have been spared. It has been well said by a writer in the *Quarterly Review*, "It is impossible to read the works of this extraordinary man without perceiving that his passions in his youth were turbulent in the extreme—that the energies of his mind were then scarcely under his own control—that years of reflection and dear-bought experience were wanting to him, above all men, in order to tame his spirit—that, like Milton's lion, he was a long time before he could struggle out of earth. 'I presume,' says he, in one of his letters, 'the Lord sees I require more hammering and hewing than almost any other stone that was ever selected for his spiritual building, and that is the secret of his dealing with me.'" In a word, he exhibited the traits of the genuine Christian—his character shining with a more lustrous light as he advanced in years, "growing brighter and brighter to the perfect day."

The character to which he chiefly aspired himself, he was equally anxious to aid in forming in his fellow men, and to this consecrated his genius as an object well worthy of it. Hence his contentment with a lot far more obscure than he could easily have attained in any department of secular life; and hence, with Paul, he accounted it his chief glory to be a "Christian Minister." (H. R.)

HALLE, a city of Prussian Saxony, government of Merseburg, on the Saale, 20 miles N.W. of Leipzig, with which, as well as with Magdeburg and Eisenach, it is connected by railways. Halle is surrounded by old walls, and irregularly built, with little to attract the eye of the stranger. It is chiefly celebrated for its university, which once ranked among the foremost in Germany. It was founded in 1694, and in 1815 was united with that of Wittemberg. It still continues to maintain a high character, particularly as a school of Protestant theology. It has faculties of theology, law, medicine, and philosophy; and in session 1853–54 had 71 professors and teachers, and 650 students. Connected with it are a number of scientific institutions, as a botanic garden, observatory, museum, library of 90,000 vols., theological and philological seminaries, chemical laboratory, anatomical theatre, cabinet of minerals, &c. Three hospitals connected with the medical school afford the students ample opportunities of seeing practice. There are a number of other educational institutions in Halle, the chief of which is the *Frankesche Stiftung*, founded by A. W. Franke in 1698. It comprises schools for the education of children of both sexes, in various stations of life, though chiefly of the poorer classes, to the number of 2220; a laboratory, where medicines are prepared and distributed; and a Bible press, which has sent forth some millions of copies of the Scriptures at a cheap rate. In the inner court of the building a fine bronze statue of the founder by Rauch was erected in 1829. Its cost was defrayed by public subscription, to which the King of Prussia largely contributed. St Mary's Church is a Gothic building of the sixteenth century; St Maurice's is a building of the twelfth, and was restored in 1840. In the market-place is a singular structure, 250 feet high, called the Red Tower. The old Castle of Moritzberg, formerly the palace of the Archbishops of Magdeburg, was mostly destroyed in the Thirty Years' War, and the only remaining wing is now used as a Calvinistic church. Outside the walls is an elegant monument to those Germans that fell at the battle of Leipzig in 1813. The salt springs in the neighbourhood of the town produce annually about 280,000 cwt. of salt. The labourers employed in them are a peculiar and distinct race called Halloren, said to be descendants of the Wends, who anciently peopled this country. Halle, besides several suburbs, comprises the towns of Glaucha and Neumarkt, each of which has its own magistrates. Pop. (1849) 33,848.

HALLEIN, a town of Upper Austria, circle of Salzburg, on the river Salzach, near the foot of the Dürrenberg, and 9 miles S. of Salzburg. It has very extensive salt works, producing annually about 400,000 cwt. of salt. Pop. 5000.

HALLELUJAH or Halleluiah. See Alleluia.

HALLER, Albert Von, one of the most illustrious physiologists of the 18th century, was born of a patrician family at Berne, October 16, 1708. He was a very precocious child, one of the few precocious children whose after life did not belie the promise of their early childhood. He was sickly and feeble, and disabled by the rickets from taking part in boyish sports. At the age of four he used to read and expound the Scriptures to his father's servants. At eight he had redacted some 2000 biographies from the Dictionaries of Bayle and Moreri. At nine he wrote in Greek the exercises that his school comrades were writing in Latin, and before his 15th year he had constructed vocabularies in Greek and Hebrew, and had written tragedies, comedies, and even an epic of 4000 lines in the manner of Virgil. When some of these youthful productions were in danger of perishing in a fire, the author, to the great danger of his life, rushed in and saved them. Afterwards, however, when time had matured his taste, he made a bonfire of them of his own accord. Choosing medicine as a profession, he began his studies at Tübingen under Camerarius and Duvernoy, but in a short time he exchanged Tübingen for Leyden, where Boerhaave and Albinus were then at the zenith of their fame. In 1727 he graduated, having chosen for the subject of his thesis Coschwitz's discovery of a salivary duct, which he proved to be nothing more than a blood-vessel. After graduation he visited London, where he formed the acquaintance of Sir Hans Sloane, Cheselden, Pringle, and other leading physicians and observers. From London he removed to Paris, where he continued his studies under Ledran and Winslow, after which he quitted Paris for Basle, where he perfected himself in mathematics under John Bernouilli. After an absence of five years he returned to his birth-place, where he was appointed keeper of the public library, and, soon after, physician to the infirmary. At the very moment when he was contributing elaborate Latin papers to a scientific journal at Nuremberg, he showed the versatility of his powers in a volume of poems which he published at this time. These various works made him known to George II. of England, who had just organized the university of Göttingen. Haller was offered the second medical chair, which comprised botany, anatomy, and surgery, and after some hesitation he accepted it. The town of Göttingen was at this time in a state of the most ruinous disrepair; and the carriage of the new professor, as he was driving through the streets, was upset, and his wife was killed. He was devotedly attached to her and bewailed her death in an ode, the finest he ever wrote. All thoughts of his personal afflictions, however, were soon dissipated by the work which he chalked out for himself. The quantity of work that he passed through his hands during the seventeen years that he held his chair in Göttingen is amazing, even though its quality be left out of account. He organized all sorts of schools, made botanical excursions into the Harz, edited and wrote prefaces for countless works, contributed largely to many scientific transactions, took part in numberless discussions, and collected materials to be digested and published during his retirement. The honours he received from the various sovereigns of Europe were numerous and flattering, but he steadily resisted all the efforts made by England, Prussia, Austria, France, and Holland, to entice him away from his native country. In 1753 he retired to Berne, where he was invested with numerous offices, lucrative but easy. The remainder of his life was spent in scientific inquiries, the active fulfilment of his official duties, and the exercise of every charity. He died in October 1777.

Haller's works comprise in all upwards of two hundred treatises, bearing upon nearly every department of medical science,—and establishing his claim to the title of the father of modern physiology. He was, in truth, the first who was bold enough to discard the old chemical and mechanical, as well as the old metaphysical explanations of the laws which govern the animal economy. Basing his whole system on a thorough knowledge of anatomy, and the structure of each individual organ as found in the dead body, he strove to evolve the powers that showed themselves in action in the living frame. These powers—and they are the dominant idea in Haller's physiological works—he limited to two, *irritability* and *sensibility*. The former of these has its seat in the muscular fibre, and differs wholly from the latter, which resides in the nervous system. The differences in the manifestations of these two powers he illustrated by detaching a muscle from the frame and stimulating it. He found that when pricked or otherwise stimulated, such a muscle showed its irritability by contracting, though it was not sensible; whereas a nerve when stimulated was found to remain perfectly unmoved, though the muscles with which it communicated were thrown into violent action. From this he inferred that irritability does not lie in the nerves, which cannot be supposed able to communicate a power they do not possess. The germ of this idea Haller seems to have taken from Gorter and Glisson, but in his hands this irritability became a new law, to which he referred almost all the animal functions; and the chief error he seems to have fallen into regarding it is, in having distinguished it too absolutely from the nervous power on which it always depends. The controversies to which his works gave rise contributed powerfully to advance the science of physiology, to which many valuable additions were soon made, among others, the important fact, which Haller either overlooked or denied, but which was proved beyond a doubt by Bichat, that every tissue has a life peculiar to itself (*vie propre*), and that a special stimulus is required to show the action of each particular organ. Haller had evolved this idea as early as 1739, and had announced it in the *Primæ Lineæ Physiologiæ*, published in 1747; but it was not till the appearance of his *Elementa Physiologiæ Corporis Humani*, 1757–1766, that he made known his doctrine in all its entirety. This work, the greatest on its subject that saw the light in the 18th century, is nearly as remarkable for the elegance and beauty of its style as for the value and novelty of the ideas it contains. A posthumous supplement to this work appeared in 1782. From 1771 till his death, Haller was engaged in publishing his *Bibliothecæ Anatomiæ, Chirurgiæ, Botanicæ, Medicinæ Practicæ, et Historiæ Naturalis*, which make up in all 10 quarto volumes, but were only completed after Haller's death. His *Opera Minora*, comprising the most valuable of his contributions to the various scientific periodicals, were published at intervals between 1762 and 1768. His *Icones Anatomicæ*, which he himself reckoned among his best works, occupy 46 plates, and present valuable drawings of many of the organs, more especially of the arteries. (Zimmerman's *Life of Haller;* Art. by Cuvier in the *Biog. Univers.; Eloges of Haller*, by Tscharner, Baldinger, Heyne, Condorcet, and Vicq. d' Azyr.) See also the art. Physiology.

HALLEY, Edmund. See art. Astronomy, vol. iii., p. 804, and the fourth Preliminary Dissertation, prefixed to this work.

HALLOWELL, a village in Kennebec county, state of Maine, North America. It stands on an acclivity on the right bank of the Kennebec river, and on the Kennebec and Portland Railroad, 58 miles N. by E. of Portland. It carries on a considerable trade, and vessels drawing 9 feet of water can come up to the wharves. A fine kind of granite is found in the vicinity, and largely exported. Pop. (1850) of township, 4769.

HALLOWMAS, the Feast of All Souls; or the time about All Souls' and All Saints' Day, viz., the 1st and 2d of November, and thence to Candlemas, or 2d of February.

HALMOTE, or Halimote, the Saxon name for what is now called a *court-baron*, the word implying a meeting of the tenants of the same hall or manor. The name is still retained at Luston and other places in Herefordshire.

HALMSTAD, a maritime laen of Sweden, bounded on the W. by the Kattegat, and on the other sides by the laens of Göteborg, Wenersborg, Jonköping, Wexiö, and Christianstad. Area, 1900 square miles. The coast is in some parts sandy, in others bold and rocky, and is much indented, forming several considerable bays. The eastern part is mountainous, but the western is generally level and sandy. The soil is poor, stony, and ill cultivated, so that about one-third of the corn required for food has to be imported. The fisheries and cattle-rearing chiefly engage the attention of the inhabitants. Pop. (1850) 51,382. The capital is of the same name, and stands at the mouth of the Nissa, 76 miles S.S.E. of Gothenburg. It has some trade in deals, pitch, and tar, an important salmon fishery, and about 1900 inhabitants.

HALO. See Corona; Chromatics, section ii.; Meteorology.

HALSTEAD, a market-town in the county of Essex, on an acclivity rising from the river Colne, 46 miles E.N.E. of London. The town, though irregularly built, has a neat appearance, and the streets are generally wide and clean. The parish church, a fine Gothic building in the perpendicular style, has been recently almost wholly rebuilt. The Church of the Holy Trinity is also a handsome building, in the early English style, erected in 1844. Halstead possesses a grammar and other schools, mechanics' institute, savings bank, market-house, and several charities. Market-day, Friday. Manufactures of silk and velvet and straw-plaiting are chiefly carried on. Pop. (1851) 5658.

HALTERES (ἁλτήρες), in the gymnastic exercises of the Greeks and Romans, were certain masses of lead, iron, or stone, held in the hands in leaping, to give impetus to the body; or swung to and fro in much the same manner as our dumbbells. Galen (*De Tuend. Valetud.*, lib. i., v., and vi.) recommends this kind of exercise for purifying the humours of the body.

HALTWHISTLE, a market-town of England, county of

Northumberland, on the left bank of the South Tyne, 34 miles W. of Newcastle, on the Newcastle and Carlisle Railway. It is pleasantly situated, but is irregularly built and poor. The chief manufacture is baize. Market-day, Thursday. Pop. (1851) 1420.

HALYS, now the Kizil Irmak, or Red River, the largest stream in Asia Minor, rises in Pontus, not far from Nicopolis. Traversing in a S.W. direction the south of Pontus and the north of Cappadocia, it reaches the Mons Argœus. It there turns to the north, traverses Galatia in a N.W. course as far as the town of Gangra on the frontier of Paphlagonia. Passing Gangra, the river flows in a N.E. direction into the Euxine Sea, separating Galatia and Pontus from Paphlagonia. Its mouth is about 50 miles distant from Sinope. As the Halys was by far the largest river in Asia Minor, a common division of that country was Asia cis-Halyn and Asia trans-Halyn. The whole length of the river is about 500 miles, but it is not well adapted for regular navigation by ships of any considerable size. In summer, indeed, it is so shallow that it may be crossed in almost any part of its course by wading. When swollen by the rains it brings down large quantities of alluvial soil, which discolours the waters of the Black Sea for 6 or 7 miles from the embouchure. A considerable delta has in this way been formed at the mouth of the river.

HALYWERCFOLK, in our old writers, the Saxon term for persons who enjoyed land by the pious service of repairing some church or defending a sepulchre. It was likewise applied to certain persons in the diocese of Durham who held their lands by the tenure of defending the corpse of St Cuthbert.

HAM. 1. The youngest son of Noah. Having provoked the wrath of his father by an act of indecency towards him, the latter cursed him and his descendants to be slaves to his brothers and their descendants. To judge, however, from the narrative, Noah directed his curse only against Canaan (the fourth son of Ham) and his race, thus excluding from it the descendants of Ham's three other sons, Cush, Mizraim, and Phut. How that curse was accomplished is taught by the history of the Jews, by whom the Canaanites were subsequently exterminated. The general opinion is, that all the Southern nations derive their origin from Ham (to which the Hebrew root חם, *hot*, not unlike the Greek Αἰθίοπες, lends some force). *Cush* is supposed to have been the progenitor of the nations of East and South Asia, more especially of South Arabia, and also of Ethiopia; *Mizraim*, of the African nations, including the Philistines and some other tribes which Greek fable and tradition connect with Egypt; *Phut*, likewise of some African nations; and *Canaan*, of the inhabitants of Palestine and Phœnicia. On the Arabian traditions concerning Ham, see D'Herbelot, *Dictionnaire Universel*.

2. A poetical name for the land of Egypt. In the Egyptian language XHMI, or KHME, signifies *black*. Plutarch also calls Egypt *Chemia*: τὴν Αἴγυπτον ἐν τοῖς μάλιστα μελάγγειον οὖσαν, ὥσπερ τὸ μέλαν τοῦ ὀφθαλμοῦ, Χημίαν καλοῦσιν.

In Gen. xiv. 5 occurs a country or place called *Ham*, belonging to the *Zuzim*, but its geographical situation is unknown.

HAM, a Saxon word signifying a place of dwelling, a house, a village, or town; as in the word *hamlet*, and in such names as Waltham, Buckingham, Nottingham, &c. It is the same as the Scottish *hame* for home.

HAM, a town of France, department of Somme, in a marshy plain 15 miles S.S.E. of Peronne. It is chiefly celebrated for its strong fortress, used as a state prison. In 1830 Prince Polignac and the other ministers of Charles X. were incarcerated here; and more recently Louis Napoleon, the present Emperor of France. Pop. of town, about 2000.

HAM, the thigh of a beast, particularly of a hog; but more particularly applied to the thigh of that animal when cured. The process of curing is performed either by steeping in brine, or by rubbing in bay-salt. It is usual to rub a little powdered saltpetre over the hams before salting; and they are often flavoured with brown sugar or treacle. Wet salting requires about three weeks, and dry salting a week longer. Hams are also made of mutton and beef. The final operation is that of smoking.

HAMADAN, or Amadan. See Ecbatana.

HAMADRYADES (formed of ἅμα, *together*, and δρυάς, *dryad*, from δρῦς, *oak*), in *Antiquity*, certain deities believed by the ancients to preside over woods and forests, and to be inclosed under the bark of oaks. The Hamadryades were supposed to live and die with the trees to which they were attached, as is observed by Servius on Virgil (*Eclog.* x., ver. 62), after Mnesimachus, the scholiast of Apollonius, who mentions other traditions relating to the same subject. The poets, however, frequently confound the Hamadryades with the dryads, naiads, and rural nymphs in general. See Dryads.

HAMAH, a city of Syria, on both sides of the Orontes, which is here crossed by four bridges, 110 miles N. by E. of Damascus. It is the Hamath of Scripture, and the Epiphaneia of the Greeks. The kingdom of Hamath lay between Zobah on the E. and Rehob on the W.; and, like Dan, is used to denote the northern boundary of the Holy Land, as in 1 Kings viii. 65, "from the entering in of Hamath unto the river of Egypt." The entering in, or entrance in, of Hamath, was a mountain pass forming its approach from the south, and was the passage from the northern extremity of the land of Israel into Syria. Amos (vi. 2) styles it Hamath the Great. Toi was king of Hamath at the time when David conquered the Syrians of Zobah. In the time of Hezekiah the town along with its territory was conquered by the Assyrians. Abulfeda, the Arabian geographer, who was prince of Hamath in the fourteenth century, states that this "is reckoned one of the most pleasant towns of Syria. The Orontes flows round the greater part of the city on the east and north. It boasts a lofty and well-built citadel. Within the town are many dams and water-machines, by means of which the water is led off by canals to irrigate the gardens and supply private houses. It is remarked of this city and of Schiazar, that they abound more in water-machines than any other cities in Syria." This description is in a great measure still correct. It is surrounded by walls and otherwise well defended; but, as in most Syrian towns, the streets are narrow, irregular, and dirty. Being on a great caravan route between Asia and Africa, it has an active commerce. It has manufactures of silk and cotton fabrics, gold and silver thread, &c. Pop. about 44,000.

HAMAXOBII, or Hamaxobitæ (ἅμαξα, *a carriage* or *chariot*, and βιος, *life*), an ancient people of Sarmatia Europæa, who inhabited the southern part of Muscovy, and lived in tents made of leather and fixed on carriages, so as to be ready for travelling at all times.

HAMBATO, or Ambato, a town of South America, state of Ecuador, department of Quito, 75 miles S. of the town of that name, and at the N.E. foot of mountain Chimborazo, 8860 feet above the level of the sea. Pop. about 10,000.

HAMBURG, a sovereign state of the Germanic Confederation, consisting of, 1. The city of Hamburg, and a small adjacent territory between Holstein and Hanover; 2. Of several islands in the river Elbe; 3. Of several scattered portions of land in Holstein and Lauenberg; and 4. Of the bailiwick of Ritzebuttel and the island of Neuwerk, on the coast of the North Sea, between the Elbe and the Weser, altogether, about 150 square English miles, with a population of 211,000 inhabitants.

The city of Hamburg is situated on the north bank of a branch of the river Elbe, in N. Lat. 53. 34., E. Long. 9. 47., about 50 miles from the North Sea, and nearly an equal distance from the Gulf of Lübeck, in the East Sea. A few miles above the town the Elbe divides into two main branches, called the North Elbe and the South Elbe, and these, again subdividing, form a number of fertile islands, occupying a breadth of about five miles in front of the town. Between these islands and the city the North Elbe has a breadth of from 1000 to 1200 feet, and the windings of its banks and sub-branches form several havens that constitute the harbour; but there are no docks. The city, however, is intersected by the river Alster, and a number of canals, that carry the merchandize from the ships to the very warehouses of the merchants. The River Alster, from Holstein, forms two lakes, or large basins, on the north-east side of the town, one outside, and the other within the walls. The latter called the Binnen Alster, is an ornamental piece of water, which, in German eyes, gives Hamburg an appearance of beauty few cities in Europe can boast of. The city consists of five distinct portions, two of which, called the Altstadt and the Neustadt, are within the walls, divided from each other by the Alster; a third, called the Hamburger-Berg, or the suburb of St Paul—the most pleasantly situate part of the town—extends northward along the river to the Danish frontier, where it is divided from Altona by a ditch eight feet wide; the fourth portion, called the suburb of St George, lies in the north-east quarter; and the fifth, a new suburb, called the Hammerbrook, has been laid out on a marshy track in the east or south-east quarter. The city proper was formerly surrounded by strong fortifications, consisting of numerous bastions, curtains, and outworks; but, since the peace of 1814, these have been all demolished, and the ground they occupied has been laid out in walks and gardens. Their outline, however, is still marked by a wet ditch, 120 feet wide, with 10 to 12 feet of water. Besides these walks there are, within the the town, two promenades, the one called the *Jungfernstieg* (young ladies' walk), along the south side, and the other, called the New Jungfernstieg, along the west side, of the Binnen Alster basin.

Until the fire in 1842 the Altstadt of Hamburg consisted of narrow, crooked, and dirty streets, lined with large, lofty, and gloomy houses, inhabited even by the better classes, while the lower classes were densely crowded into courts, closes, and cellars. At that time, however, about a third part of the city was destroyed, and advantage has been taken of the calamity to introduce various improvements in the new buildings, to widen the streets, to establish water-works, form sewers, and fill up ditches. The public buildings are not worth notice as objects of architectural or artistic interest. The council-house and the bank, both destroyed at the time of the fire, have been rebuilt in better style, and the church of St Nicholas, also destroyed, is now being restored, from a design in the Gothic style by an English architect. The finest building is the church of St Michael, erected between 1762 and 1786, which has a tower of 460 feet in height, affording an extensive view over the adjoining country, and along the Elbe, almost as far as the sea. The exchange, likewise, is a fine building in the Adolphe Platz. The charitable institutions are numerous, and some of them on a magnificent scale. The orphan-house provides for the maintenance and education of 600 children, and the apprenticing of them to useful trades. The great hospital in the suburb of St George is capable of containing about 5000 sick, and the yearly cost of supporting it is about L.17,000. The schools are well conducted; there is a gymnasium or high school, and a Johanneum, an establishment of the same kind, a sort of college, both scientific and practical. There are French and German theatres, and every means is taken to satisfy the prevailing taste for music and dancing.

The manufacturing industry of Hamburg is very considerable. The principal branches consist of sugar-refining, spinning-mills, hat-making, linen, silk, and velvet weaving, calico-printing, snuff and tobacco manufacture, whalebone-cutting, and gold and silver smithery; but it is as the commercial entrepôt and shipping port of Northern Germany that Hamburg is most distinguished. From its position on the tideway of a river navigable for more than 500 miles from the sea, it enjoys a prodigious internal trade. Communicating by water with a great part of Prussia, and with the whole of Saxony and Bohemia, it supplies these countries with all the colonial and other foreign productions that they require, and exports in return their raw and manufactured produce. With the East Sea it is connected by canals; and now, it is connected also with Kiel, Wiemar, and Rostock, by railways through Holstein and Mecklenburg, and by other railways with Berlin, Magdeburg, Brunswick, and Hanover, and other parts of Germany. The value of the merchandise imported from all parts of the world, in 1853, amounted to L.32,828,590; and in 1854, to L.39,247,322. The value of the exports for the same two years was respectively L.31,186,268, and L.36,463,665. Hamburg is consequently a great centre of money transactions, which are managed by a large number of private bankers. The trade is conducted entirely by silver, deposited by its owners in the Bank of Hamburg, and transferred by means of checks. This bank possesses no capital, and therefore neither discounts bills nor makes advances on any sort of securities. It is purely a place of deposit; and its expenses are paid by a charge on the transfers. The amount of bullion in its vaults is reckoned at about L.4,000,000. The number of seagoing vessels that arrived and cleared out in 1854, with their tonnage and crews, are stated in the following table:—

From and To	Arrived.			Departed.		
	No. of Ships.	Burden in tons.	Crews.	No. of Ships.	Burden in tons.	Crews.
Europe.....	4427	742,155	34,878	4326	702,723	33,660
America...	416	139,083	5,037	473	152,862	5,466
Asia	39	19,290	627	17	6,528	254
Africa	13	3,276	142	13	3,822	152
Australia ..	1	300	10	50	25,079	759
Totals...	4896	904,104	40,694	4879	891,014	40,291

The number of ships belonging to Hamburg at the end of 1854 was 456, with a burden of 159,867 tons.

Hamburg has now regular communication by steam-ships with London, Hull, Grimsby, Newcastle, Leith, West Hartlepool, Rotterdam, Amsterdam, Gothenburg, and Bergen.

The government of Hamburg was formerly very aristocratic; but the great commotion of 1848 produced a change of the constitution. The government is now vested in a senate of fifteen members, of whom seven must be well acquainted with law and finance, and six with commerce. There is also a council of burgesses, consisting of 192 members, who appoint a civic committee of twenty members, to assist the senate on urgent and important business. The senate names from its own body, for its president, a first and a second burgomaster, who serve for a year, and who, if re-elected, cannot remain in office more than two years consecutively. The manner of election to these councils is very complicated, and far removed from popular suffrage and control. The public revenues are derived from various sources, and the budget for 1855 stood thus:

Receipts.		Expenditure.	
From State property ...	L.29,015	Ordinary	L.420,161
... Indirect taxes	262,659	Extraordinary	15,800
... Direct taxes	60,115		
... Sundry receipts ...	50,124		L.435,961
... Special receipts ...	3,867	Excess of expenditure	30,181
Total	L.405,780		L.405,780

The amount of the public debt was L.4,828,477. The military force is very small; and the Hamburg contingent to the Federal army is only 1947 men.

The city and suburbs contained, in 1853, 161,390 inhabitants, of whom the greater part were Lutherans, not more than a tenth part being Catholics, Calvinists, Jews, Mennonites, and of other sects. They are divided into three classes. The first consists of the *Handelstand* or Traffickers, subdivided into *Kaufleute*, or mercantile people, and *Kramer*, or retail dealers. The second class consists of the learned, such as ministers of religion, schoolmasters, lawyers, and medical practitioners. The third class consists of artizans and day labourers, the paid officers of the state, soldiers, servants, strangers, and Jews. Any one may be a merchant who chooses, but the Kramers form a corporation or guild. The officers of the state are not allowed to carry on trade; but those who are invested with honorary offices may continue their business. Of the lawyers it is not required that they should have gone through a regular course of study; but all who become members of the courts or the senate must be doctors of law. Strangers cannot possess any real property, or follow any civil profession; and the Jews, though there are nearly 10,000 of them resident in the city, cannot properly become citizens.

Early in the ninth century a castle was erected by Charlemagne on the spot where Hamburg now stands, and the place soon became of importance. In the reign of Otto IV. (1215) it was constituted a free city of the empire, and, in the year 1241, a commercial treaty between Hamburg and Lubeck formed the foundation of the powerful Hanseatic League. Shipping and trade formed always the principal objects of attention with the citizens, and they soon made their city one of the principal trading towns in the north. In 1536 the Hamburgers joined the league of Schmalkald, and the Reformed religion became fully established. Their independence was often threatened by the kings of Denmark, till, in 1768, all differences were settled, and, for a considerable sum of money, their imperial privileges fully acknowledged. During the period of French intrusion, Hamburg suffered most severely. Its trade was ruined by the English blockade, and the citizens were impoverished by forced loans to their foreign rulers. In 1810 Hamburg was annexed to the French Empire; and in 1813–14 it was in possession of a French army, under Marshal Davoust, who withstood a siege from the Allies till 31st May 1814, when it was freed from its oppressors. In 1815 it was acknowledged as one of the free cities and sovereign states of the German Confederation. Since that time its trade has increased enormously, and its population has more than doubled.

The principal place of note in the territory of Hamburg is Cuxhaven, a town of about 1000 inhabitants on the seacoast, outside of the mouth of the Elbe. It is noted for its lighthouse, and harbour. South-east of the city is a low alluvial tract, called the *Vierländer*, consisting, as the name implies, of four distinct portions, divided by rivers. They are said to rival the Egyptian Delta in fertility, and are inhabited by people of very primitive manners and habits, who marry only among themselves, and regard strangers with jealousy. They are said, however, to be very wealthy, finding in the city a ready market for all their produce.

HAMEL, Jean Baptiste du. See Duhamel.

HAMELN, a town of Hanover, principality of Calenberg, on the river Weser, at its confluence with the Hamel, 25 miles S.W. of Hanover. It is surrounded by old walls scarcely defensible, and was formerly protected by Fort George on the opposite side of the river; but this fort was destroyed by the French in 1806. The Weser is here crossed by an iron suspension bridge 500 feet in length, supported by a pier erected on an island in the middle of the river. Hameln is interesting as containing many wooden houses of the old German style. Being the capital of a cognominal bailiwick, it is the seat of several courts and public offices; and from the river being here navigable, it carries on a considerable trade. The navigation was improved by the construction of a large sluice here in 1734, by George II. A salmon-fishery and various branches of manufacture are carried on. Pop. 6500.

HAMESECKEN, or Hamesucken. Burglary, or nocturnal housebreaking, was, by the ancient English law, called *Hamesecken*, as it is in Scotland to this day.

HAMILCAR, the name of a number of persons who distinguished themselves in the history of Carthage. By far the most eminent of the name was Hamilcar Barca, the father of Hannibal. The details of his exploits are given under Carthage.

HAMILTON, a municipal and parliamentary borough and market-town of Scotland, county of Lanark, about a mile from the junction of the Avon with the Clyde, and 10 miles S.W. of Glasgow. The town originated in the fifteenth century, under the protecting influence of the lords of Hamilton, who constituted a place called the Orchard, between this point and the Clyde, the principal messuage of the barony, and which is still the chief seat of the Hamilton family. In 1451, a collegiate church was founded in the vicinity; but in 1732, the new church was built.

The town of Hamilton occupies a rising ground, commanding fine views of a rich and highly picturesque country, and consists of several streets of well-built houses, somewhat irregularly dispersed. The proprietors, alive to the value of their grounds for feuing purposes, have published various competing plans for villas. This, together with its ready access with Glasgow by railway (half-an-hour's ride), and the amenity of the locality, are rapidly converting Hamilton into a suburb of Glasgow. The staples of trade are silks and cambrics. Many of the females are engaged in tambour or sewed muslin work. Both coal and ironstone are found in the parish, and are largely wrought. It is governed by a provost, two bailies, and twelve councillors; and unites with Airdrie, Linlithgow, Falkirk, and Lanark, in returning a member to parliament. Dr Cullen, Professor Millar of Glasgow, Dr Matthew Baillie, and his sister Joanna Baillie, were natives of Hamilton. Pop. (1851) 9630; registered electors 300. Market-day, Friday.

Immediately east of the town is *Hamilton Palace*, the seat of the Duke of Hamilton, premier peer of Scotland. The pleasure-grounds around the mansion comprise nearly 1500 acres. The present palace was commenced in 1822, and consists of a large elegant building in the style of the Temple of Jupiter Stator at Rome. The interior is highly decorated; and contains one of the most valuable collections of paintings in Scotland. Within the policies, on the summit of a precipitous rock, 200 feet in height, the foot of which is washed by the Avon, stand the ruins of Cadzow Castle, the original seat of the Hamilton family. It was conferred on the chief of that family immediately after the battle of Bannockburn, having been previously a royal residence for at least two centuries. In the park attached to the castle are still preserved some of the old Scotch breed of wild cattle; they are milk-white in colour, excepting their muzzles, horns, and hoofs, which are black.

Hamilton, a town of Upper Canada, beautifully situated on Burlington Bay, at the western extremity of Lake Ontario. It is well laid out, and contains some fine public buildings, among which are two market-houses, a customhouse, post-office, and theatre. Being the capital of the district of Gore, it is the seat of the court and public offices for the district. Hamilton was founded in 1813, and incorporated in 1833. In 1844 it had 5669 inhabitants, and in 1852, 14,112, while in 1854 they were estimated at about 20,000. See Canada, vol. vi., pp. 135–44–52, &c.

HAMILTON, Anthony, *Count*, author of the *Memoirs* *of Count Gramont*, was a cadet of the noble Scottish family of that name, and was born in Ireland about 1646. He was educated in France, but after the Restoration passed over to London, where he met the Chevalier, afterwards Count de Gramont. This nobleman, temporarily banished from the French court, fell in love with Hamilton's sister, and engaged to marry her. As soon as his term of exile had expired he set out for Paris, neglecting to fulfil his engagement. Anthony and a younger brother of the bride took horse, and overtaking the fugitive at Dover, asked him if he had forgotten nothing in London. "Pardon, gentlemen," said the Count, "I forgot to marry your sister." He returned, and the ceremony was performed. Hamilton made frequent voyages to France to see his sister and her husband; and on one of these occasions was chosen by Louis XIV. to figure in Quinault's ballet of the *Triomphe de l'Amour*. Exiled with James II., who had warmly befriended him on account of his attachment to the Catholic religion, he spent the remainder of his days at St Germains, where he wrote his delightful works, and where he died in 1720, at the age of about seventy-four.

Of Hamilton's works, the best and the best remembered is his *Mémoires de Gramont*. It is indeed the cleverest book of its class in existence. Though no one who reads it can fail to see its frivolity, it is impossible to lay it aside without reading on to the end. The pictures of the court of Charles II. which it contains, are like the best pieces of Boucher. Expressing almost nothing, they yet possess charms and attractions denied to the far more ambitious efforts of greater minds. Though the grossest indelicacy is often hid by a mere veil of gauze, and is thus doubly dangerous, especially to the young reader, there is yet a grace, a truth to nature, and a gaiety in the work that make it one of the most pleasant, as it certainly is one of the most valuable records of the dissolute court of the Restoration. Hamilton's other works, once much in vogue, are now forgotten. There have been many editions of the *Memoirs* both in France and England. One of the rarest is that printed by Horace Walpole at the Strawberry Hill press, of which only 100 copies were thrown off; better still is the London edition of 1792; but best of all is that of 1811, with sixty-three portraits, and many notes and illustrations, some of which are said to have been furnished by Sir W. Scott. One of the best editions is that of Paris in 4 vols. 8vo, 1812, or 5 vols. in 18mo, 1813.

Hamilton, *Elizabeth*, the author of some admirable novels and educational works, was born at Belfast in Ireland, of parents of Scottish extraction. Of her personal history little is known. She seems to have been a governess in the family of a Scottish nobleman, and to have written to the eldest of her pupils, her *Letters on the formation of the Religious and Moral Principle*. She died after a painful illness at Harrowgate, July 23, 1816. After her death a very well written notice of her literary life and labours appeared in the *Monthly Magazine* for Sept. 1816, which was attributed on good grounds to Miss Edgeworth.

Of all Miss Hamilton's works the best known, though not the most valuable, is her novelette, entitled the *Cottagers of Glenburnie*. In this work she describes with graphic force and effect the manners of the lower grades of the Scottish rural population of her day. The filth, self-complacency, laziness, and contentedness of the loutish sluggards that figure in that story are so humorously, so truly, and withal so kindly described, that the book soon gained and still enjoys a wide popularity, and has been really useful in stimulating a great social reformation. Her other leading works are the following, which we give in chronological order:—*Letters of a Hindoo Rajah*, 1796; *Modern Philosophers*, 1800, a kind of satire on the admirers of the French Revolution, and the dangerous absurdities of their doctrines when carried out to their legitimate conclusions; *Letters on the Elementary Principles of Education*, 1801–2; *Life of Agrippina, wife of Germanicus*, 1804; *Exercises in Religious Knowledge*, 1809; *Popular Essays*, 1813. The most valuable though not the best known of her works, is her *Letters on Education*, in which she applies to education, and brings within the compass of general comprehension the metaphysics of the question, which before her time had seemed reserved for philosophers only. In the words of Miss Edgeworth, she "shows how the doctrine of the association of ideas may be applied in early education to the formation of the habits, of temper, and to the principles of taste and morals; she has considered how all that metaphysicians know of secretion, abstraction, &c., can be applied to the cultivation of the judgment and the imaginations of children. No matter how little is actually ascertained on these subjects, she has done much in wakening the attention of parents, and of mothers especially, to future inquiry. She has done much by directing their inquiries rightly; much by exciting them to reflect upon their own minds, and to observe what passes in the minds of their children."

Hamilton, *Gavin*, a distinguished Scottish painter, was born at Lanark in the course of the first half of the eighteenth century. At an early age he was sent to Rome, where he studied art under Massuchi. The highest qualities of a great painter—invention, purity, and correctness of style, and the secret of colour, he undoubtedly lacked. No small part of his merit lies in his choice of subject, to which he was helped by his fine taste and his deep knowledge of classical literature. His best pieces are designs from the *Iliad*, such as "Achilles beside the dead body of Patroclus;" "Andromache bewailing the death of Hector;" "Helen and Paris." Hamilton, however, has rendered greater services to art by his discoveries of precious fragments of ancient monuments than by his direct contributions to it. The latter part of his life was devoted to researches of this kind, which he prosecuted in various parts of the Roman States, but especially at Civita Vecchia, Velletri, Ostia, and above all at Hadrian's Villa, at Tivoli. The statues, busts, and bas-reliefs found by him form the most interesting portion of the Museo Clementino after the treasures of the Belvidere. Many collections in England, Germany, and Russia, owe their chief ornaments to his labours. To one of the best of these—the Townley Gallery—Hamilton contributed a large number of valuable marbles, a list of which is given in the *Townley Gallery*, published by the Society for the Diffusion of Useful Knowledge. Fuseli, giving expression to the feelings of all who knew Hamilton, declares that however great his talents may have been, they were far surpassed by the generosity, benevolence, and humanity of his character. The only work known to have proceeded from his pen is his *Schola Italica Picturæ*, Rome, 1773, in which he traces the progress of the different styles of the Italian school from Da Vinci down to the Caracci.

Hamilton, *Robert*, an eminent Scottish writer on political economy and finance, was born at Edinburgh in 1743. After an excellent education he entered a bank, where he passed the first years of his youth as a clerk, and thus acquired a practical knowledge of financial affairs, which he afterwards turned to good account. In 1760, however, he changed his views, and, resolving to devote himself to teaching, was made rector of the Perth Academy, and ten years later was promoted to the chair of natural philosophy in Marischal College, Aberdeen. In 1780 he exchanged this chair for the more congenial professorship of mathematics in the same university. For some years before his death in 1829, Hamilton had retired from the active business of his chair, and quitted his privacy only at rare intervals to take part in important affairs concerning the college.

Hamilton published a number of minor pieces, but it was not till the appearance of his *Essay on the National Debt* in 1813 that he attracted especial attention as a political economist. That work, published under the title of an *Inquiry concerning the Rise and Progress, the Redemption and Present State, and the Management of the National Debt of Great Britain*, was written with a view to expose the inadequacy of the sinking-fund system, which had been received as an axiom in financial science ever since the days of Pitt. In course of time Hamilton's views, regarded at first with disfavour, came to be known and adopted in other countries of Europe than Great Britain. His other works, such as his *Introduction to Merchandise*, his essay on *War and Peace*, exhibit marks of strong common sense, and a vigorous understanding; but as they discuss their subjects solely with reference to the actual state of things and without allusion to the future, their interest has long since died away.

Hamilton, *Sir William*, a diplomatist and patron of the fine arts, was a native of Scotland, where he was born in 1730. On the threshold of youth he was condemned (to use his own words) to make his way in the world with an illustrious name and a thousand pounds. He took the first step with characteristic caution and boldness, and made his career in life smooth and easy by marrying in 1755 a lady of large fortune, with the additional recommendations of youth, birth, and beauty. Nine years after this Sir William was made ambassador at Naples, and retained that office till 1800. After the death of his first wife he married (in 1791) the beautiful but abandoned Emma Harte, whose name as Lady Hamilton is so painfully associated with that of Nelson. (See Nelson.) Sir William returned to England in the first year of the present century, and died there in very reduced circumstances in 1803.

It is not as a diplomatist but as a lover of art that Sir William Hamilton has a claim to posthumous renown. His great work, the *Campi Phlegræi*, is a noble monument of mingled art and science. It consists of a series of coloured engravings executed with admirable taste and spirit, showing the volcanic action of Vesuvius, and some of the most remarkable eruptions that occurred in the course of his sojourn at Naples. His collection of vases was one of the best private collections of that day. Engravings and descriptions of the most valuable pieces are given in the famous *Antiquités Etrusques, Grecques, et Romaines, tirées du Càbinet de M. Hamilton*, edited by d'Hancarville. Many of these are now in the Townley Gallery in the British Museum. The interest that Sir William took in art and antiquity is attested by his contributions to the *Philosophical Transactions*, his *Observations on Vesuvius, Mount Etna*, &c., and his zeal in furthering and superintending the excavations made at Herculaneum and Pompeii. He even contributed liberally out of his private fortune the means of forming the museum at Portici, and of properly caring for and profiting by the MSS. and other valuable articles rescued from the buried cities. The Neapolitan government looked upon his enthusiasm with coldness if not positive suspicion.

Hamilton, *William, of Bangour*, one of the minor poets of Scotland, was born in Ayrshire in 1704. He is not so much remarkable for original or strong powers of mind as for having been one of the first of native-born Scotchmen who wrote English verse with elegance, correctness, and good taste. One of his ballads, however, that entitled

Busk ye, busk ye, my bonny, bonny bride,

is in its own vein little if at all inferior to the best of the old ballads. Hamilton joined the standard of the young Chevalier in the '45, and, after Culloden, was obliged to fly to the continent. On being pardoned he returned to Scotland, but delicate health drove him once more to France, where he died in 1754. There have been numerous editions of his poems.

HAMLET (from Sax. *ham*, domus), a little village or small cluster of houses in the country. This word, says Stow, originally meant the seat of a freeholder, comprehending the mansion-house and adjacent buildings.

HAMLET, a prince celebrated in the annals of Denmark, whose name has been rendered familiar by forming the subject of one of the noblest tragedies of Shakspeare. Adjoining a royal palace, which stands about half a mile from that of Kronberg, in Elsinore, is a garden, called Hamlet's Garden, and, according to tradition, is the very spot where the murder of his father was perpetrated. The house is of modern date, and situated at the foot of a sandy ridge near the sea. The garden occupies the side of the hill, and is laid out in terraces. Elsinore is the scene of Shakspeare's Hamlet; and the original history from which our poet derived the principal incidents of his play is founded upon facts, but so deeply buried in remote antiquity that it is difficult to discriminate truth from fable. Saxo Grammaticus, who flourished in the twelfth century, is the earliest historian of Denmark who relates the adventures of Hamlet. His account is extracted, and much altered, by Belleforest, a French author, an English translation of whose romance was published under the title of the *Historye of Hamblet;* and from this translation Shakspeare formed the groundwork of his play, though with many alterations and additions.

HAMM, the capital of a cognominal circle in the Prussian province of Westphalia and government of Arnsberg, on the Lippe, at its confluence with the Ahse, 22 miles N.N.W. of Arnsberg. It is inclosed by walls, but the ditches that formerly surrounded it have been filled up and converted into promenades. Hamm was formerly a member of the Hanseatic League: it has a famous gymnasium, bleach works, manufactures of linen and woollen fabrics, leather, &c., and an active trade in hams. It is situated at the intersection of the Cologne-Minden Railway by that between Munster and Paderborn. Pop. (1849) 6005.

HAMME, a town of Belgium, province of East Flanders, 18 miles E.N.E. of Ghent, on the right bank of the Durme, near its confluence with the Schelde. It has breweries and oil-mills; and some manufactures of linen, soap, cordage, &c. It also carries on a considerable trade with the surrounding country. Pop. (1851) including commune, 9684.

HAMMER, a tool used by mechanics, which consists of an iron head fixed crosswise upon a handle. The hammers used by blacksmiths are of several kinds; as, the hand-hammer, which may be wielded with one hand at the anvil; the up-hand sledge, used with both hands, and seldom lifted above the head; the about-sledge, which is the largest of all, and held by both hands at the furthest end of the handle, and, being swung at arm's-length over the head, is made to fall upon the work with a heavy blow. There is also the *riveting hammer*, which is the smallest of all. Carpenters and other artizans have likewise hammers suited to their several purposes.

The name of *steam-hammer* has been given to various powerful machines worked by steam, for dealing heavy blows with rapidity and precision. The steam-hammer of Mr Nasmyth, the introducer of this machine, is particularly deserving of mention, as greatly economizing time and labour, and for its successful employment in ironmaking, the forging of anchors, pile-driving, &c. See Iron-Making.

HAMMERFAST, a town of Norway. See Lapland.

HAMMERSMITH, a town and parish in the county of Middlesex, 4 miles W. by S. of London, near the N. bank of the Thames, which is here crossed by an elegant suspension bridge. The parish church is a plain brick building with a low tower, erected in 1631. A new district church was erected in 1820. There are also chapels for Wesleyan Methodists, Baptists, Quakers, and Roman Catholics; two Roman Catholic convents; almshouses; and national and other schools. The parish is studded with numerous elegant residences, and the neighbouring grounds are chiefly occupied by nurseries and market-gardens, which furnish the metropolis with some of the choicest flowers and vegetables. Pop. of parish (1851), 17,760.

HAMMOCK, or Hamac (Span. *hamáca*—a word of Indian origin), a kind of hanging bed which is suspended between trees or posts, or to hooks. The true Indian hammock is a long narrow net made of strong cord, and terminated at each end by small ropes for suspending it. The hammock used on board ship consists of a piece of stout canvas, about six feet long and three broad, gathered at the ends and suspended by cords.

HAMMOND, Henry, a learned divine of the Church of England, was born at Chertsey in 1605. He was educated at Eton, and graduating at Oxford became a fellow of Magdalene College. Upon taking orders he became rector of Penshurst in Kent, and in 1643 archdeacon of Chichester. When the civil war broke out he hastened to join the king at Oxford, was made canon of Christ Church, and public orator in 1645. Three years later he was driven from the university by the parliamentary visitors, and confined for some time. After regaining his liberty he retired to Westwood, in Worcestershire, the seat of Sir John Pakington, where he spent the remainder of his days, dying at the very moment when the restored head of the Stuart family had fixed upon him for preferment to the see of Worcester.

Hammond's works, published in 4 vols. fol., 1674-84, consist, for the most part, of controversial sermons and tracts. The best of them are his *Practical Catechism*, his *Paraphrase and Annotations on the New Testament*, and an incomplete work of a similar nature on the Old Testament. Though these, with others of Hammond's works, have long since lost any value they may at one time have had, their author possessed many qualities entitling him to be remembered long after his works are forgotten. He was an excellent preacher. Charles I., whose taste on æsthetic questions was indisputable, pronounced him the most natural orator he had ever heard. His range of reading was very extensive, and comprised modern as well as ancient literature and philosophy. His charities and kindnesses to the poor were unbounded. Antony-à-Wood says that he became known as the "most zealous promoter of almsgiving that lived in England since the change of religion," and that, consequently, he "had the disposal of great charities reposed in his hand." With all this wealth, however, his habits were self-denying and abstemious, and he often gave away in charity luxuries which might have been of much service to his own feeble health. His industry was astonishing. "No burden was more heavy," he used to say, "or temptation more dangerous, than to have time lie on one's hand." In 1739 a collection of Hammond's Letters was published by Peck.

Hammond, *James*, the son of Anthony Hammond, the "silver-tongued Hammond," as he was named by Bolingbroke, from the persuasive sweetness of his forensic eloquence, was born in 1710. He was educated at Westminster school, and became equerry to the Prince of Wales. He entered parliament as member for Truro in 1741, and died the following year. While still a very young man, he published his *Love Elegies*, correct and tasteful pastorals indeed, but cold and vapid. Dr Johnson was not too severe when he said, "these elegies have neither passion, nature, nor manners." The heroine, whom the author calls Delia, was a Miss Dashwood, whose scorn of the poet's love first drove him mad, and finally sent him to his grave at the early age of thirty-two. The lady, we are told, survived him for seven and thirty years without finding any one else either to marry or fall in love with her. Dr Johnson observes that the character which Hammond bequeathed her was not likely to attract courtship.

HAMPDEN, John, the celebrated leader of the Long Parliament, was descended from an ancient and honourable family of Buckinghamshire. His father was the proprietor of the large family estates, and died while his son was an infant. His mother was the daughter of Sir Henry Cromwell of Hinchinbrook, and the aunt of the great Oliver, who was thus John Hampden's cousin-german. After passing through the courses of the grammar-school of Thame and Magdalene College, Oxford, he began the study of the law at the Inner Temple. In 1619 he married and began to reside permanently on his estates, leading the same sort of life as was led by most English squires of the day. When the king found it necessary to summon a parliament, Hampden was returned first by the borough of Grampound, then thrice consecutively by Wendover, and finally entered the Long Parliament as one of the members for the county of Bucks. His history from this time till he fell mortally wounded in the skirmish with Prince Rupert upon Chalgrove Field, June 18, 1643, is the history of England. (See Great Britain.) As Hampden comes before posterity as a party-man and the leader of a party, it is extremely difficult to form an estimate of his character such as will reconcile the various accounts of him that we possess. His partizans excite our pity when they set him up as the greatest man of his age, and as a man in whom were centred and surpassed the high and valuable qualities of Cromwell, Vane, Manchester, Hale, and Sidney. Equally absurd is the conduct of those who deny that he possessed great sagacity, great powers of debate, great courage in war, and great ability as an administrator and man of practice. He was not a man of genius, as Cromwell was; but he had great talents, and a mental constitution as refined as powerful. His *personnel* seems to have been a highly interesting one. He was the only leading man among the Parliamentarians in whom the Royalist wits could find nothing to assail. There is no act of his life in which he can be charged with anything like meanness or want of soul. His patriotism was at once a principle and a sentiment, and his noble self-devotion and heroic end prove that it was as strongly approved by his judgment as accordant with his sympathies. After hearing that his wounds were fatal, he quietly continued the despatch of some important public business; which done he calmly awaited his end. His last prayer was a prayer, not for himself only, but for his country which even in the agonies of death occupied his thoughts:—"Lord Jesus, receive my soul. O Lord, save my country. O Lord, be merciful to ——." His death was that of a Christian as well as a hero. (See Carlyle's *Cromwell;* Nugent's *Memorials of Hampden;* Hume, *Hist. Engl.;* Clarendon, *Hist. Rebel.;* Macaulay, *Hist. Engl.;* and *Essay on Hampden* reprinted from *Edinburgh Review.*)

HAMPSHIRE, Hants, or county of Southampton (anciently *Hamtechare*), a maritime county of England on the shores of the English Channel, bounded on the N. by Berkshire, E. by the counties of Surrey and Sussex, S. by the English Channel, and W. by Wiltshire and Dorsetshire. It is of an irregular quadrilateral form, and is about 46 miles in extreme length from N. to S., by 41 in extreme breadth. This is exclusive of the Isle of Wight, which is comprised in the county, and is about 23 miles long from E. to W., by 14 broad from N. to S. The entire area is 1,070,216 acres, or 1672 square miles. Hampshire, in its general aspect, presents a beautiful variety of gently rising hills and fruitful valleys, adorned with numerous seats and pleasant villages, and interspersed with extensive woodland. In comparison with many other counties it has but little waste land, but at the western extremity, bordering on Dorsetshire, a small portion of sandy heath is scarcely productive of anything but pasture for sheep. A considerable tract, extending from Winchester to the northern extremity of the county, is down-land, principally used for sheep-pasture, but when brought under the plough is very fertile in barley, turnips, clover, and sainfoin. This county contains a great extent of woodland. The New Forest, so well known from its association with William the Conqueror, contains about 92,000 acres, but within its boundary a large portion of the land is highly cultivated and very fertile. The abundance of trees of large dimensions, the open glades between, and the variety of foliage and underwood, render the scenery of the district highly delightful. The oaks, many of which are of some hundred years' growth, are the characteristic feature of the forest. They do not grow to a great height, but swell to large dimensions in the trunk, and shoot out strong crooked branches, which give them a very picturesque appearance, and add to their value as naval timber, being well adapted for use as knees in ships of the largest size. The beech trees also grow to a very great size, and contribute to the beauty as well as the profits of the forest.

The other principal forests are those of Alice Holt and Woolmer, situated within a short distance of each other, near the eastern border of the county, and extending over about 15,500 acres; of which nearly one-half belong to the crown, and afford excellent oak timber. Bere Forest, also, in the south-east, a few miles to the north-east of the Portsdown Hills, and about five miles from Portsmouth, contains about 16,000 acres, but its timber has been much neglected. In these forests there is abundance of deer belonging to the crown, some of which are annually killed, and distributed (according to ancient prescription) among the various officers of the government and the royal household. The greater part of the county is inclosed, and even the down-lands are so in a great measure.

The principal rivers of Hampshire are the Itchen, the Avon, the Boldre, the Tees, and the Anton. The Itchen rises near Alresford, flows by Kingsworthy, Winchester, and Twyford, and falls into the Southampton Water. This river has been navigable from Winchester to Southampton as early as the Conquest. The Avon has its source in Wiltshire, enters the county near Breamore, passes by Fordingbridge and Ringwood, and after being joined by the Stour, a small Dorsetshire river, which only passes through about six miles of Hampshire, empties itself into Christchurch Bay. The Boldre takes its rise in the New Forest, and, after collecting the waters of several brooks during its course through the forest, it falls into Lymington Creek. The Tees or Test rises in the neighbourhood of Whitchurch, and, after receiving the Anton and numerous small brooks, passes by Stockbridge and Romsey, and forms the head of the Southampton Water. The other rivers are the Exe, Hamble, and a few small tributaries of the Thames, which water the northern portions of the county.

The canals of the county are but two—Basingstoke and Andover. The Basingstoke Canal was begun in 1778, to communicate between that town and London. It is 37 miles in length, and terminates near Guildford in the River Wey. It passes through a tunnel, nearly three-quarters of a mile in length, under Grewell Hill, near Odiham. This canal was not completed till 1794, when it had cost L.100,000; and the tolls are not yet sufficient to pay the interest. The Andover Canal was begun in 1789, at that town. Its termination is at Redbridge, and it is useful to convey coals and other heavy commodities to the centre of the county. It is continued by a branch to Salisbury.

Several railways traverse the county. There is communication with London by means of the South-Western Railway, which enters Hampshire at Farnborough, passing by Winchester, and from thence to Southampton, a branch diverging from Bishopstoke to Gosport, and again to Portsmouth *via* the South Coast Railway, by a branch from Foreham. The South Coast Railway also affords to the south-eastern portion of the county ready access to London, through Brighton. This line enters the county at West Boarne, passes by Havant and a few other unimportant places, into Portsmouth. A branch from Reading and the Great Western Railway joins the South-Western at Basingstoke, and the Guildford and Reigate branch of the South Coast Railway communicates with Alton. A line called the Direct Portsmouth Railway, commenced in August 1853, is in course of construction. The projectors of this line intend to form a junction with the South Coast Railway at Havant, whence it is to pass along the eastern border of the county to Godalming, and thence by the Woking Junction and South-Western Railway to London. This line, when completed, will shorten the distance between London and Portsmouth by 22 miles. Southampton communicates with Dorchester by the Dorchester Railway, which passes by Ringwood, and with Salisbury by a branch line passing through Romsey. At present Plymouth and other parts of the south-west of England can only be reached by the Great Western Railway, a most tedious and circuitous route; but other lines have been projected, which will make a material alteration in this respect. The towns of Southampton and Portsmouth are in communication with London by means of the electric telegraph, which is also in operation between Southampton and Dorchester.

The soil is very various, but in almost every part it rests on a calcareous subsoil. The uplands are generally appropriated to breeding sheep, and hence the culture of turnips has been much extended. After the turnips are eaten off the land, barley is usually sown, and with it clover, or other artificial grass-seeds. To the clover succeeds sometimes wheat or oats, and, when the land is somewhat heavier in texture, occasionally beans; but in few parts of England are the rotations of crops more diversified. The average produce of corn on these high lands is not more than 16 bushels of wheat, 22 of barley, and 24 of oats, to the acre. The ploughing is almost universally performed by horses, which are of a very excellent breed. On much of the stiffer lands four of these strong horses are thought necessary; but on lighter lands, and with a single-wheeled plough, sometimes two or three are used, and very rarely are harnessed abreast of each other. On the higher lands the hay for winter consumption is generally made from sainfoin, a plant which peculiarly flourishes when the subsoil is calcareous. When it is sown great care is taken to extirpate all weeds, and every other description of grasses, and thus the crop will usually continue for ten years to be fit for mowing; and on some soils it has been found to last even twenty years, and yield abundant crops of hay. There is no part of England in which this valuable grass is so well or so extensively cultivated.

The corn lands on the lower levels of the county are much more productive; but on those districts they have no occasion for sainfoin, and scarcely for clover, as their rich water meadows supply them with a sufficiency of hay. Some of these meadows are perhaps the most valuable of any lands in this island, and are managed with great skill and attention. Where a rapid stream of water can be passed over them during the whole winter, it seldom becomes frozen; and the grasses grow during the cold weather, so as to be fit for pasture at an early period in the spring, before any traces of vegetation appear in the surrounding fields. This young grass is a provision for the sheep when no other green food is to be found, and supplies them to the beginning of May, when it is allowed to grow, and in six or eight weeks it is fit to be mowed, and yields an abundant supply of hay. There is much of this valuable description of land in the fertile valley that extends from Overton to Redbridge by Stockbridge.

In the eastern part of the county, bordering on Surrey, there are extensive hop plantations, the produce of which is equal in flavour to those in the adjoining villages of that county near Farnham.

A parliamentary report on the agricultural statistics of this county gives the number of acres of arable land, in October 1853, at 603,219½. Of these 96,228¼ were in wheat, 62,380¾ barley, 57,075¼ oats, 1907½ rye, 14,096¾ peas and beans, 13,868½ tares and vetches, 2801¼ potatoes, 83,847 turnips or rape, 388½ carrots, 1515¾ mangel-wurzel and beet-root, 355 cabbages, 100,114½ clover, lucerne, &c., 123,519½ meadow and pasture, 73¼ flax, 1711¼ hops, 4260 other crops, 39,076½ fallow. The woods or plantations covered an area of 105,839½ acres, and commons or wastes occupied 89,630¼. There were 24,076 horses, 19,350 milch cows, 13,148 other cattle, 489,227 sheep and lambs, and 61,860 swine.

The original breed of Hampshire sheep was white-faced, with horns; but these have been so often crossed with other kinds, that few of an unmixed breed are left. Most of the flocks now are of the Southdown kind; they are found to be more profitable, both on account of the superior quality of their wool, and the tendency to fatten with a less quantity of food than any others. The cows are not much attended to, and are not generally of the best kind. The introduction of the Welsh breed has made some improvement, but there is room for much more.

The breeding and fattening of pigs has long been a most important part of Hampshire husbandry. The bacon from them is the principal animal food of the rural inhabitants. In the vicinity of the forests the pigs are fed on acorns and beech-mast; and those so fattened are considered the best, either for pickled pork, or for bacon. The average weight of these animals when deemed fit for slaughter is about 440 or 450 lbs., but many of them weigh 800 lbs.

The manufactures of this county are neither numerous nor extensive, except those carried on at Portsmouth in connection with the Royal Navy. Besides the ship-building in the royal yard, many vessels, both for war and trade, are built on the River Itchen at Buckler's Hard, on the River Boldre, and on the banks of Southampton Water. The manufacture of woollen goods upon a small scale is carried on at Andover, Romsey, Alton, and Basingstoke. Paper is made at Romsey and at Overton. The mills at the latter place have supplied the whole of the thin paper used by the Bank of England for their notes ever since the reign of George I. Ringwood has been long celebrated for the excellence of the strong beer brewed there, but the quantity has declined of late years. On the sea-shore at Lymington, and on the island of Hayling, near Havant, some salt is made by the evaporation of sea-water. The quantity depends on the degree of heat which prevails during the summer season, as the first part of the process of evaporation is performed by the heat of the sun alone; the brine is afterwards conveyed to iron pans, and the process completed by artificial heat. But as coal is the only fuel, the process is expensive, and prevents the proprietors from competing with the northern manufacturers of salt.

The foreign commerce of the county was inconsiderable until the formation of the Southampton Docks, and the consequent rise of that place as a commercial port. Its commerce even now can by no means be compared with that of several other counties—Southampton being principally used as a steam-packet station. That port, however, imports much wine from Portugal, which, before the introduction of the bonding system, used to be deposited in the islands of Guernsey and Jersey, to save the interest upon the amount of the duties. It also carries on a considerable commerce with the Baltic. At Christchurch there are a few vessels fitted for the Newfoundland fishery.

The most considerable towns, with their population, according to the census of 1851, are:—

Towns.	Pop.	Towns.	Pop.
Portsmouth and Portsea	72,126	Basingstoke	4,275
Southampton	34,092	Lymington	4,166
Winchester	12,079	Ringwood	3,933
Fareham	5,843	Alton	3,300
Romsey	5,649	Fordingbridge	3,178
Andover	5,195		

These will be found described in their alphabetical order in other parts of this work.

Aldershott, a little village on the borders of Surrey, has become of late a place of some note, by the formation of a military camp on Aldershott Heath. The camp is constructed at the base of a range of hills on the left of the road leading from the town of Farnham. It is at present formed entirely of wooden huts, but permanent barracks are in course of construction. When completed, the huts will afford accommodation for 20,000 militia, and the barracks for 10,000 regulars, consisting of cavalry, infantry, and artillery. The cost of the whole erections will be upwards of L.300,000.

The antiquities of this county are very numerous, and may be contemplated in the ruins of numerous castles, abbeys, and shattered towers, which add not a little to the beauty of the scenery. The most remarkable are Calshot Castle, Netley Abbey, Hurst Castle, Porchester Castle, and Beaulieu Abbey. Antiquities of more early date, of ancient British or of Roman origin, are scattered over the county. The numerous barrows are ascribed to the former, and many vestiges of intrenched camps and castles to the latter.

The beauty of the county has attracted to it a greater number of families of rank and fortune than almost any other county can enumerate. The principal seats alone number nearly 300.

By the Reform Act of 1832, this county has, for election purposes, been divided into the northern and southern parts, each of which returns two members to the House of Commons. The place of election for the northern division is Winchester; and the other polling places are Fareham, Lymington, Ringwood, and Romsey. By the same law the boroughs of Whitchurch and Stockbridge were disfranchised; and the boroughs of Petersfield and Christchurch, which used to elect two members, now choose only one each. The towns which now return two members each are Winchester, Southampton, Andover, Lymington, and Portsmouth, with which is incorporated the adjacent large town of Portsea.

The whole population of Hampshire amounted in 1801 to 219,656; in 1811, to 245,080; in 1821, to 283,208; in 1831, to 314,700; in 1841, to 355,004; and in 1851, to 402,033 (199,834 males, and 202,199 females); so that in half a century the county has nearly doubled the number of its inhabitants. It appears by the register of burials that the deaths between 1801 and 1811 were 1 in 46 of the inhabitants; that from 1811 to 1821 they were 1 in 54; and from 1821 to 1831 (notwithstanding an increase of mortality by the cholera) 1 in 56. In these years, therefore, there was a continued and marked decrease in the rate of mortality; but within the last few years there has been a perceptible increase, caused, without doubt, by the great and rapid augmentation of the population of the large towns. According to the latest averages, the mortality of the county is still below that of the whole country, and this we think may be accepted as a proof of the general salubrity of its climate.

According to the census returns of 1851, there were then 818 places of worship in the county, containing 214,674 sittings. Of these places of worship, 389 belonged to the Church of England, 116 to Independents, 69 to Baptists, 190 to Methodists, 13 to Roman Catholics, 7 to Latter-Day Saints, 6 to Quakers, 6 to Unitarians, and the rest to minor bodies. There were 1508 day schools, with 57,960 scholars; of these 487, with 39,906 scholars, were public schools; and 1021, with 18,054 scholars, were private schools. Of the public schools, 25 were supported by general or local taxation, 59 by endowments, and 386 by religious bodies.

There were also 576 Sunday-schools; of which 322 belonged to the Church of England, 98 to Independents, 58 to Wesleyan Methodists, 45 to Baptists, and the rest to other bodies. Of evening schools for adults, there were 33, with 677 scholars.

HAMPSTEAD, a village in the county of Middlesex, 4 miles N.W. of London. Its pleasant situation, on a considerable eminence commanding extensive views, and the salubrity of its atmosphere, render it a favourite place of residence and of resort. The hill, on the southern slope of which the village stands, is the loftiest site near the metropolis, being 443 feet above the level of the Thames, or 36 feet higher than the cross of St Paul's. The extensive heath on the summit of the hill covers an area of about 280 acres. The streets are mostly narrow and tortuous, lined with houses of all kinds, from the mere cottage to the spacious mansion. The parish church, erected in 1747, and enlarged in 1844, is a building in the Italian style, having accommodation for 1600 persons. East of the town is a mineral spring which was in high repute during the seventeenth century, at which time Hampstead was a fashionable watering-place. In the vicinity are numerous villas. Pop. of parish (1851) 11,986.

HAMPTON, a village in the county of Middlesex, on the N. bank of the Thames, 12 miles W.S.W. of London. The parish church is a handsome edifice having a square tower at its western end. There are numerous elegant villas in the vicinity. Hampton Court Palace, a deserted abode of royalty, stands close to the river about a mile from the village. It was originally erected by Cardinal Wolsey, and presented by him to his royal master Henry VIII., who made some additions to it. The original edifice consisted of five quadrangles, of which only two now remain, but a third was erected by Sir C. Wren for William III. The western quadrangle has undergone little alteration since Wolsey's time, and is a good specimen of Tudor architecture. The middle quadrangle, called the Clock Court, from a curious astronomical clock placed over the gateway, is of mixed style, the massive character of the old building being marred by the improvements of Kent in 1732. The northern side is wholly occupied by the length of the hall, and on the opposite side is the incongruous colonnade of Sir C. Wren. The third quadrangle was erected, as already said, for William III., under whom also the gardens and park were laid out in their present form. The king's entrance in the Clock Court leads to the grand staircase and state apartments. Hampton Court contains an extensive and valuable collection of pictures, including a large collection of portraits of persons connected with English history, by Holbein, Lely, Kneller, West, &c.; and the celebrated cartoons of Raffaele, seven in number, representing some of the most striking incidents recorded in the New Testament. Hampton Court became the favourite residence of Henry VIII. Edward VI. was born here, and here his mother Jane Seymour died. James I. and his son Charles I., Cromwell, Charles II., James II., William III., Queen Anne, and George II. made this their occasional or more permanent residence. It is now open to the public free of charge, and part of it is occupied by persons of rank in reduced circumstances.

HAMSTER. See index to MAMMALIA.

HANAPER, formerly an office in Chancery, but abolished by 5th and 6th Vict. c. 103. It was under the direction of a master, his deputy and clerks, and answered in some measure to the Roman *fiscus.* (See FISC.) It received the name of Hanaper from the wicker baskets or hampers (*hanaperia*) in which the writs were anciently kept. Writs relating to the subject were deposited in these hanapers; while those concerning the Crown were kept in a little sack or bag; whence another office of the same court took the name of the Petty or Little Bag.

HANAU, a town of Germany, capital of a cognominal province, in the electorate of Hesse-Cassel, on the Kinzig, near its junction with the Main, 12 miles E. of Frankfort-on-the-Maine, with which it is connected by railway. It consists of an old and a new town; the former is ill-built, with narrow and irregular streets, but in the latter the buildings are of a better class, and the streets are generally broad and regular. Its ancient castle in the old town is now the seat of the Wetteravian Society of Natural History. The market-place in the new town is a large oblong parallelogram with handsome fountains in the four corners, and the large town-hall at one end. Hanau possesses four Calvinistic churches, a Roman Catholic church, synagogue, hospital, theatre, gymnasium, and several scientific and literary associations. This is the principal commercial and manufacturing town in the electorate. Its industrious products comprise silks, ribands, cottons, carpets, leather, gloves, stockings, hats, tobacco, gold and silver wares, musical instruments, carriages, &c. It has also a large trade in wine, timber, casks, carriages, &c. Here, on 30th October 1813, Napoleon, in his retreat from Leipzig, totally defeated a very superior force composed of Bavarians and other allied troops, under Marshal Wrede. Near Hanau are the electoral palace of Philippsruhe and the watering-place of Wilhelmsbad. The province of Hanau has an area of 535 square miles, and contained 124,328 inhabitants in 1854.

HANCES, HANCHES, HAUNCHES, or HANSES, in *Architecture*, certain small intermediate parts of arches between the crown and the spring at the bottom, being probably about one-third of the arch, and placed nearer to the bottom than the top, which are likewise denominated the *spandrels.*

HAND. See ANATOMY, vol. iii., p. 33, &c.; also, Sir Charles Bell's treatise *On the Hand.*

HAND, a measure of four inches, or a handsbreadth; used in measuring the height of horses. The term is also used to denote the fore-foot of a horse.

Imposition, or laying on of HANDS, signifies the conferring of holy orders; a ceremony in which the hands are laid on the head of a person as a sign of a mission, or of a power given him to exercise the functions of the ministry belonging to the order. The apostles began to appoint missionaries by the imposition of hands.

HANDEL, GEORGE FREDERIC, the most illustrious of musical composers, was born at Halle, in Upper Saxony, Feb. 24, 1684. His father was an eminent physician of the same place, and upwards of sixty years old when this son, the issue of a second marriage, was born. From his very childhood Handel discovered a passion for music which could not be subdued by the commands of his father, who intended him for the profession of the law. Notwithstanding that he was forbidden to touch a musical instrument, the boy found means to get a little clavichord conveyed secretly into one of the attics of the house. To this room he constantly repaired when the family had retired to rest, and, by his assiduous labours at the midnight hour, made considerable progress in his favourite pursuit.

It happened, when Handel was about seven years old, that his father had occasion to pay a visit to a son by a former wife, who was then serving as attendant to the Duke of Saxe-Weissenfells. Handel implored that he might be permitted to accompany him; and, on being refused, he followed the carriage some way on the road, till he overtook it. His father at first chid him for his disobedience; but, yielding to his solicitations, at last took him into the carriage. During his stay at the ducal residence, he continued to show the same irresistible inclination for music. He could not be kept away from harpsichords, and he contrived to gain admission into the organ gallery at church, and to play when the service was over. Upon one of these occasions the duke, who happened to leave the chapel later than usual, was attracted by the uncommon style in which the instrument was touched. Inquiring who played, he heard to his astonishment that it was a boy of seven years of age. The duke immediately desired to see young Handel, and was so much pleased with his precocious genius, that he prevailed upon his father to allow him to follow the bent of his inclinations. He made the boy a present, and told him that if he was attentive to his studies he should not want encouragement.

On his return to Halle, Handel was placed by his father under Zachau, organist of the cathedral church of that city; a man of considerable abilities, and proud of his pupil. By the time he was nine years old, our young musician was not only able to supply his master's place at the organ, but began to study composition. At this early period of his life, he wrote a service, or *spiritual cantata*, every week, for voices and instruments, and continued this labour for three years successively. He also composed sonatas for the oboe, which was his favourite instrument.

Handel appears to have studied in his native city till he was about the age of fourteen. He then, as Zachau himself acknowledged, far excelled his master; and it was recommended to his father to send him to Berlin. Thither he accordingly went in 1698. The opera at Berlin was then in a very flourishing state, under the direction of Buononcini and Attilio. Handel distinguished himself in this city as an astonishing musician for his years, and gave earnest of such great talents that the elector of Brandenburg offered to take him into his service, and send him to Italy to complete his studies. But his father declining this honour, from a spirit of independence, Handel returned to Halle. Not long after this, his father died, and Handel not being able to go to Italy on account of the expense, removed to Hamburg, in order, by his musical talents, to procure a subsistence.

Mattheson, an able musician and voluminous writer on music, who resided at Hamburg, tells us that Handel arrived there in the summer of 1703. "Here," says Mattheson, "almost his first acquaintance was myself, as I met him at the organ of St Mary Magdalen's Church, July the 30th, whence I conducted him to my father's house, where he was treated with all possible kindness as well as hospitality; and I afterwards not only attended him to organs, choirs, operas, and concerts, but recommended him to several scholars. At first he only played a *ripieno* violin in the opera orchestra; and being naturally inclined to indulge in a kind of dry humour, pretended unusual ignorance, in a manner that made the most serious people laugh, though he preserved his own gravity. But his superior abilities were soon discovered; for the harpsichord player of the opera having been absent for a time, Handel was persuaded to take his place, and on this occasion showed himself to be a great master, to the astonishment of every one, except myself, who had frequent opportunities of knowing his abilities on keyed instruments."

Mattheson and Handel became intimate acquaintances, and did not allow any professional rivalship to interfere with their friendship, until the occurrence of the following adventure. Mattheson had composed an opera called *Cleopatra*, which was performed in Hamburg, and in which he acted the part of Antony himself, and Handel played the harpsichord. Mattheson was accustomed, upon the death of Antony, which happened early in the piece, to preside at the harpsichord in the character of composer; but one evening Handel refused to indulge his vanity by relinquishing this post to him. This occasioned so violent a quarrel between them, that, on going out of the house, Mattheson gave him a blow on the face; upon which both immediately drew their swords, and a duel ensued in the market-place, before the opera-house. Luckily the sword of Mattheson broke against a metal button on Handel's coat, or, as some allege, a score of music which he carried under it, which put an end to the fight.

This rencontre happened upon the 5th of December 1704; but, as a proof of a speedy reconciliation, Mattheson mentions, that on the 30th of the same month, he accompanied the young composer to the rehearsal of his first opera of *Almira*, at the theatre, and performed the principal part in it; and that afterwards they became greater friends than ever. Whilst he remained at Hamburg, Handel composed his opera of *Nero, oder Die durch Blut und Mord erlangte Liebe*, which was very successful. He also produced two operas entitled *Florinda*, and *Dafne*, and wrote innumerable songs, cantatas, and pieces, for the harpsichord. His style, Mattheson allows, was greatly improved by his constant attendance at the opera; and he was esteemed a more powerful player on the organ than the famous Kuhnau of Leipzig, who was at this time regarded as a prodigy.

Handel having now acquired, by his operas at Hamburg, a sum sufficient to enable him to visit Italy, he set out for that seat of the muses. He stayed some time at Florence, where he composed his opera of *Rodrigo*. From this city he went to Venice, where, in 1709, he produced his *Agrippina*, which was received with acclamation, and had a run of thirty nights. Here he met with Domenico Scarletti, Gasparini, and Lotti. He next visited Rome, where he had an opportunity of hearing compositions and performers of the first class. At Cardinal Ottoboni's, by whom Handel was greatly caressed, he had frequently the advantage of hearing the celebrated Corelli perform his own works. During his stay at Rome, our young composer produced a serenata entitled *Il Trionfo del Tempo;* after which he went to Naples, where he set *Acis and Galatea* in Italian.

Handel returned to Germany about the beginning of the year 1710, and was made *Kapellmeister* to the elector of Hanover, afterwards George I. He does not appear, however, to have remained long in the service of the elector, but bent his course to London, where a passion for dramatic music had already manifested itself in several awkward attempts at operas, and to which place he had received invitations from several of the nobility he had seen in Italy and Hanover. His reception in England was flattering to himself and honourable to the nation, at this time no less successful in war than in the cultivation of the arts of peace. To the wit, poetry, literature, and science, which marked this period of our history, Handel added all the blandishments of a nervous and learned music, which he first brought hither, planted, and lived to see grow to a very flourishing state. The first opera he wrote in England was *Rinaldo*, taken from Tasso's *Gierusalemme*, which at once established his reputation. He afterwards produced his *Pastor Fido*, *Theseus*, and, in 1715, *Amadis da Gaula*. In all of these, Nicolini and Valentini, the first Italian singers that appeared in England, performed. When the peace of Utrecht was brought to a conclusion, Handel was employed to compose the Hymn of Gratitude and Triumph on the occasion. The grand *Te Deum* and *Jubilate* he produced was composed with such force, regularity, and instrumental effect, as to excite universal delight.

On the arrival of George I. Handel was honoured with the most flattering marks of royal favour from the king and queen, who added largely to the pensions previously conferred on him by Queen Anne.

We now come to the busiest and most glorious period of Handel's life. His great natural powers had been highly improved by cultivation; his genius for composition was unbounded; he stood at the head of his profession, esteemed alike by the sovereign, the nobility, and the public, of a great and powerful nation, at a period of its greatest happiness and prosperity. Such were Handel's circumstances, when the Royal Academy, or an association for the establishment of an Italian opera in England, was formed.

Handel was appointed director and composer, engaged singers, and, although he had to contend with several rivals, at length, by the superior grandeur and invention of his operatic music, distanced them all. About this period of his career Handel unfortunately became involved in a quarrel with the vocalist Senesino, the particulars of which we pass over. The result was to break up the academy; and it not only proved injurious to the fortune of our composer, but was the cause of infinite trouble and vexation to him during the rest of his life. From the institution of the academy till its dissolution in 1729, Handel produced about thirty operas. The greater part of these had immense success; yet such was the influence of opposition and neglect, that none of his operas composed subsequently to 1740, although actually his highest achievements in operatic composition, were received with the admiration due to their merit.

Following the narrative of Burney in his sketch of Handel's life, we leave his dramatic transactions, and come now to notice the sacred dramas or *oratorios* of this great musician. The oratorio of *Esther* was the first he composed; and in 1733 *Deborah* was given to the public. It was during these early performances of oratorios that Handel first played his organ concertos, a species of music wholly of his own invention, in which he usually introduced an extempore fugue, a diapason-piece, or an adagio, displaying not only great fertility and readiness of invention, but the most perfect accuracy and nicety of execution. In 1735 he produced *Acis and Galatea*, and *Alexander's Feast;* in 1738, *Israel in Egypt;* and in 1739, *L'Allegro ed il Penseroso*. In 1740 the oratorio of *Saul* was performed at the theatre in Lincoln-Inn Fields; and from this period Handel almost entirely devoted his labours to the service of the church. The profits arising from the performance of his oratorios were not sufficient to indemnify his losses; and it remains a stigma upon the taste of the nation, that the *Messiah* at first proved neither successful, nor remunerative to the composer. Chagrined with repeated disappointments, Handel went to Ireland, in order, as Burney remarks, "to try whether his oratorios would be out of the reach of prejudice and enmity in that kingdom." In allusion to this, Pope wrote his well-known lines, supposed to be addressed by the poet personifying the Italian opera, to the goddess of Dulness.

> "Strong in new arms, lo, giant Handel stands,
> Like bold Briareus, with his hundred hands;
> To stir, to rouse, to shake the soul he comes,
> And Jove's own thunders follow Mars' drums,
> Arrest him, empress, or you sleep no more:—
> She heard, and drove him to the Hibernian shore."

After remaining about nine months in Ireland, where his exertions were successful, Handel returned to London, and produced *Samson* and the *Messiah*, which latter work was now received with universal applause. This truly sublime oratorio was performed annually at the laudable and benevolent instigation of the author, and under his direction, for the benefit of the Foundling Hospital; and the produce of these performances, from the year 1749 to the year 1777, amounted to nearly L.10,300. Although the *Messiah* was performed almost always to crowded houses, the other oratorios were but thinly attended. This was owing no less to the capriciousness of public taste than to the extraordinary hostility of some of his powerful adversaries. The king, however, continued his steady patron, and attended his oratorios when they were neglected by the rest of the court.

Towards the close of his life Handel was afflicted with blindness, which, however, did not affect his faculties, as he continued to play to the last with his wonted vigour. "To see him, however," says Burney, "led to the organ after this calamity, at upwards of seventy years of age, and then conducted towards the audience to make his accustomed obeisance, was a sight so truly afflicting and deplorable to persons of sensibility, as greatly diminished their pleasure in hearing him perform." It was remarked, that with many parts of his music he was unusually agitated, particularly with that affecting air in *Samson*, "Total eclipse—no sun, no moon," which so peculiarly applied to his own situation. The last oratorio he attended and superintended was upon the 6th of April, and he expired on Friday the 13th, or Good Friday 1759, the very day he had seriously wished that event should happen, "in hopes," as he said, "of meeting his good God, his sweet Lord and Saviour, on the day of his resurrection," meaning the Easter Sunday following.

The musical powers of Handel can perhaps be best expressed by Arbuthnot's reply to Pope, who seriously asked his opinion of him as a composer. "Conceive," said he, "the highest you can of his abilities, and they are much beyond anything you can conceive." He excelled in almost every style of composition. The church, the theatre, and the chamber, were equally adorned by his talents. The best of his Italian operas are superior in variety and ingenuity to those of all preceding and contemporary composers throughout Europe. In his full, masterly, and admirable organ fugues, upon remarkably natural and pleasing subjects, he has surpassed the most renowned writers in this difficult and elaborate species of composition; and every judicious and unprejudiced musician, when he hears or peruses the noble, majestic, and sublime oratorios and anthems of Handel, must allow, with readiness and rapture, that they are unacquainted with any thing equal to them among the works of the greatest masters that have existed since the invention of counterpoint. (*Memoirs of the Life of G. F. Handel*, 1760. Consult Townsend's *Account of the Visit of Handel to Dublin.*) (A.H.)

HANDSPIKE, a wooden bar or lever used on board ship in working the windlass.

HANG-CHAU-FOU, an important city of China, capital of the province of Che-kiang, on a plain near the River Tsientang, about 40 miles from its mouth, and 140 miles S.E. of Nanking. It is surrounded by high and strong walls, said to be 9 miles in circumference; and adjoining it are very extensive suburbs. The Governor-General of Che-kiang and Fu-kien resides in this city, and also the governor of the province, which, with their courts and troops, in addition to its great trade, render this one of the most important and richest cities in the empire. A portion of the space within the walls is divided off for the accommodation of a garrison of 7000 troops. The Grand Canal has its southern termination here in a large irregular basin. The streets are well paved; and the shops and warehouses are large and well stored with goods. There are numerous rich temples and elegant public buildings; and altogether this city presents the appearance of great wealth and splendour. It is noted for its silk manufactures, which employ a large portion of its inhabitants. The population is said to be about one million.

HANGO HEAD, a promontory on the north coast of the Gulf of Finland, at its mouth, in N. Lat. 59. 46. 20.; E. Long. 22. 58. In 1714 the Swedes were defeated in a naval engagement by the Russians off this point; and on 5th June 1855, an English boat's crew, while landing Russian prisoners under a flag of truce at the village of Hango, were attacked by troops under cover, when ten or twelve men were killed, and the others captured.

HANLEY, a town of England, county of Stafford, near the centre of the pottery district, 16 miles N. of Stafford. It is indebted for its rise and present importance to the potteries, which afford employment to nearly its entire population. The parish church is a handsome building, with a fine tower 100 feet in height. The township of Hanley is, for local purposes, united with that of Shelton into one market-town, which, in 1851, contained 25,369 inhabitants. Hanley is included in the parliamentary boundaries of Stoke-upon-Trent.

HANNIBAL, a Carthaginian general, son of Hamilcar Barcas, was born 247 B.C., in the eighteenth year of the first Punic War, the same year in which his father first took a prominent part in public affairs. His family was one of the most distinguished in Carthage, and, claiming to be descended from the ancient kings of Tyre, it ruled its native city with almost regal power. The history of Hannibal forms an epoch in the destinies of Rome. We can have little difficulty in forming a true estimate of his character when we know that, almost unaided by his countrymen, he sustained for upwards of sixteen years a struggle for the empire of the world with a nation which had hitherto been victorious in every contest it had undertaken, and had at its disposal the resources of the greater part of Italy. It was the last struggle which the republic of Rome maintained for existence; and there was none which called forth more conspicuously the energies of her mighty warriors, or displayed more fully their unconquerable perseverance and undaunted bearing in the most untoward circumstances. If Hannibal had been properly supported by his countrymen at home, the star of Rome would probably have set for ever, and Carthage would then have stood forth as the conqueror of the world, and the source of civilization. The key to all Hannibal's proceedings is to be found in his hatred of the Romans, a feeling indelibly impressed upon his mind by his father when he made him swear at the altar of his country that he would pursue the Romans with unrelenting hatred.

The military education of Hannibal must have commenced from boyhood, but of his early years we have no detailed account. He was eighteen years of age on his father's death (229 B.C.), and probably spent the greater part of the next eight years in the camp of his brother-in-law Hasdrubal, who had succeeded to the command of the troops in Spain on the death of Hamilcar, and who pursued the same line of policy as his predecessor, in trying to obtain entire possession of the resources of Spain as a means of attacking Rome. Private revenge cut off Hasdrubal in the midst of his career (221 B.C.), and the soldiers by acclamation raised Hannibal to the vacant command. The appointment was ratified by the senate at home, and from this moment Hannibal regarded Italy as his province, and war with Rome as the only object worthy of his attention. The conciliatory measures of Hasdrubal had succeeded in uniting the greater part of the nations of Spain to the dominions of Carthage; and those who still maintained independence Hannibal determined to reduce at once by the energy and activity of his proceedings. He led his troops into the country of the Olcades, a people who seem to have been situated in the mountainous district of Cuença, near the sources of the River Xucar; and having taken their chief city, he entirely defeated them. He was equally successful in his attack on the Vaccæi, a people inhabiting the country round Salamanca; and having subdued all the nations south of the River Ebro, except the Saguntines, he was prepared to complete his conquests by the reduction of their city.

The attention of the Romans, which had latterly been much occupied with the affairs of the north of Italy, was now drawn towards Spain, and they became alarmed at the proceedings of Hannibal. An embassy from Saguntum roused them to active measures, and deputies were hurried off to remonstrate with Hannibal for his interference, contrary to treaty, with an ally of the Roman people. Polybius enters into a discussion whether we ought to consider this attack on Saguntum as the real cause of the second Punic War, and wisely, we think, decides that it was merely the pretext. We must go farther back, and search more deeply, to discover the real motives which induced the Carthaginians to support Hannibal in his attack on Rome. It was the unfair advantage that had been taken to wrest from them Sardinia, that had made an indelible impression on the minds of the Carthaginians; and the Barcine faction, which was now headed by Hannibal, used all its influence to keep alive the national feeling of hatred to Rome. There was indeed a party for peace, headed by Hanno, but their feeble voice was drowned amidst the din of warlike preparations. Hannibal was already busily engaged in the siege of Saguntum, a city situated on the east of Spain, about one mile from the sea, and the ruins of which are still to be seen near Murviedro (*Muri Veteres*), when the Roman deputies made their appearance, and demanded an audience. This was refused by Hannibal, under pretence that he could not guarantee their personal safety in the midst of so many barbarous nations; and the deputies found themselves obliged to continue their journey to Carthage. Here they were not more successful, and immediately returned to Rome to hasten the preparations for war. Meanwhile Hannibal continued the siege of Saguntum, which was defended with all the obstinacy for which the Spaniards have ever been distinguished; but it was at last taken, after a brave resistance of eight months, and delivered over to all the horrors of pillage. Thus the way was cleared for an attack on Italy; and though the Romans had evidently never imagined it possible that such a daring measure would for a moment be entertained, it is quite clear that Hannibal, from the first day of his command, had resolved to put it into execution without delay. The Romans intended that Spain should be the scene of action; but Hannibal boldly determined to attack them in the very centre of their power, on the plains of Italy.

Hannibal spent the winter of 219 B.C. in preparations for his gigantic undertaking, and omitted nothing which he thought likely to forward his object. He allowed many of his soldiers to visit their homes, as it might be their last opportunity; he drew up instructions for the use of his brother Hasdrubal, who he intended should govern Spain in his absence; and prudently secured the maintenance of peace in both Africa and Spain, by an exchange of the troops of the two countries. Neither did he neglect to make himself acquainted with the feelings of the people through whose territory he must pass in his way to Italy, and sent secretly to Cisalpine Gaul to secure the co-operation of the disaffected tribes as soon as he should make his appearance amongst them. He discovered also that the passage across the Alps was practicable, though it might be attended with great difficulty.

Having thus made his preparations, Hannibal began his march from Carthago Nova, now Carthagena, in the beginning of spring 218 B.C., with an army of 90,000 foot and 12,000 horse. As the River Ebro had been made by treaty the boundary between the Roman and Carthaginian portion of Spain, he found all the tribes at the foot of the Pyrenees ready to dispute his passage, and he did not reduce them without a considerable diminution of his forces. He found, besides, many of his Spanish soldiers frightened at the dangers which lay before them, and, making a virtue of necessity, he sent a considerable portion of them back. The troops that passed the Pyrenees were thus reduced to 50,000 foot and 9000 horse; but they were mostly men whose bodies were inured to hardships by a long course of war. Hannibal had reached the banks of the Rhone before the Romans were aware that he had moved from Carthagena; and Publius Scipio, who had been dispatched with sixty ships towards Spain, was much surprised to find, on reaching the mouths of the Rhone, that Hannibal was in that neighbourhood. He landed his troops, and prepared to attack Hannibal; but the energy of that general had anticipated his intention, and the first slopes of the Alps were already ascended before Scipio moved from his position. The road which Hannibal pursued across the Alps is a much disputed point, but this is not the place to enter at any length into such a subject. We feel more confidence in the statements of Polybius—who tells us (iii. 48) that he had examined the passages of the Alps with great care—than in those of Livy, who, though admirable for the beauty of his style, has no pretensions to geographical accuracy. Yet, even from Polybius, all that we can gather with certainty is, that Hannibal passed the Alps to the north of the River Isara (Isère), and descended into the Insubrian territory in Italy. It was therefore across the Alpes Graiæ (Little St Bernard) that he passed, and not the Alpes Cottiæ (Mount Genevre), as Livy, and Strabo (iv. 209) evidently think. But be this as it may, Hannibal succeeded in crossing the Alps in fifteen days, though not without great difficulty, and the loss of many of his troops. He found, on examination, that he had not more than 20,000 infantry and 6000 cavalry. The whole journey from Carthago Nova had occupied five months.

Scipio had no sooner convinced himself that Hannibal was serious in his intention of crossing into Italy than he hurried back with part of his troops, and, to the astonishment of Hannibal, was ready on the banks of the Po to oppose his progress. It was necessary for Hannibal that a conflict should immediately take place, to confirm the wavering minds of the Gauls; and the battle fought on the banks of the River Ticinus, in which he defeated Scipio, and compelled him to retire beyond the Po, was the signal for a general rising. Hannibal pursued Scipio across the river, and found that he had taken up his position on the banks of the River Trebia, near to Placentia (Piacenza). Scipio now saw that his true policy was to weary out Hannibal, and to give him no opportunity of attacking; but the Roman general was wounded, and could take no active part in the proceedings. His colleague, Tiberius Sempronius, elated by some partial success, ventured beyond the intrenchments, and the result was the speedy and complete defeat of the Romans. Placentia soon afterwards fell into his hands; and thus, within a couple of months, the whole of the north of Italy was at his disposal. The Romans heard this intelligence with great dismay, but took active measures to maintain the contest. The two consuls now took a position where they could watch the proceedings of Hannibal, who would naturally advance to the south as soon as the rigour of the winter months had abated. Accordingly, in the beginning of spring, 217 B.C., Hannibal crossed the Apennines into Etruria, by a road, the position of which has been as much disputed as that by which he passed the Alps. We are satisfied with Vaudoncourt, who has minutely examined this point, that he crossed the Apennines by the road which leads from Parma to Pontremoli and Sarzana; and that the marshes, where Hannibal had nearly lost his life, are those now called Paludi di Fuccechio, a little above the place where the Arno falls into the sea.

Hannibal found the consul Flaminius posted at Arretium, a city situated on the slopes of the Apennines, and ready to dispute his advance. He laid waste the country on every side, and drew Flaminius into an ambuscade which he had laid for him on the banks of the Thrasymene Lake, where the consul fell, and his whole army was defeated. The road to Rome was now open to him; and it has often been matter of surprise that he did not march directly upon the city, and by one bold stroke put an end to the war. We have no means of knowing the reasons which deterred him from this obvious proceeding; but he turned to the east, at the city of Spoletium (Spoleto), and proceeding through Umbria and Picenum, where he seems to have met with no resistance, he entered the rich province of Apulia, where he wintered. The following year, 216 B.C., he found himself opposed by the cautious policy of Fabius; and though Hannibal used every means to provoke the Roman general to action, his temper and prudence were proof against every attack. Towards the end of the year, however, Hannibal again asserted his superiority; and the battle of Cannæ, fought at a small village of Apulia, on the banks of the Aufidus, on the 2d of August, was as celebrated a defeat as the Romans had ever sustained. Fortune now again seemed to point the way to Rome; and it seems impossible not to feel convinced that Hannibal committed an unpardonable blunder in not attacking the city itself. He wintered at Capua, and the enervating luxury of that district is said to have entirely changed the character of his soldiers. The progress of Hannibal was by no means so rapid as might have been anticipated from his victories. Many of the cities of Campania made a successful resistance; and the obstinacy with which they maintained their alliance with the Romans proves that the sway of that people must have been by no means burdensome. It appears to us that the failure of Hannibal was chiefly owing to the small number of his troops, which did not enable him to garrison the cities which he took, or to station bodies of men in various parts of the country to repress insurrectionary movements. Nor do the Carthaginians seem to have entered into the contest with that spirit which the greatness of the prize might have fully justified. Had the number of his men enabled him to follow up his victories by active measures, there can be no doubt that Rome must have fallen into his hands.

The next year produced no action of any importance on either side, though Hannibal gradually lost ground. He pressed earnestly for reinforcements; and his brother Hasdrubal crossed the Alps with a considerable body of troops, 207 B.C., which might again have changed the aspect of affairs. Fortune, however, had deserted him; for Hasdrubal fell in an engagement on the banks of the River Metaurus, and his army was entirely defeated. Hannibal was now left to his own resources, and he was obliged to confine himself to defensive measures. Meanwhile Scipio had commenced his career of conquest in Spain, and had subdued the whole country as far as Gades. He crossed into Africa, and, assisted by Masinissa, attacked the Carthaginians in their own territory. Hannibal was thus obliged to return to the defence of his country, 203 B.C., after he had maintained his footing in Italy for sixteen years. The battle of Zama, fought in Africa, 202 B.C., in which Hannibal was completely defeated, left nothing for the Carthaginians but humble submission to the conqueror. Peace was granted, though on hard conditions; and Hannibal now took an active part in the domestic arrangements of his country. He attempted to reform the numberless abuses which had crept into the constitution; but he at the same time excited the enmity of the great body of the aristocracy, who were ready to seize the first opportunity of banishing him. They accused him to the Romans of keeping up an active communication with Antiochus, king of Syria, then supposed to be preparing war against them; and when the Romans sent three commissioners to take cognizance of the affair, Hannibal did not choose to await the result, but fled towards the east, and reached Tyre in safety. Here he stayed a few days, and was received with much honour; whilst at Carthage his property was confiscated, and his house razed to the ground. He then proceeded to Ephesus, where he was kindly welcomed by the king, and consulted as to the best mode of attacking the Romans. With Antiochus he remained several years, though his advice was by no means always listened to. At last, when Antiochus was defeated, 190 B.C., the king was unable any longer to protect him from the vengeance of his enemies. He therefore fled first to Crete, and afterwards to Prusias, king of Bithynia, where he resided several years, and assisted him in his war against Eumenes, king of Pergamus, the ally of the Romans. Here, too, the vengeance of his enemies reached him. Ambassadors from Rome demanded that he should be given up;

and as Prusias was ungenerous enough to accede to the demand, Hannibal resolved to free himself from all further persecution, and swallowed poison, which he always carried with him. In what year he died is a point in which the ancients do not agree. According to Atticus (apud Nep. Hannib., c. 13), and Valerias Antias (apud Liv. xxxix. 56), and Cassiodorus, it was 183 B.C., the same year in which Philopœmen and the elder Scipio died. Polybius, however, makes it 182, and Sulpicius 181 B.C. Thus died the most celebrated of the Carthaginians, the only man who could have saved his country from ruin, and restored it to its ancient glory.

HANNO, a Carthaginian, celebrated for a voyage of discovery along the western coast of Africa; but at what period it was made is not known with any degree of certainty. The different writers who have examined the point have fixed him at various periods between 1000 and 300 B.C.; but we are inclined to agree with Rennel, who thinks he must have lived about 570 B.C. The principal object of this expedition is set forth in the journal, which begins with these words:—"It was decreed by the Carthaginians that Hanno should undertake a voyage beyond the Pillars of Hercules, and found Libyphœnician cities. He accordingly sailed with sixty ships, of fifty oars each, and a body of men and women to the number of 30,000, and provisions and other necessaries." It is much to be regretted that this curious remnant of antiquity should have been exceedingly brief, and that it should not have come down to us in its original form, for it is evidently a mere abstract of a larger work. Some, indeed, have endeavoured to strip it of all pretensions to credit, and to rank it with the Arabian tales; but though some of the stories may have the appearance of fable, such as *fiery torrents* and *women covered with hair*, the facts, which are susceptible of verification, either by the test of geography or a comparison with the descriptions of travellers, are of too consistent a nature to allow us to doubt that the voyage was really undertaken. It would appear that the first city was founded at no great distance from the Strait of Gibraltar, the rest to the north of Cape Bojador. This voyage extended a little to the south of Sierra Leone; but we must refer the reader to the writers who have examined the subject for a detailed account of his geographical statements. The title of the Periplus is, *An Account of the Voyage of Hanno, Commander of the Carthaginians, round the parts of Libya beyond the Pillars of Hercules, which he deposited in the Temple of Saturn.* It has been published by Hudson (*Geogr. Min.*, vol. i.), and Falconer (Oxford, 1797), with an English translation and explanations; also by Kluge, *Hannonis Navigatio, textum critice recogn. et adnotat. illustravit*, Leip. 1829. The following authors have also published commentaries on the voyage, viz., Bochart, Campomanes, Dodwell, Bougainville, Gosselin, Heeren, and Rennell.

HANNO, a senator of Carthage, who headed the party opposed to the warlike policy of the Barcine faction. He was first appointed to the command of the troops in the interior of Africa, and was successful in reducing Hecatompylos, with the adjoining country. When the mercenary troops which had been employed in the first Punic War became clamorous for their arrears of pay, and at last ventured to make open war on Carthage, Hanno was appointed to the command of the forces to be employed against them. His talents, however, seem to have been by no means fitted for the field, and affairs assumed such a threatening aspect under his mismanagement, that the Carthaginians began to be alarmed for the very existence of their state. They therefore appointed as his colleague Hamilcar Barcas; but the enmity which existed between the generals completely neutralized the good that might have been derived from their abilities. At last, however, the dangerous position of affairs compelled them to forget their differences, and to unite cordially in resisting their common enemy. (Polyb. i. 73–88.)

He continued during his whole life to be the advocate of peace, in opposition to the ambitious policy of Hannibal; and when that general sent his brother Mago, after the battle of Cannæ, to obtain reinforcements, Hanno exerted all his influence to prevent this request being granted, and even proposed that Hannibal should be given up to the Romans. (Liv. xxi., 3, 9; xxiii., 13.)

HANOVER, a kingdom in Germany, formed out of the duchies which formerly belonged to several families of the junior branch of the house of Brunswick. In the course of the revolutionary war, under the influence of France, the dukedoms of Bavaria, of Saxony, and of Wirtemburg had been raised to the rank of kingdoms; and when the overthrow of Bonaparte was accomplished, the dukedoms which had composed the electorate of Hanover were thought by the allied powers of sufficient consequence to be elevated to the same dignity, as, with the additions then made to them, they were nearly equal in extent and population to the other portions of Germany whose rulers had received that rank. It accordingly assumed that grade in 1814, under George III., and was acknowledged as such by all the powers of Europe.

The obscurity in which antiquity has involved the early history of nations can only be in a slight degree cleared up by tracing the origin of the families that maintained the continued rule over them. The ruling family of Hanover has been traced, by the combined efforts and researches of Muratori and Leibnitz, to an Italian origin, in the dark ages, that is, to the princely house of Este; and by Gibbon, from that house up to the descendants of Charlemagne. A Marquis of Este, in the eleventh century, married Cuniza or Cunegonda, an heiress of a princely family in Bavaria, whose son received the name of Guelph, derived from his maternal ancestors, and inherited their dominions, including the dukedom of Bavaria. The grandson of this Guelph, named Henry the Black, and his son named Henry the Proud, acquired by marriage new and extensive dominions on the banks of the Elbe and the Weser; and Henry the Lion, the most powerful prince of his age, was the first of the race who assumed the title of Duke of Brunswick. Under this Henry, who distinguished himself as a great warrior, an uncle wrested from him the southern portion of his territory in Bavaria and Suabia, and left him, at the conclusion of most bitter hostility, in the possession of the northern portion of it. He made the city of Brunswick the capital of his dominions, and, being in possession of the rich silver mines of the Hartz, was enabled to extend his power over the tribes of Northern Germany, inhabiting Holstein, Mecklenburg, and nearly the whole coast of the Baltic Sea.

Henry the Lion was twice married. By his first wife he left no family; and, although by his second wife, who was Maud, the daughter of Henry II. of England, he had several sons, none of them left any issue except William, and under Otho, the only son of William, took place the partition of the house—Brunswick and Luneburg being divided into two dukedoms. The latter branch received the Hanoverian portion as a fief from William Sigefred, bishop of Hildesheim. After the death of Otho, and of his two sons Otho and William, who successively followed, the male line became extinct in 1369. Otho, elector of Saxony, who had married a daughter of William, was, by the influence of the emperor of Germany, Charles IV., invested with the government. He died without issue, having by his testament bequeathed the dukedom to his uncle Wenceslaus, elector of Saxony—a bequest which was contested by Torquatus Magnus, duke of Saxony, but at length was terminated in a compromise, by which Bernard, the eldest son of Torquatus, obtained the dominion, and reigned until 1434. After several successions, the power became vested in

Ernest of Zell, who first introduced the Lutheran religion into his states, and died in the year 1546. The succession since has been,—William, who died in 1592; Ernest, in 1611; Christian, in 1633; August, in 1636; Friedrich, in 1648; Ernest Augustus, bishop of Osnaburg, who was made an elector of the German empire in 1692, and died in 1698; George Louis, who, after the death of his uncle George William, inherited the dukedom of Zell in 1705, and succeeded to the crown of Great Britain by the title of George I. in 1714. He died in 1727, since which period the succession continued the same as in that kingdom, until the death of William IV. in the year 1837, when, by the salique law, the crown descended to the Duke of Cumberland.

The accession of the electors of Hanover to the throne of Great Britain, though it led ultimately to a great extension of territory, did, on the other hand, subject the electorate to sufferings and oppression during the wars between Great Britain and France. At the commencement of the Seven Years' War, a French army invaded it; and the forces under the Duke of Cumberland, being unequal to its defence, were compelled, by the convention of Kloster-Severn, to abandon the country to the invaders. By the peace of 1763 it was again restored to its ancient sovereign. At the renewal of hostilities after the treaty of Amiens, Hanover was once more seized upon by the French, and by them delivered over to the king of Prussia, who ruled it till after his defeat at Jena. It was then incorporated as part of the kingdom of Westphalia, erected in favour of Jerome Bonaparte. This rule was terminated by the battle of Leipsic, by which Hanover, with the rest of Germany, was delivered from French domination, and returned to its ancient sovereigns, with the addition of the provinces of Hildesheim, Osnaburg, East Friesland, Goslar, and some other territories. On the other hand, Hanover gave up the ancient duchy of Lauenburg, which was transferred to Denmark, and some portions or bailiwicks,—a part to Prussia, and a part to the Duke of Oldenburg.

The kingdom of Hanover lies between N. Lat. 51. 18. and 53. 52., and E. Long. 6. 43. and 11. 45.; and is bounded on the N. by the German Ocean, N.E. by the Elbe, which separates it from Denmark, Hamburg, and Mecklenburg, E. and S.E. by Prussia and Brunswick, S.W. by Hesse-Cassel and Prussia, and W. by Holland. The boundaries include the duchy of Oldenburg, which almost completely separates Hanover into two large portions, the connection being maintained by a narrow stripe of land, not more than 6 miles in width, S. of the duchy. A small portion in the S. is separated from Hanover proper by the interjection of part of Brunswick. The entire area amounts to about 9,464,446 acres, or 14,788 square miles, as follows:—

Provinces.	Extent in English Acres.	Population in Dec. 1852.	Number of Dwelling-houses.
Hanover	1,483,698	349,958	48,445
Hildesheim	1,102,089	367,883	52,042
Lüneburg............	2,769,562	338,764	43,835
Stade	1,674,368	279,834	44,031
Osnabruck	1,540,649	261,965	41,027
Aurich	737,968	185,129	30,024
Clausthal	156,112	35,720	3,392
	9,464,446	1,819,253	262,796

The chief cities are Hanover, Hildesheim, Lüneburg, Emden, Osnabruck, Göttingen, Zell, Clausthal, and Goslar.

The province of Hildesheim is somewhat mountainous, and that of Clausthal, containing the Harz, is wholly so, as well as some parts near Göttingen. The other provinces form a part of that extensive plain which commences on the shores of the German Ocean, and terminates on the frontiers of Russia. The whole plain is a sandy soil, resting on a bed of granite, and is generally sterile, except on the banks of the various rivers that water it, or near the cities, where cultivation has been improved by artificial means. The most fruitful part of the kingdom is on the banks of the Elbe and near the German Ocean, where, as in Holland, rich meadows are preserved from being immersed in water, by broad dykes and deep ditches, constructed and kept in repair at great expense.

The most remarkable mountains are those of the Harz Forest, three-fifths of which are in this kingdom, and two-fifths in the duchy of Brunswick. These mountains are not a part of any chain, but rise from a plain in an isolated group, the highest points of which are nearly in the centre. (See Harz Mountains.) They are covered with extensive forests. On their lower sides the trees are of the deciduous kinds, but the summits are exclusively covered with pines. These mountains abound with minerals of almost every kind, and the principal employment of the inhabitants consists either in mining, or in manufacturing the iron and copper into domestic utensils. Some of the mining and manufacturing towns, as Clausthal, Andreasberg, Cellerfeld, and several others, are from 1700 to 1900 feet above the level of the sea; and their population would suffer most severely from the cold of the severe winters, but for the abundance both of wood and fossil coal with which they are supplied.

The whole of the kingdom of Hanover dips towards the north, and the courses of all the rivers are in that direction. These are, *first*, the Elbe, which borders a large part of the dominion, and receives into it the Ohre, which rises in the province of Lüneburg; the Aland and the Jeetze, which come out of Prussia, and are navigable before they terminate in the Elbe; the Ilmenau, which becomes navigable at Lüneburg; the Este, which is navigable to Buxtehude; the Lühe, navigable to Hornburg; the Schwinge, by which vessels reach Stade; the Oste, which passes Harburg, and is navigable to Kirchosters; and the Medem, which runs through the Hadeln-land, and admits large vessels as high as Otterndorf. *Second*, the Weser, which enters the dominions of Hanover at Münden, being there formed by the junction of the Fulda and the Werra. It is navigable for barges from the spot at which its name commences; and it receives, in its course, the Hamel, the Aller, the Oertze, the Leine, the Böhme, the Eyther, the Wümme, which in the lower part of its course takes the name of Lesum, the Geeste, and the Hunte; all of which are Hanoverian rivers, and continue their united courses till they are lost in the German Ocean near Bremen. *Third*, the Ems, a river rising in the Prussian province of Westphalia. After entering Hanover, it receives the waters of the Aa, the Hase, the Else, and the Leda. Before reaching the sea, it falls into the Dollart near Emden, which is the principal seaport in the kingdom. It is navigable for flat-bottomed vessels from Rheina downwards, and for sea-going ships from Halte and Weener. About 1,200,000 thalers (L.180,000 sterling) have been expended in improving the navigation, and it has become in consequence a very important channel for the inland trade of the country. *Fourth*, the Vecht, a river of short course, rising in the Prussian province of Westphalia, and terminating in the Zuyder Zee. Its principal importance is derived from a navigable canal, which commences at the city of Münster, and is the channel of some trade through the Vecht to Amsterdam.

Though Hanover is generally a sandy soil, it has some small fresh-water lakes. The Dummersee, in Diepholtz, is about 12 miles in circuit. The Steinhudermeer, in the province of Kalenburg, is about 4 miles long and 2 broad; and the Dollart, at the mouth of the Ems, which is rather an estuary than a lake, is 12 miles across. The canals are all of short course. The Aurich Canal, between Aurich and Emden, is 15 miles long; the Bremen

Canal, between the Oste and the Schwinge, serves both for draining and for transport; the Papenburg Canal, between Papenburg and the Ems, is unimportant.

The climate varies considerably with the nature of the country. In the low-lying districts near the coast it is moist and foggy, but the winters are not so severe as in the interior. Hurricanes are not unfrequent on the sea-coast during winter. In spring the prevailing winds are the N.E. and E., in summer the S.W. The mean annual temperature of the kingdom is about 46° Fahr.; at Lüneburg it is 48°; at Göttingen, 46°; but in the Harz district, only 43°. The average annual fall of rain is about 23·5 inches, but it varies greatly in different parts of the kingdom.

Though agriculture constitutes the most important branch of industry in the kingdom, it is still in a very backward state. The greater part of the soil is indeed of very inferior quality; but much that is susceptible of cultivation is still lying waste. The farms are generally very small, nearly one-half of them being under seven acres; while about three-fifths of the land is in the hands of small proprietors, comparatively few of whom possess the capital necessary for adequate cultivation. The best cultivated lands are those belonging to the crown, or nobility; and here considerable advances have recently been made. The best agriculture is to be found in the districts of Hildesheim, Kalenberg, Göttingen, Grabenhagen, on the banks of the Weser and Elbe, and in East Friesland and Bremen. In the hill country the three-field system prevails; but the low marsh lands have a system peculiar to themselves. The usual rotation is, first a fallow, on which the land is cultivated for potatoes, peas, or flax; then follows winter corn, either rye or wheat, but generally the former; and to these succeeds summer corn, either barley or oats. Of the entire area of the country about 28·98 per cent. is arable, 1·76 in gardens and orchards, 16·92 in meadow or pasture land, 13·88 in forests, 34·75 in heath, moor, &c., and 3·71 in roads, rivers, buildings, &c. Barley and oats are largely cultivated and exported in considerable quantities to England. Wheat is grown on the richer soils, but the quantity raised is not equal to the demand. Potatoes are universally cultivated, and constitute the chief food of the poorer classes. Rye is generally grown for bread. Flax, for which much of the soil is admirably adapted, is extensively cultivated, and forms an important article of export, chiefly, however, in the form of yarn. Hemp, tobacco, turnips, and hops are also among its products.

The rearing of cattle is extensively carried on. The number of horned cattle in Hanover is estimated at about 950,000, of horses at 300,000, and of sheep at 1,650,000. East Friesland is especially noted for its breeds of cattle and horses. Bees are reared very extensively in the heaths of Lüneburg. Large flocks of geese are kept in the moist situations; their flesh is salted for winter domestic consumption, and their feathers are preserved for sale.

Manufacturing industry prevails less in Hanover than in the other states of Germany. Linen yarn and cloth are the principal branches. Woollen cloths are made to a considerable extent in the southern part of the kingdom, and this branch of trade has lately been increasing. In the west, stockings and gloves are made. Cotton-spinning has also increased, but is still insignificant; and the same may be said of silk. Potteries, tile works, and tobacco-pipe works are numerous. There are nine glass-houses, and fifty-two paper-mills which produce yearly about 20,000 balls of paper. Wax is bleached to a considerable amount, and there are numerous tobacco factories, tanneries, breweries, vinegar works, and brandy distilleries, the produce of which last has of late very much increased. East Friesland produces gin. The most thriving branch of industry, however, is that of metal wares. The whole population of the Harz lives by the mining and forging of metals, excavating coal, and manufacturing wooden articles. Foundries and forges, and works of iron, copper, brass, wire, silver and lead, vitriol and sulphur, are in the utmost activity. These mines and associated works support about 35,000 persons. About 20,000 workmen were very recently employed in the Harz, and the yearly value of the produce was 5,000,000 thalers (L.750,000 sterling).

The latest returns give the following quantities for one year, for Hanover and Brunswick together:—Gold, 82 oz.; silver, 375,833 oz.; iron, 377,812 cwt.; copper, 540; vitriol, 5400; quicksilver, 540; coal, 2,160,000; salt, 842,000.

As may be supposed from the small quantity of surplus production, the trade of Hanover is not extensive. The principal port, Emden, has some export and import trade; but from the state of the roads between that place and the more populous parts of the kingdom, more of its trade passes through Hamburg and Bremen than through that city. Besides the more considerable articles made from flax, its honey, wax, feathers, and large quantities of timber, are sent to Hamburg and Bremen. Wool, horses, and cattle, wheat and other grain, butter and cheese, tobacco, and mineral productions, are among the chief exports. Hops, rape-seed, oil-cake, fruit, hams, and sausages, form also articles of export of small amount. The imports consist pincipally of English manufactures, colonial produce, fruits, wines, jewellery, and silks. As the roads to the great fairs of Leipsic and Frankfort pass through Hanover, the transit of goods for these used to create a pretty large commission trade, and give employment to many waggons, horses, and men, as well as to the barge owners. These, however, are now in some degree superseded by railways, the city of Hanover having become a central station, from which these diverge in different directions to Hamburg, Brunswick, Hildesheim, Bremen, and Minden. Hanover has joined the *Zollverein* or General Customs Union from 1st January 1854.

Hanover is a hereditary monarchy in the house of Guelph, with a salique law, which prevents the throne being filled by a female. In case the present branch becomes extinct, the heir of the duchy of Brunswick will succeed. In the several provinces that formerly composed the electorate, the provincial states were vested with functions much the same as those of the old States-General of France, and the central government communicated with these states separately. In 1814, when the territory was augmented, the same arrangement was extended to the newly acquired province. Various efforts were subsequently made to form a general constitutional government for the whole territory of the kingdom, resulting in what has been called the Constitution of 1819. Under this constitution the provincial states continued to subsist in their original forms, superintending the affairs of their several provinces; but there was superadded a States-General, divided into chambers—the first consisting of three princes, three counts, two Catholic bishops, three Protestant abbots, thirty-five deputies of the *Ritterschaft*, or higher landed gentry, the presidents of the board of taxes, and others; the second, of the deputies of the towns, universities, smaller landed proprietors, &c. This continued, with some alterations, till 1833, when it was superseded by a reformed constitution granted by King William I. At his decease, however, in 1837, this constitution was repudiated by his successor, King Ernest, who called an assembly of the States, as under the constitution of 1819. Under the pressure of the great movement of 1848, the Ritterschaft resigned their most important privileges, and were replaced in the upper chamber by the great funded proprietors; but under the subsequent re-action, the concessions then made by the crown have been partly recalled, and the constitutional question remains still undetermined. In 1851, the Federal Diet invited all the German governments to modify such of their fundamental laws as might seem calculated to foster revolutionary notions; and the government of Hanover has shown itself quite ready to follow out the spirit of the invitation. The Ritterschaft have been constantly endeavouring to recover their privileges, and have made applications for this purpose to the Federal Diet, which, in March 1855, resolved that, as the constitutional arrangements in the kingdom of Hanover were in many respects contrary to the fundamental federal laws, the Hanoverian government should be invited to bring its institutions into harmony with the federal system; and in case of obstacles arising to the required modifications, the Diet reserved to itself the power of interfering according to law. On 16th May 1855, the king issued an ordonnance in conformity with this resolution, making several modifications of the constitution, but reserving the power of carrying the order of the Diet more fully into effect. In December 1855 he abolished the right of trial by jury for political offences.

The sovereigns of Hanover were, like most others in Germany, the largest landed proprietors in their dominions. Their lands, however, royalties, and other branches of crown revenue, have been given up by the crown, and now form a branch of the general revenue of the kingdom. The budget for the year 1855–6 stood thus:—

RECEIPTS—From the Royal domains	L.247,592
... ... Imposts	767,280
... ... Forest and mines of the Upper Harz	7,239
... ... Lower Harz	6,598
... ... Coal-mines	6,515
... ... Salt-works	2,900
... ... Limestone of Lüneburg	2,895
... ... Tolls	48,299
... ... Posts	25,557
... ... Railways	133,208
... ... Tolls and pontage of the Board of Roads	30,116
... ... Lotteries	7,963
... ... Interest of active capital	17,401
... ... Other miscellaneous receipts	5,374
Total receipts	L.1,308,937
Total estimated expenditure	1,247,046
Surplus	L.61,891
Public debt at 16th January 1855	L.2,324,331
Railway debt	3,616,813
Total debt	L.5,941,144

Interest on debt...L.148,817, 13s. 2d.

The military establishment, consisting of the usual proportions of infantry, cavalry, artillery, and engineers, amounted altogether to 24,107 men.

The prevailing faith is Lutheran; the Lutherans in 1852 numbering 1,494,033 adherents. The Calvinists amounted to 95,220, chiefly in the provinces of Aurich and Osnabrück. The Roman Catholics are chiefly confined to the provinces of Osnabrück and Hildesheim, and amounted to 217,367. The Jews numbered 11,562, and other sects 1071. Education receives a considerable amount of attention, and is placed under a special board of direction. First among its educational institutions is the university of Göttingen, which is usually attended by about 700 students. (See GÖTTINGEN.) The other institutions are similar to those in the continental countries where education is best conducted, including primary and secondary schools, gymnasia, industrial, normal, and grammar schools. The scholars attending the various schools amount to about 220,000. There are also several medical, midwifery, and veterinary schools, and a school of mines and forestry at Clausthal. The charitable institutions are numerous.

HANOVER, the capital of the kingdom of the same name, is built on an extensive sandy plain on the Leine, which here receives the Ihme, and is from this point navigable to the Weser. The river flows through the town, dividing it into two parts, between which communication is maintained by several bridges. The old town, on the right bank of the river, is very irregularly built, and the streets are narrow, crooked, and dirty. The new town, on the opposite side of the river, is much superior in appearance, and contains several handsome streets. The walls surrounding the town, having become useless as a means of defence, were, in 1780, partly levelled and laid out in streets, and the remainder converted into a handsome esplanade. Outside the town are two suburbs, the Linden and the Gartengemeinde. The most interesting of the public buildings are the royal palace, with opera-house attached; the viceroy's palace; the house of assembly of the states; mint; arsenal; royal stables, with the famous breed of Hanoverian horses; the new theatre, built in 1851 of Italian architecture; and the town-hall and record office, containing a library of about 40,000 volumes, besides a valuable collection of MSS., chiefly given by Leibnitz. The Waterloo column, 162 feet high, surmounted by a figure of Victory, was erected in memory of the Hanoverians who fell at the battle of Waterloo. An open rotunda inclosing a marble bust has been erected in memory of Leibnitz. There are four Lutheran, one Roman Catholic, and three Calvinistic churches, and a Jewish synagogue. The educational institutions comprise the Georgianum (a college for educating sons of the nobility), a lyceum, a normal, a trade, and numerous elementary schools. Among the charitable institutions are an orphan asylum, blind asylum, almshouse, and several hospitals. The inhabitants derive their chief support from the presence of the court and nobility. Some manufactures are carried on, but chiefly on a small scale. The transit trade, however, is considerable—the town being connected by railway with Hamburg, Bremen, and Brunswick. In the vicinity are the royal palaces of Mont Brilliant, the summer residence of the present king, and Herrenhausen, with their famous gardens. Pop. (1852), including suburbs, 49,909.

HANOVER, a village of Grafton county, state of New Hampshire, North America. It stands on an elevated plain about half a mile E. of Connecticut River, and 55 miles N.W. of Concord. In connection with Dartmouth College, founded here in 1769, there is a flourishing medical school instituted in 1797. Among the eminent men who have been educated at Dartmouth College may be mentioned the late Daniel Webster. Pop. 2352.

HANSEATIC LEAGUE, the name given to an association, formed in the twelfth and thirteenth centuries, of the principal cities in the N. of Germany, Prussia, Poland, &c., for the better carrying on of commerce, and for their mutual safety and defence; and which contributed, in no ordinary degree, to introduce civilization and good government into the north.

Hamburg, founded by Charlemagne in the ninth century, and Lübeck, founded about the middle of the twelfth (1140), were the earliest members of the League. They early formed an intimate political union, partly with the view of maintaining a safe intercourse by land with each other, and partly for the protection of navigation from the pirates, with which every sea was at that time infested. There is no very distinct evidence as to the period when this alliance was consummated; some ascribe its origin to the year 1169, others to 1200, and others say 1241. But the most probable opinion seems to be, that it grew up by slow degrees, and was perfected according as the advantages derivable from it became more obvious. Such was the origin of the

Hanseatic League.

Hanseatic League, so called from the old Teutonic word *hansa*, signifying an association or confederacy.

From the beginning of the twelfth century, the progress of commerce and navigation in the north was exceedingly rapid. The countries which stretch along the Baltic from Holstein to Russia, and which had been occupied by barbarous tribes of Slavonic origin, were then subjugated by the kings of Denmark, the dukes of Saxony, and other princes. The greater part of the inhabitants being exterminated, their place was filled by German colonists, who founded the towns of Stralsund, Rostock, Wismar, &c. Prussia and Poland were afterwards subjugated by the Christian princes and the knights of the Teutonic order. So that, in a comparatively short period, the foundations of civilization and the arts were laid in countries whose barbarism had ever remained impervious to the Roman power.

The cities that were established along the coast of the Baltic, and even in the interior of the countries bordering upon it, eagerly joined the Hanseatic confederation; and previously to the end of the thirteenth century it embraced every considerable city in all those vast countries extending from Livonia to Holland, and was a match for the most powerful monarchs.

The Hanseatic confederacy was at its highest degree of power and splendour during the fourteenth and fifteenth centuries. It then comprised from 60 to 80 cities, which were distributed into four classes or circles. Lübeck was at the head of the first circle, Cologne of the second, Brunswick of the third, and Dantzic at the head of the fourth. The supreme authority of the League was vested in the deputies of the different towns assembled in congress. In it they discussed all their measures; decided upon the sum that each city should contribute to the common fund; and determined all questions relative to their common interests. The meeting of congress was most frequently held at Lübeck, which was considered as the capital of the League; but sometimes congresses were held at Hamburg, Cologne, and other towns. They met once every three years, or oftener if occasion required. Any one might be chosen for a deputy; and besides merchants, the congress comprised clergymen, lawyers, artists, &c. When the deliberations were concluded, the decrees were formally communicated to the magistrates of the cities at the head of each circle, by whom they were communicated to those below them; and the most vigorous measures were adopted for carrying them into effect. One of the burgomasters of Lübeck presided at the meetings of congress; and during the recess the magistrates of that city had the sole, or at all events the principal, direction of the affairs of the League.

Besides the towns already mentioned, there were others that were denominated confederated cities or allies. The latter neither contributed to the common fund of the League, nor sent deputies to congress. Even its members were not all on the same footing in respect to privileges—an arrangement that was a fruitful source of internal commotions.

As the power of the confederated cities increased, they began to aspire to the monopoly of the trade of the north, and to exercise the same dominion over the Baltic that the Venetians exercised over the Adriatic. For this purpose they succeeded in obtaining, partly in return for loans of money, and partly by force, various privileges and immunities from the northern sovereigns, which secured to them almost the whole foreign commerce of Scandinavia, Denmark, Prussia, Poland, Russia, &c. They repressed piracy by sea and robbery by land; introduced among the inhabitants conveniences and enjoyments unknown to their ancestors, and inspired them with a taste for literature and science; they did for the people round the Baltic what the Phœnicians had done in remoter ages for those around the Mediterranean, and deserve, equally with them, to be placed in the first rank among the benefactors of mankind.

Hanseatic League.

The kings of Denmark, Sweden, and Norway, were frequently engaged in hostilities with the Hanse towns; but their efforts to abolish the privileges the League had acquired in these countries served, for more than two centuries, only to augment and extend its influence.

"The astonishing prosperity of the confederated cities was not wholly the effect of commerce. To the undisciplined armies of the princes of the north, the cities opposed, besides the inferior nobles, whose services they liberally rewarded, citizens accustomed to danger, and resolved to defend their liberties and property. It was chiefly, however, on their marine forces that the cities depended. They employed their ships indifferently in war or commerce, so that their naval armaments were fitted out at comparatively small expense."[1]

The extirpation of piracy was one of the objects which had originally led to the formation of the League. Owing, however, to the barbarism then so universally prevalent, and the countenance openly given by many princes and nobles to those engaged in this infamous profession, it was not possible wholly to root it out. But the vigorous efforts of the League to abate the nuisance served to render the navigation of the North Sea and the Baltic comparatively secure, and were of signal advantage to commerce. Their exertions also to protect shipwrecked mariners from the atrocities to which they had been subject, and to procure the restitution of shipwrecked property to its legitimate owners, were in no ordinary degree meritorious; and contributed not less to the advancement of civilization than to the security of navigation.

To facilitate and extend their commercial transactions, the League established various factories in foreign countries; the principal of which were at Novogorod, London, Bruges, and Bergen.

Novogorod, situated at the confluence of the Volkof with the Imler Lake, was for a long period the most renowned emporium in the north-eastern parts of Europe. During the twelfth, thirteenth, and fourteenth centuries, it formed the *entrepôt* between the countries to the east of Poland and the Hanseatic cities. Its fairs were frequented by people from all the surrounding countries, as well as by numbers of merchants from the Hanse towns, who engrossed the greater part of its foreign trade, and furnished its markets with the products of distant countries.

But in the latter part of the fifteenth century, Ivan Vassilievitch, czar of Russia, asserted his right to the principality of Novogorod, and supported his pretensions by a formidable army. Having entered the city at the head of his troops, Ivan received from the citizens the charter of their liberties, which they either wanted courage or inclination to defend. But notwithstanding the despotism to which Novogorod was subject during the reigns of Ivan and his successors, it continued for a considerable period to be the largest, as well as most commercial, city in the Russian empire.

But the scourge of the destroyer soon after fell on this celebrated city. Ivan IV., having discovered, in 1570, a correspondence between some of the principal citizens and the king of Poland relative to a surrender of the city into his hands, took the most inhuman revenge. The crime of a few citizens was made a pretext for the massacre of 25,000 or 30,000. Though it never recovered from this blow, Novogorod continued to be a place of considerable trade until the foundation of Petersburg, which immediately became the seat of the commerce of which it had previously been the centre.

The merchants of the Hanse towns, or Hansards, as they were then commonly termed, were established in London at a very early period, and their factory was of considerable magnitude and importance. They enjoyed various privileges and immunities; they were permitted to govern themselves by their own laws and regulations; the custody of one of the gates of the city (Bishopsgate) was committed to their care; and the duties on various sorts of imported commodities were considerably reduced in their favour. These privileges naturally excited the ill-will and animosity of the English merchants; and the Hansards were every now and then accused of acting with bad faith, and obstructing the commerce of the English in the Baltic. The Hansards were in consequence exposed to many indignities; and their factory, which was situated in Thames Street, was not unfrequently attacked. The League exerted themselves vigorously in defence of their privileges; and having declared war against England, they succeeded in excluding our vessels from the Baltic, and acted with such energy, that Edward IV. was glad to come to an accommodation with them. In the treaty for this purpose, negotiated in 1474, the privileges of the merchants of the Hanse towns were renewed, and the king assigned to them, in absolute property, a large space of ground, with the buildings upon it, in Thames Street, denominated the Steel Yard, whence the Hanse merchants have been commonly denominated the Association of the Steel Yard. The property of their establishments at Boston and Lynn was also secured to them; and the king engaged to allow no stranger to participate in their privileges. One of the articles bore that the Hanse merchants should be no longer subject to the judges of the English Admiralty Court, but that a particular tribunal should be formed for the easy and speedy settlement of all disputes that might arise between them and the English. And it was further agreed that the particular privileges awarded to the Hanse merchants should be published as often as the latter judged proper, in all the seaport towns of England, and that such Englishmen as infringed upon them should be punished. In return for these concessions, the English acquired the liberty of freely trading in the Baltic, and especially in the port of Dantzic and in Prussia. In 1498, all direct commerce with the Netherlands being suspended, the trade fell into the hands of the Hanse merchants, whose commerce was in consequence very greatly extended. But, according as the spirit of commercial enterprise awakened in the nation, and as the benefits resulting from the prosecution of foreign trade came to be better known, the privileges of the Hanse merchants became more and more obnoxious. They were, in consequence, considerably modified in the reigns of Henry VII. and Henry VIII., and were at length wholly abolished in 1597.

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[1] *L'Art de vérifier les Dates*, 3^{me} partie, tom. viii., p. 204.

The different individuals belonging to the factory in London, as well as those belonging to the other factories of the League, lived together at a common table, and were enjoined to observe the strictest celibacy. The direction of the factory in London was intrusted to an alderman, two assessors, and nine councillors. The latter were sent by the cities forming the different classes into which the League was divided. The League endeavoured at all times to promote as much as possible the employment of their own ships. In pursuance of this object, they went so far, in 1447, as to forbid the importation of English merchandise into the confederated cities, except by their own vessels. But a regulation of this sort could not be carried into full effect; and the irritation produced by the occasional attempts to act upon it, contributed materially to the subversion of the privileges which the Hanseatic merchants had acquired amongst us.

The principal factory of the League was at Bruges, which became, at a very early period, one of the first commercial cities of Europe, and the centre of the most extensive trade carried on to the north of Italy. The art of navigation in the thirteenth and fourteenth centuries was so imperfect, that a voyage from Italy to the Baltic and back again could not be performed in a single season; and hence, for the sake of their mutual convenience, the Italian and Hanseatic merchants determined on establishing a depôt or storehouse of their respective products in some intermediate situation. Bruges was fixed upon for this purpose, and, in consequence, speedily rose to the very highest rank among commercial cities. It was at once a staple for English wool; for the woollen and linen manufactures of the Netherlands; for the timber, hemp and flax, pitch and tar, tallow, corn, fish, ashes, &c., of the North; and for the spices and Indian commodities, as well as their domestic manufactures imported by the Italian merchants. The vivifying effects of this commerce were everywhere felt; the regular intercourse opened between the nations in the north and south of Europe made them sensible of their mutual wants, and gave a wonderful stimulus to the spirit of industry. This was particularly the case with regard to the Netherlands.

From the middle of the fifteenth century, the power of the confederacy, though still very formidable, began to decline. This was not owing to any misconduct on the part of its leaders, but to the progress of civilization, the general diffusion of the arts, and the establishment of the authority of government. In addition to these circumstances, the interests of the different cities of the League became daily more and more opposed to each other. Lübeck, Hamburg, Bremen, and the towns in their vicinity, were latterly the only ones that had any interest in its maintenance. When the Zealanders and Hollanders became sufficiently powerful at sea to be able to vindicate their right to the free navigation of the Baltic by force of arms, they immediately seceded from the League; and no sooner had the ships of the Dutch, the English, &c., begun to trade directly with the Polish and Prussian Hanse towns, than these also embraced the first opportunity of withdrawing from it. The fall of this great confederacy was really, therefore, a consequence of the improved state of society, and of the development of the commercial spirit in the different nations of Europe. It was most serviceable so long as those for whom its merchants acted as factors and carriers were too barbarous, too much occupied with other matters, or too destitute of the necessary capital and skill, to act in these capacities for themselves. When they were in a situation to do this, the functions of the Hanseatic merchants ceased as a matter of course; and at the middle of the seventeenth century the cities of Lübeck, Hamburg, and Bremen, were all that continued to acknowledge the authority of the League. They still, indeed, preserve the shadow of its power; being acknowledged in the act for the establishment of the Germanic confederation, done at Vienna in 1815, as free Hanseatic cities. (M'Culloch's *Treatises on Economical Policy*, 8vo. Edin. 1853.)

HANSY, a town of Hindustan, in the British district of Hurreeana, under the jurisdiction of the lieutenant-governor of the north-west provinces, situated on the edge of the canal cut from the River Jumna about the year 1353 by Sultan Feroz Shah, and restored by the British government in 1825. It is a very ancient town, and contains the tomb of a Mohammedan saint called Sheikh Jemmal. It was taken by the Mohammedans early in 1035, and has experienced many revolutions. Towards the end of the eighteenth century it was the capital of the short-lived principality erected by the adventurer George Thomas, which is now incorporated with the British dominions. Pop. of town, 9112; Lat. 29. 6., Long. 76. 3.

HANWAY, Jonas, a social reformer and philanthropist of the last century, was born in 1712 at Portsmouth. He served his apprenticeship to a merchant in Lisbon, and in 1743 became partner in an English firm in St Petersburg. His business led him to travel into Persia, and on his return he published *An Historical Account of the British*

Trade over the Caspian Sea, &c., in 4 vols. 4to—a work of no high literary aims, but of great practical use to the mercantile men of the day. The work had great success; and Hanway, encouraged by the result, continued for the remainder of his life to use his pen, though chiefly for the sake of the many charitable and philanthropic schemes which he either set on foot himself or took a strong interest in. He founded the Marine Society and the Magdalen Charity, both still in existence, and in their respective spheres doing much good; and strenuously promoted the Sunday-schools, then in their infancy. His great services were at length to meet their reward. In 1762 a deputation from leading merchants of London was successful in obtaining for him from government a commissionership of the navy. The name of Hanway often occurs in the social history of these times. He was a handsome man, and knew that he was so; indeed at St Petersburg he used to be called "Le bel Anglais." He took great care of his person, and on one occasion became the talk of the town for carrying about an umbrella with him; and as that curious engine did not come into vogue till about thirty years later, its first supporter had much ridicule and banter to encounter. His whims on the subject of tea are well known. Hanway died September 5, 1785.

HARBOURS

ARE either natural or artificial. Some parts of the British coasts are amply provided with natural bays and creeks, while in other parts the accommodation and shelter for shipping have been entirely supplied by artificial means. Thus, Ireland and the west coast of Scotland are plentifully intersected by excellent deep water bays and anchorages; but on the east and south-west shores of Britain there are but few natural harbours. Cromarty Bay is 200 miles distant from the Firth of Forth, which is the nearest southern natural harbour; while there are no less than 400 miles between the Firth of Forth and the Thames, which may be considered as the next really unexceptionable harbour of refuge. On the west coast there are about 200 miles of coast between the nearest natural harbours of Holyhead and Loch Ryan. The construction of artificial places of refuge becomes therefore a very important matter in a country where every winter's lists of shipwrecks and loss of life, remind us how much nature has left for art to accomplish. For the most complete body of evidence regarding the ports of Britain, we cannot do better than refer to the volumes of Reports by the Tidal Harbour's Commission, for the completeness of which the public is mainly indebted to the zeal of Captain Washington, the present indefatigable Hydrographer to the Admiralty.

The designing of harbours constitutes confessedly one of the most difficult branches of civil engineering. In making such designs, the engineer, in order to avail himself of the advantage which is to be derived from past experience, must endeavour to the best of his power to institute a comparison between the given locality and some other, which he supposes to be in *pari casu*. Perfect identity, however, in the physical peculiarities of different stations, seldom if ever exists, and all that can be done is to select an existing harbour, which appears to be as nearly as possible similarly circumstanced to the proposed work.

Force of waves.

In considering the subject of the construction of harbours in exposed situations, the first and most important subject deserving our attention is the destructive action of the element with which we have to deal,—what are its energies when excited by storms, and what the direction of its forces on the barriers which have been raised to control it?

Smeaton, in his history of the Eddystone, when speaking of the objection that might be raised against the necessity for using joggles in the masonry of that building, says, "When we have to do with, and to endeavour to control *those powers of nature that are subject to no calculation*, I trust it will be deemed prudent not to omit in such a case anything that can without difficulty be applied, and that would be likely to add to the security." This statement of our greatest marine engineer, indicates the propriety of carefully collecting any facts that may help us to a more accurate estimation of those forces which he regarded as being "subject to no calculation." We shall therefore state a few facts which have been recorded of the destructive power of the waves in inland lakes, and in the open ocean.

The writer has seen at Port Sonachan, in Loch Awe, where the fetch is under 14 miles, a stone weighing a quarter of a ton, torn out of the masonry of the landing slip and overturned. Mr D. Stevenson, in his *Engineering of North America*, describes the harbours in Lake Erie as reminding him of those on our own sea-girt shores, and mentions having seen one stone weighing upwards of half a ton which had been taken out of its bed in the pier at Buffalo, moved several feet and overturned. The Comte de Marsilli, in his *Histoire Physique de la Mer*, published at Amsterdam in 1725, states that the highest wave observed by him on the shores of Languedoc in the Mediterranean Sea, where the breadth is about 600 miles, was 14 feet 10 inches. At the mouth of a harbour on the German Ocean, with a fetch of about 600 miles, the writer had observed for him the height of the waves during south-easterly gales, and on one occasion the result was $13\frac{1}{2}$ feet from the crest of the wave to the trough of the sea. In deeper water, and with a north-easterly gale there is no doubt that the waves of the German Ocean will attain a height considerably greater than this. In November 1817 the waves of the German Ocean overturned, just after it had been finished, a column of freestone 36 feet high and 17 feet base. The diameter at the place of fracture was about 11 feet. In the Atlantic Ocean, Dr Scoresby stated, in a communication to the British Association in 1850, that during several hard gales he had measured many waves of about 30 feet, but the highest was 43 feet from the hollow to the crest. Waves of such magnitude could scarcely, however, reach our artificial harbours from the shallowness of the water near the shore. To these facts it may be added, that we know (from the testimony of an eye-witness) of a block of 50 tons weight being moved by the sea at Barrahead, one of the Hebrides; and what is far more extraordinary, we know, and can vouch for the fact, that blocks of 9 tons weight have been quarried, or broken out of their beds *in situ*, on the top of the Bound Skerry of Whalsey in Zetland, which is elevated 85 feet above the level of the sea. The Bound Skerry and neighbouring rocks, which are in the German Ocean, certainly furnish by far the most wonderful proof that has yet been discovered, of the great force which is developed by the billows of the ocean when suddenly checked by opposing rocks.

The writer has stated (in the *Trans. Roy. Soc. Edinburgh*) that, from the observations which he had made with the marine dynamometer (a self-registering instrument designed by him for the purpose), he had found the force of the waves of the *German* Ocean during hard gales, to be $1\frac{1}{2}$ *ton per superficial foot* at the Bell Rock, and of the Atlantic Ocean to be 3 *tons per superficial foot* at the Skerryvore Lighthouse. But these results may still be far short of the maxima. As the marine dynamometer has been often found useful in indicating the force of the waves in situations where harbours were to be built, it may be proper to give such a description of it as will enable any one to have it made.

DEFD is a cast-iron cylinder, which is firmly bolted at the projecting flanges G, to the rock where the experiments are to be made. This cylinder has a circular flange at D. L is a door which is opened when the observation is to be read off. A is a circular disc on which the waves impinge. Fastened to the disc are four guide rods B, which pass through a circular plate C, which is screwed down to the flange D, and also through holes in the bottom EF. Within the cylinder there is attached to the plate C a powerful steel spring, to the other or free end of which is fastened the small circular plate K, which again is secured to the guide rods B. There are also rings of leather, T, which slide on the guide rods and serve as indices for registering how far the rods have been pushed through the holes in the bottom, or, in other words, how far the spring has been drawn out by the action of the waves against the disc A.

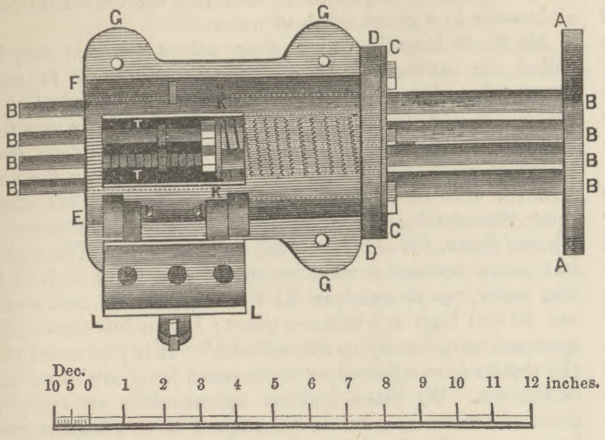

Fig. 1.

Line of maximum exposure.

In comparing an existing harbour with a proposed one, in order to ascertain the dimensions which are necessary to insure stability, perhaps the most obvious element is what may be termed the *line of maximum exposure*, or, in other words, the line of greatest *fetch* or *reach* of open sea, which can be easily measured from a chart. But though possessed of this information, the engineer still does not know in what ratio the height of the wave increases in relation to any given increase in the line of exposure.

As this inquiry is one of great moment in the practice of marine engineering, and has not been in any way investigated, the writer has for some time back been making occasional observations on the subject, when favourable circumstances occurred. These observations have been but limited in extent, and cannot be regarded as deserving of confidence unless in cases where the two harbours are not far different in their lines of exposure. So far as these experiments have gone, the waves seem to increase in height most nearly *in the ratio of the square root of their distances from the windward shore*.

It does not follow, however, that the line of maximum exposure is in every case the line of maximum effective force of the waves; for this must depend not only on the length of *reach*, but also on the angle of incidence of the waves on the walls of the harbour. What may be termed the line of *maximum effective exposure* is that which, after being corrected for obliquity of impact of the waves, produces the maximum result, and this can only be taken from the chart after successive trials. Let $x =$ the greatest force that can assail a pier, $h =$ height of waves which produce (after being corrected for obliquity) the maximum effect, and which are due to the line of maximum effective exposure. Sin $\alpha =$ sine of azimuthal angle formed between directions of pier and line of maximum effective exposure, radius being unity. Then $x \propto h \sin^2 \alpha$ when the force is resolved normal to the line of the pier; but if the force is resolved again in the direction of the waves themselves, the expression becomes $x \propto h \sin^3 \alpha$.*

It should not be forgotten, in connection with this subject, that there are various qualifying elements to which special attention requires in some cases to be given. The waves, for example, may often be noticed, when approaching the land obliquely, to alter their direction when they get close to the shore (in consequence of the depth changing), so as to strike it more nearly at right angles to the general line of the beach. In this way a swell from the ocean may enter a bay which is not directly exposed to it. It should also be observed, that the lines of exposure cannot be directly compared if the depths of the water through which they pass are materially different.

Effect of the tides.

The tides, too, exert in many places a very decided effect on the nature of the billows, in some places causing waves of an unusually dangerous character, while at others they are found to *run down* the sea. If a marine work is situated in a *race* or rapid tide-way, such, for example, as those called "roosts" in Orkney and Shetland, the masonry will be exposed to the action of a very trying and dangerous high-cresting sea. As an example of this, we may refer to Port-Patrick in Wigtonshire, where the violence of the waves is, we have no doubt, much due to the rapidity of the tides. If, on the other hand, the race or roost runs in such a direction as to be entirely outside of the harbour, and at some distance off, it will have a decided tendency to shelter the works, and to act as a breakwater. Thus it appears, from observations specially made for the writer at Sumburgh Head Lighthouse in Shetland during a south-westerly storm, that so long as the Sumburgh roost (one of the most formidable in those seas) was cresting and breaking heavily, one could have easily landed in a small boat at a creek or bay called the West Voe; but no sooner did the roost disappear towards high water than there came in towering billows that totally submerged cliffs of very considerable height. The study of the modifying and intensifying effects of tide-currents on the waves of our British seas seems to have been entirely neglected in the late discussions regarding the merits of vertical and sloping walls, which will be referred to in another section of this article.

We think it right to mention that we consider as erroneous the opinion expressed by a writer in the *Edinburgh Philosophical Journal*—that the cause of races or roosts is the meeting of two rapid currents; neither do we believe that they are occasioned by the projection of rocks from the bottom of the sea as many sailors suppose.

From careful inquiries, as well as from actual personal experience, of such formidable breaking waters as the Boar of Duncansbay, and the Merry Men of Mey in the Pentland Firth, and several others, we are of opinion that the true cause is the *swell of the sea encountering a tidal current running in a direction more or less opposed to that of the waves.* While it is obvious that two rapid tides may meet each other without any dangerous effects, it is also quite true that when two tides meet each other in a rough sea, as in coming round such islands as Stroma or Swona in the Pentland Firth, the effect of their union being to increase the current at that place, there will be produced a highly dangerous sea; but the fact of their meeting, though calculated to aggravate, is not, we think, the primary cause. The races which occur in open seas, as, for instance, off headlands and turning-points of the coast, are certain portions of those seas in which the waves *break* to a greater or less extent, although the water may be very deep, and there may be no wind at the time. At all such places it will be found that there are rapid tides. The roosts on the west coast of Orkney or of the Pentland Firth, for example, are worst with *ebb* tides and *westerly* swells, because the Atlantic swell and current of ebb are opposed. Those again on the east coast are worst with *flood* tides and *easterly* swells from a similar cause. Thus at the east end of the Pentland Firth the Boar of Duncansbay is well known to rage with easterly swells and a flood tide; whereas, at the west end of the same firth, the Merry Men of Mey are equally well known to be worst with ebb tide and a westerly swell, at which time no boat could enter them without the risk of being overturned. The dangerous surf which exists at the mouths of some rivers is, we believe, not solely due to the want of depth at the bar, but also to the meeting of the outward current with the waves of the sea.

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* For experimental results *vide* article HYDRODYNAMICS.

When a swell encounters a rapid opposing current, the onward motion of the waves seems to be arrested, and their width becomes visibly decreased. They get higher and steeper, crest, and at last break, sometimes very partially, and at other times almost as they would on a shelving beach. It appears to us possible that several waves may ultimately combine in such disturbed waters into one mountainous billow; for the wave that has partially broken may have its onward motion so much checked as to allow the wave behind to overtake it, and having thus coalesced, they may, as one large wave, acquire a superior velocity, so as to overtake those in front, and be farther augmented by the union of other waves which have been reflected from the shore.

It is to this cause we are inclined to refer such wonderful effects as that to which we have already alluded, where blocks of 9 tons weight were quarried out of the solid rock at an elevation of 85 feet above the sea. Were such violent action common to all the shores of the German Ocean, instead of being restricted to one or two similar places, half of our eastern seaport towns would, without any doubt, be washed into the sea during the first stormy winter. As a further proof of the great effect of the tides in exasperating the waves, we may mention that the time when most damage is done to seaworks which are in tolerably deep water, is from one to two hours before and after high water, which nearly corresponds to the time when the tide runs strongest outside. We have found this to hold true at many different parts of the coast, but will only refer to one well-marked instance. At Peterhead harbour, which projects prominently into the sea on an isthmus, the tides, at but a short distance seaward of the harbour, run very rapidly. On the 10th January 1849 there was a very heavy sea, and a crowd of people were down, about *two hours before high water*, helping to secure the whalers and other vessels in the harbour, when three successive waves carried away 315 feet of a bulwark, founded 9½ feet above high-water springs, which had stood for many years. One piece of this wall, weighing 13 tons, was moved 50 feet. After this outbreak of the sea the waves became more moderate, until about *two hours after high water*, by which time the large whalers had taken the ground, when other three enormous waves again swept over the harbour, submerging the quays to the depth of from 6 to 7 feet of solid water, by which sixteen people were drowned. These waves filled the harbour to such a depth as to set all the whalers afloat again, and they continued so for several minutes, until the excess of water had run out through the harbour mouth.

These gigantic waves were, in our opinion, clearly the result of some such action as has been attempted to be described. We should not have dwelt at such length on this subject were it not that we might again refer to the facts when we come to treat of the subject of vertical and sloping walls for harbours of refuge, where it is of importance to show that even in the deepest water, the waves are not purely oscillatory, but that wherever there is a tide-way the waves will more or less partake of the qualities of waves of translation.

Relation between height of waves and depth of water.

Another circumstance affecting the exposure of any marine work is the depth of water in front of it. The great mountainous billows so commonly met with in the Atlantic Ocean cannot be generated in the shallower waters of the German Ocean, unless perhaps in such peculiar circumstances as have just been adverted to. It becomes, therefore, of great consequence to ascertain the maximum possible wave in a given depth of water.

Mr Scott Russell, whose observations on what may be called the marine branch of hydrodynamics are of such great value, has stated that if waves be propagated in a channel whose depth diminishes uniformly, the waves will break when their height above the surface of the level fluid becomes equal to the depth at the bottom below the surface (p. 425 *Brit. Assoc. Rep. on Waves*). This statement, the meaning of which seems doubtful, Mr Russell elsewhere (*Instit. Civ. Eng.*, p. 136) defines thus: "The author has never noticed a wave so much as 10 feet high in 10 feet water, nor so much as 20 feet high in 20 feet water, nor 30 feet high in 5 fathoms water; but he has seen waves approach very nearly to those limits." It is presumed that the datum here referred to is the mean level of the surface of the sea. We have had no opportunities of verifying these observations; but as the subject is very important—because the depth of water in front of a work may be said to be the ruling element which determines the amount of force which it has to resist, whatever be the line of maximum exposure, we shall simply state what has come within our own knowledge and observation. We have repeatedly seen at different parts of the coast breaking waves of from 4 to 5 feet, measuring from hollow to crest, in from 7 feet 8 inches to 10 or 11 feet of water, measuring from the bottom up to the mean level; and on one occasion we were told of waves which were estimated at 9½ feet in 13 feet water. It must, however, be borne in mind that these observations, and we conceive also those of Mr Russell, apply only to common waves of the sea, or those short, steep, and superficial waves which are due to an existing wind, and not to the ground swells which are almost constantly to be found in the open ocean, and which may be the result of former gales, or are the telegraph, as Mr Russell terms them, of those which are yet to come.

From what has been stated, it would appear that in most cases the heaviest waves should assail any tide-work at high water. This, however, as mentioned in the last section, is not always the case, the greatest damage being often found to occur at the time when the tide runs strongest.

Mr Leslie found that the Arbroath Harbour-works were in general less severely tried by the very heaviest waves than by a class of waves somewhat smaller than these, owing to the outlying rocks, which, from the small depth over them, had the effect of *tripping* up the heavier seas, and thus destroying them before they reached the harbour, while the depth was sufficient to allow the smaller waves to pass over the shoals unbroken. In some cases of severe exposure the waves might to some extent be reduced by dropping very large stones outside of the harbour, so as, by forming an artificial shoal, to cause them to crest and break.

One great difficulty connected with the subject of the generation of waves still remains unsolved, viz.,—What are the minimum line of exposure and area of sea which are compatible with the existence of a ground swell? This question, we fear, cannot be answered in the present state of our knowledge.

Deep Water Harbours.

Profile of breakwater for harbours of refuge.

Harbours of refuge are distinguished from tidal harbours mainly by the superior depth of water which they possess, and the larger area which they inclose. The requisites are shelter during storms, and easy access for shipping at any time of tide. There has been much discussion as to whether piers for harbours of refuge should be *vertical* or *sloping*. Col. Jones, R.E., has especially advocated the superior merits of the vertical wall; and the discussions on his plan at the Institution of Civil Engineers, and the able protest by Sir Howard Douglas, will be found, from their interest and importance, to merit a careful perusal.

The principle which is asserted is, that oceanic waves in deep water are purely oscillatory, and would occasion no impact against vertical barriers, which would be the most eligible, as they would only have to encounter the simple hydrostatic pressure due to the height of the advancing billow, and would reflect the waves without causing them to break.

Were it even admitted that the waves were purely oscillatory, and were reflected by a vertical barrier, would no force, it may be asked, be expended when the motion of the particles was reversed? The reflection of a wave is equivalent to the nearly instantaneous creation of a wave in the opposite direction, for which a very considerable force must surely be required.

We believe, however, that from the effect of tide currents, to which we have already referred, and perhaps from other causes whose action seems to have been overlooked by the advocates of the upright wall, any form of barrier, in whatever depth it may have been erected, must be occasionally subjected to heavy impact. We conceive that the possibility of waves of translation being generated in the deepest water has been already established, if we succeeded in satisfying the reader of the truth of the following assertions:—*First*, That waves break in deep water during calm weather; a fact which is apparent to the eye and familiar to all sailors: and, *secondly*, and negatively, That to leeward of those races or portions of broken water, which certainly do not reflect the incoming waves, there is comparatively smooth water both at sea and on the adjoining shores, until such time as the strength of the tide is exhausted, and the roost has disappeared, when violent action is again fully manifested.

It may be argued that these are extreme cases, and that such high velocities in the current of the tide are seldom met with. This objection has, no doubt, truth in it; but still the tendency is shown, and though the velocities may be less in other quarters, there may yet be quite enough to destroy the condition of *stagnation* which the oscillatory theory assumes. The breaking of waves at sea, and the existence of races, seem to prove beyond question that waves of translation are possible in the deepest water. Is it not also a probable case that waves which have been reflected by a vertical wall, and have (irrespective of the question of tide currents) combined with the advancing waves, may then become waves of translation, possessing all the elements which endanger the stability of a sea work? Or, again, how much more damage would result to a vertical wall than to a slope of loose stones, from the sinking of the foundations, or from their getting underwashed by the reaction of the waves? It therefore appears that the method generally resorted to of forming deep water harbours of masses of rubble stone with long slopes, so as to form an artificial beach for the waves to spend on, is, in most circumstances, the best and cheapest kind of construction. We incline, however, to the adoption of an upright wall, founded on the rubble as a basis (similar to that at Cherbourg, about to be described), in preference to long paved slopes, as there is always experienced a great difficulty in founding the toe of such talus walls among the loose rubble. When pitched slopes are adopted, great benefit will be found to accrue from leaving at the bottom or toe of the slope a wide foreshore. Much, however, depends on local peculiarities in selecting the best design for any work; and the nature of the bottom is all-important. Where the bottom is soft, a vertical wall can hardly, if ever, be attempted.

In making these remarks, we must not be understood as condemning the adoption of vertical walls in cases where the foundation is good. All that we assert is the opinion, that waves of translation do exist in deep water, and therefore that harbours of refuge will prove failures unless they are built in such a manner as to resist the impact of those waves of translation. The Cherbourg breakwater has been often referred to as a successful instance of the application of a vertical wall, and has been contrasted with the Plymouth breakwater, which has a long slope. But this appeal is quite fallacious, as the profile of that work is, as already hinted, of a composite character, consisting of a talus wall sloping at the rate of 10 horizontal to 1 perpendicular, surmounted by a plumb wall; so that whatever merit may be supposed to belong to the vertical profile is entirely nullified at Cherbourg by the long talus wall in front, on which the violence of the waves is much broken. Moreover, the heaviest waves at Cherbourg come from the N.W., and do not assail the breakwater at right angles to its direction, but come more nearly *end on* to the work, so as to a great extent to run along the outer wall. The N.W. waves are propagated from the Atlantic, while the waves which are most trying to the work come from the N., in which direction the line of exposure is only about 21 leagues. These facts we obtained during a recent visit to Cherbourg, undertaken for the special purpose of ascertaining the physical characteristics of the place. The attempt to make out a parallelism between Plymouth, which faces the Atlantic directly, and Cherbourg, which is comparatively land-locked, cannot, in our opinion, stand the test of a candid inquiry.

Other comparisons may be referred to which have been advanced on equally untenable grounds. Thus, the old pier of Dunleary, which is vertical, and has stood well, has been compared with the talus walls of Kingstown Harbour, which now protect Dunleary, and which have often received much damage. The all-important element of depth of water has been in this instance entirely overlooked; for at Kingstown there is a depth of 27 feet, while Dunleary is all but dry. An able writer on the same *questio vexata*, in comparing different sea walls in the Firth of Forth, has, in like manner, not sufficiently adverted to the great differences in the depths opposite the works to which he refers.

An important advantage of the sloping wall is the small resistance which it offers to the impinging wave, but it should also be borne in mind that the weight resting on the face stones in a talus wall is decreased in proportion to the sine of the angle of the slope. If we suppose the waves which assail a sloping wall to act in the horizontal plane, their direct impulse, when resolved into the force acting at right angles to the sloping surface of the talus wall, will be proportional to the sine of the angle of incidence. The effective force when estimated in the horizontal plane, will be proportional to the square of the sine of the angle of incidence. But if we assume the motion of the impinging particles to be horizontal, the number of them which will be intercepted by the sloping surface will be also reduced in the ratio of the sine of the angle of incidence, or of elevation of the talus wall. Hence the tendency of the waves to produce horizontal displacement of the wall, on the assumption that the direction of the impinging particles is horizontal, will be proportional to the cube of the sine of angle of elevation of the wall.

If it farther happens that there is obliquity of action in the azimuthal as well as in the vertical plane arising from the relative direction of the pier and of the waves, there will be another similar reduction in the ratio of the squares or cubes of the angle of incidence according as the force is resolved into that at right angles to the line of the pier, or to that of the direction of the waves.

Let ϕ = vertical angle of incidence or angle of elevation of wall;

ϕ' = azimuthal angle of incidence;

f = horizontal force exerted on unit of surface at right angles to the line of harbour wall;

h = height of greatest assailing waves;

$$f \propto h\,(\sin\phi \sin\phi')^3.$$

Harbours.

The above expression assigns, we think, too great a reduction, as the motion of the particles may not be horizontal, and no account is taken of the effects of friction against the rough surface of the masonry. Experiments are therefore wanting to determine the constant for correcting the theoretical results due to this expression. For further information on this subject, we refer the reader to the article on HYDRODYNAMICS.

Parabolic profile.

Mr Scott Russell recommends the parabolic curve as that best suited for the profile where the object is to *break* the waves, and not to reflect them, as is the case in sloping breakwaters. This curve possesses, according to Mr Russell, the advantages of superior strength, of economy in the materials, of breaking the wave early, and of continuing an uniform action over the longest period of time. When the tide is low, the toe of the slope, which springs out of the *foreshore* and forms the vertex of the parabola, would, we fear, be found rather weak, and perhaps difficult to form. On the whole, we rather incline in such cases simply to throw in the materials, and to allow the sea to form its own slope.

According to Sir John Rennie (*Account of Plymouth Breakwater*), rubble breakwaters with slopes formed at the angle of repose, were adopted by the Greeks in the moles of Tyre and Carthage, and by the Romans at Athens and Halicarnassus. The same design was also followed at Venice, Genoa, Rochelle, Barcelona, and other places. In this kingdom the first example on a large scale which we find is at Howth. Kingstown, Holyhead, and the noble breakwater at Plymouth, were afterwards carried out on the same principle, and chiefly under the directions of the late Mr Rennie. The great national harbours of refuge at present in progress in this country, according to Mr Rendel's designs, at Holyhead and Portland, are on a similar principle; while those under Messrs Walker, Burgess, & Cooper, at Dover, Alderney, and Jersey, are more nearly vertical.

On the best Forms of Walls for Tidal Harbours.

Having now considered the few facts of which we are in possession regarding the disputed nature of the impulse of the waves in deep waters, we shall direct the reader's attention to their effects in shallow water. Those in deep water were chiefly *whole waves*, and regarded by many as being purely oscillatory, while those in shoal waters are breaking waves, and therefore regarded by all as waves of translation. We have hitherto been considering breakwaters erected in deep water, and which were constantly exposed to the waves; we now turn to piers and sea-walls which are placed within the range of the surf, and which are exposed to its force for a limited period only, being sometimes left nearly, or altogether dry by the receding tide.

The impulse of the waves against a sea-wall or pier may be resolved practically into four directions:—1st, The direct horizontal force which tends to shake loose, or carry before it, the blocks of which the opposing masonry consists. This force may also blow up the pitching, or overturn the inner or quay-wall by condensing the air, or pressing upon the water which occupies the interstices of the rubble. We know two cases in the German Ocean where, in consequence of want of width in the pier, coupled, in one instance, with insufficient workmanship, the inner or quay-walls were observed first to bulge and fall, before the sea-wall was injured. One of these piers measured 26 ft. 4 in., and the other 24 ft., on the roadway. 2d, The vertical upward force which may act on any projecting stone or protuberance. 3d, The vertical downward force of the water which results either from the wave breaking upon the toe of a talus wall, or from the wave passing over the parapet, and falling upon the pitching behind, so as to plough it up. 4th, The *back-draught* which tends by reaction from the wall to plough up the soft bottom, and thus to undermine the lower courses of the work, or perhaps by *suction* to pull out the facework. We may conclude from the above that the points which require to be carefully attended to are—1st, The contour and quality of masonry of the wall itself; 2d, The parapet, which, if not of sufficient height, or built in a proper direction, leads to damage in the pitching behind it; and 3d, The foundation-courses, in the design and construction of which, if similar precautions be not attended to, underwashing of the bottom may in some situations take place, so as to leave the lowest courses without protection.

Harbours.

Buildings on a rock foundation.

We shall in the first place consider how far those remarks are applicable where the bottom is solid rock. Such a supposition will render unnecessary any precautions arising from the wasting of the bottom, and, *cæteris paribus*, there does not seem to be any reason for preferring a talus to a vertical wall. The question of preference in such a case will in the main depend upon the kind of material which can be obtained. Should the stone be scarce or costly, and the quality such as to warrant the introduction of masonry of the best description, the vertical wall may be found to be the most economical. Where freestone is to be used, it is not only desirable that it should be got in large blocks, but that the face stones should possess considerable hardness. This precaution is particularly necessary in selecting the stones for the lower courses, and especially where the beach consists of hard gravel. For the same reason, it is highly important that all stones which are subject to decay from atmospheric influence should be either entirely rejected or assembled in the upper courses of the parapet.

Where the materials are abundant, but of an unworkable nature, a long talus wall will generally be found most economical. For such walls the rate of slope must depend very much upon the exposure of the place, and upon the plentifulness of rubble-stone hearting. The easily-dressed and naturally flat-bedded materials, which the stratified rocks of the secondary formation very often furnish, are especially applicable for the construction of vertical walls; while the uncouth blocks of the primary and igneous formations are better suited for talus walls. Such rocks as gniess, the schists, basalts, greenstones, amygdaloids, and the tougher kinds of granite, are best fitted for this purpose. With some of those rocks the angularity of the pieces, and the excessive difficulty of dressing, render it necessary to assemble them without almost any alteration of their shape, by an adaptation of their salient and re-entrant angles, so as to make a kind of random rubble face-work. In this kind of work, mortar is very seldom employed. The parapet generally consists of squared masonry, surmounted by a heavy cope, and it should in every case be set in good lime mortar.

Where the materials are light and of small sizes it is desirable to equalize the action of the sea over the whole work, and not to concentrate it against any particular place. Mr Russell states that the cycloidal form was recommended for this purpose by Franz Gerstner of Bohemia. The only instance with which we are acquainted of the adoption of this curve was in a sea-wall erected at Trinity, near Edinburgh, by the late Mr Robert Stevenson, in 1822.

Buildings on soft or sandy foundations.

It has been already stated that, irrespective of the quality of the masonry, the two points in the structure which are weak or dangerous are the top and bottom of the wall. With a rocky bottom the risk of failure at the foundations is removed; on the other hand, where the shore consists of rotten rock, moving shingle or sand, it is obvious that provision must be made for both those sources of evil. In fact, if we consult the history of harbours, we shall find that by far the most frequent cause of damage is the reaction of the sea against the shore.

The general slope of a fragmentary beach must depend upon the size and nature of the particles and the force of the sea. The dissimilarity between the slopes of a beach near the levels of high and low water, arises from a decrease in the force of the waves, owing to their being broken before they reach the high-water mark. The great object, therefore, is to design the profile of our wall so as to alter as little as possible the symmetry of the beach. Where isolated rocks or large boulders are seen projecting above the surface of a sandy beach, there will generally be formed around them hollows, corresponding in depth to the kind of obstruction which the rocks present. The principal point in the design, therefore, must be to avoid great and sudden obstructions to the movement of the water. The best form which could be adopted in any situation would of course be the same as the cross section of the beach itself, but this would answer no possible purpose; and, as the wall is to consist of heavy blocks of stone instead of minute particles of sand, it is clear that a much steeper slope may be adopted than *the profile of conservancy* of the coast, provided the lower part of the slope be flattened out so as to meet the sand at a low angle. The action of a bulwark is to arrest the waves before they reach the general high water mark, and to change the horizontal motion of the fluid particles to the vertical plane, or to compel the waves to destroy themselves on an artificial beach consisting of heavy stones. To prevent underwashing, the two following requisites should therefore be as far as possible secured:—1st, The foundation courses or bottom of the wall should rise at a very small angle with the beach, so that their top surfaces may be coincident with the profile of conservation of that portion of the beach out of which the wall springs; 2d, The outline of the wall should be such as to allow the wave to pass onwards without any sudden check till it shall have reached the strongest part of the wall, which should be as far from the foundation as possible.

Those two requisites show clearly how inapplicable a vertical wall must in most cases be for a sandy beach. Instead of altering the direction of the wave at a distance from its foundation, the whole change is produced at that very point, and unless the wall be founded at a great depth, its destruction is all but certain. Where the materials are costly, but admit of being easily dressed, we are disposed to think that horizontal, or nearly horizontal wall connected with a vertical one by a quadrant of a circle may be found suitable. Such a form will prevent to a considerable extent the danger of reaction by causing an alteration in the form of the wave at that part where the wall is strongest and at the greatest distance from the toe or curb course. Where the materials are abundant and of a rougher nature, a cycloidal wall, with vertical and horizontal tangents somewhat similar to that erected at Trinity, to which we have already referred, may be adopted with advantage.

Foundations in clay.

A special caution may not be out of place regarding clayey bottoms. Many are apt to suppose that there can be no better foundation than clay; and it is indeed true that some kinds of hard clay form a satisfactory subsoil. But there are others of a softer kind, and permeated by sandy beds, which are extremely treacherous. If there be the slightest dip seawards, there is always a risk of any pier that may be built on such a base slipping bodily into the sea. This holds especially true of inland lochs, where the sides very often slope suddenly. In one instance, the particulars of which we got on the spot shortly after the accident, a pier built on a clayey beach, sloping below low water at the rate of 1 in 12½, suddenly began to move, and after two hours it had slipped seawards 150 feet, and had by that time descended bodily a height of 34 feet, the top of the pier being then no less than 23 feet below low-water spring tides.

Construction of Harbours.

Our space will not admit of our going much farther into the subject of the construction of harbours than the few remarks we have already made. A knowledge of such matters may to some extent be acquired by a careful perusal of the published histories of marine works; but, after all, it must be confessed that the only valuable teacher in this wide practical field is *experience*. It is, in truth, impossible to lay down any general rules of guidance as to matters of this kind. All that can be done within our space is to notice very briefly some of the more important methods of working. And first, with regard to that invaluable piece of apparatus, the diving-bell, we would refer to the article on the subject in this work, and to Smeaton's *Account of Ramsgate Harbour*, published in 1721, where it was first applied by him to harbour works. The diving-helmet is a most useful and convenient modification of the diving-bell, and is now very generally employed.

Diving-bell.

Beton.

Of late years Mr Walker has introduced from France the use of *beton* as a substitute for backing. This artificial concrete is sometimes used in enormous masses. We have seen at Cherbourg blocks of 50 tons prepared in boxes, whose sides and tops are removed after the concrete has set, in order to be again similarly employed. The proportions used at Cherbourg by M. Rebeille were two of sand or fine gravel, to one of Portland cement.

Edge work.

We may also mention that the method of assembling stones on their edges, instead of on their beds, which formerly was in use in some old Scottish harbours and sea-walls, as at St Andrews, Prestonpans, &c., deserves to be more generally known and adopted, from its superior strength.

Mr Bremner's pontoons.

The proposal of Mr Bremner, of Wick, for putting in the foundations of low-water piers also merits notice. Mr Bremner proposes to construct, in some adjoining place of shelter, enormous pontoons of timber, on which the under parts of the work are built, and afterwards floated to the desired spot in favourable weather, and carefully grounded. Such a plan might, we have no doubt, be found economical and useful in some situations.

Mr Rendel's method of assembling the *pierres perdues.*

Mr Rendel has introduced an improved method of assembling the *pierres perdues* or rubble used in the construction of large breakwaters; this method he employed at Millbay Pier, near Plymouth, in 1838, in a depth of 38 feet; and he is at present carrying out the same principle on a still larger scale, in the construction of the breakwaters at Holyhead and Portland. The improvement consists in depositing the rough materials from stagings of timber elevated a considerable height above high water. The stones are brought on the staging in waggons, through the bottoms of which they are discharged into the sea. The principle on which the stagings are designed is that of offering the smallest possible resistance to the sea, the under structure consisting of nothing more than single upright piles, there being only one line of piles for each roadway.

Harbours of refuge at Portland and Holyhead.

Mr Rendel, in a letter kindly communicated to us, states, "I use no timber braces of any kind, as these offer more resistance to the sea than strength to the staging. At Portland, however, where any accident would be a serious evil, owing to our employing convicts in the quarries, we stay the piles with iron guys, fixed to Mitchell's screw moorings, and also truss the outer piles in each row with iron rods. We also fix the piles in the ground with a screw.

"At Holyhead, however, we only attach to each pile boxes filled with small stones, for the purpose of getting them into a vertical position, and use no stays or guys of any kind.

"The superstructure consists simply of balks of timber, with rails laid on them to carry the waggons. The piles are placed in rows 30 feet apart, and the ease and certainty with which the staging is constructed is such that a length of 30 feet, including the screwing in of the piles, the laying down of the roadways, and all minor works necessary to make them fit to carry the waggons, never occupies more than one working day and a half, and often less. The length of the piles that we are now using varies from 84 to 90 feet, the depth of water at both Holyhead and Portland being about 11 fathoms.

"Of the strength of the stage you may judge from its carrying on each roadway as much as three waggons, weighing in the gross 12 tons each.

"The advantages of the staging are obvious. It contributes greatly to the consolidation of the stone, it makes a greater length of breakwater to be under construction at the same time, and it enables the deposits to be carried on without interruption, almost in the heaviest weather. As an instance of this, I may remark that my resident at Portland informs me that the waggons and locomotives were engaged yesterday at a time when such a sea was running that large bodies of spray were thrown 55 feet above the water level. As a proof of the facilities which the stage affords for rapidity of construction, I should state that we have deposited this year at Holyhead, where free labour is employed, nearly one million tons of stones. The loss from accidents to the stage is comparatively small on its first cost, and when spread over the cost of the whole works it is a mere trifle. I find the sea-slopes are, in the deep water and exposed parts, from $5\frac{1}{2}$ or 6 to 1 between 6 feet above high-water and from 12 to 15 below low-water, from which point they rapidly become about 1 to 1. The inside slopes are never more than $1\frac{1}{4}$ to 1, and seldom more than 1 to 1. The materials are excellent for our purpose."

Harbours of refuge at Alderney, Jersey, Dover, and Plymouth.

Mr Walker has also kindly contributed some facts connected with the construction of the great works now going on under the direction of Messrs Walker, Burgess, and Cooper at Jersey, Alderney, and Dover. At Alderney, which is a very exposed place, the *base*, up to 12 feet below low-water, is formed by stones thrown, or rather dropt in from barges. Up to low-water the work is all done by diving-helmets. The wall is faced with granite, backed with blocks of *beton* made of sand, shingle, and Portland cement. Above low-water it is faced with stone of the island, a kind of millstone-grit, and is backed with blocks of rubble set in Roman cement. The millstone-grit is raised in very large blocks. The profile is to consist of a quay, an esplanade, and a parapet.

Jersey is much the same as Alderney, but the *pell-mell* work is carried to low-water, having nearly vertical walls of conglomerate built above. Dover has nearly vertical walls, faced with granite from the very bottom, which is now 45 feet below low-water. This work was done with diving-bells.

Sir J. Rennie, in his *Account of the Plymouth Breakwater*, says, "From the bottom to within 8 feet of low-water springs, we find that the slope is $2\frac{1}{2}$ or 3 to 1. Here the effect of the waves is comparatively small, being neutralized by the mass of water. From thence to low-water of spring-tides the slope increases from 3 or 4 to 1, but between low-water of spring-tides and high-water, when the effect of the waves is greatest, there we found that the rubble would not lie at less than 5 to 1, whilst, on the inside, the slope stands generally at from $1\frac{1}{2}$ or 2 to 1."

The above interesting details regarding these national works show, from the variety which they exhibit, how difficult it is to lay down any general rules for the construction of harbours, and confirm the principle that each work must be judged of *per se*.

Miscellaneous Observations.

The reduction in the height of waves after passing into harbours, and the proper width of entrance.

The ultimate object of constructing harbours is, by lowering the height of the waves, to preserve the tranquillity of the area of water which is inclosed by the piers; and this property is variously possessed by harbours of different forms, and depends much upon the relative widths of the entrance, and of the interior, the depth of water, the shape of the entrance, and the relation between the direction of its opening, and that of the line of *maximum exposure*.

The only formula of which we are aware is that by the writer of this article (*Edin. New Phil. Journal*, 1853), which gives an approximation to the *reductive power*, or is, in other words, a numerical form of expressing how much a wave of given height becomes reduced, after it has entered a harbour. Though the results obtained by the formula may not be absolutely correct, this will be no objection where the object is merely to obtain a comparative value, as, for example, in comparing one design for a harbour with another.

When the piers are high enough to screen the inner area from the wind, where the depth is uniform, the width of entrance not very great in comparison with the width of the wave, and when the quay walls are vertical, and the distance not less than 50 feet,—let

H = height in feet of waves in the open sea.
x = reduced height of waves in feet at place of observation in the interior of the harbour.
b = breadth of entrance to harbour in feet.
B = breadth of harbour at place of observation in feet.
D = distance from mouth of harbour to place of observation in feet.

$$x = H\left\{\sqrt{\frac{b}{B}} - \frac{1}{50}\left(1 + \sqrt{\frac{b}{B}}\right)\sqrt[4]{D}\right\}$$

This formula has been found to give good approximations at several harbours where the heights of the waves were registered. When H is assumed as unity, x will represent the *reductive power* of the harbour.

Decrease in height of waves from lateral deflection.

In situations where the highest waves cross the harbour mouth at an oblique angle, a farther reduction is due to this cause. We have been unable to find any observations that have been made on this subject by others, and for want of better, we shall give three observations made under our directions at Latheronwheel harbour:—

Angle of obliquity.	Distances run through by waves.	Height of wave after passing through angle.
0°	16 feet.	1·00
50°	32 ...	0·68
140°	68 ...	0·21

These must, however, be regarded as but approximations. It is obvious that as the wave may be deflected through more than 360°, the curve representing the reduction must be a spiral; but more observations are wanted to determine of what kind.

Booms for entrance.

Booms are logs of timber placed across the mouth of a harbour or the entrance to an inner basin or dock, having their ends secured by projecting into grooves cut in the masonry on each side of the entrance. The booms are dropped into those grooves to the number of from 10 to 20, or as many more as will insure close contact of the lowest one with a sill-piece placed in the bottom of the harbour, without which precaution the swell is found to enter the harbour from below the booms. By this contrivance, which forms a temporary wall, the waves are completely checked and prevented from spreading into the interior basin. The longest booms we have seen are about 45 feet, and in some places, as at Hartlepool and Seaham in Durhamshire, they are taken out and in by steam power.

Though perfectly successful in their tranquillizing effect (provided they are kept in contact with the sill piece at the bottom), booms are not suited for the mouths of harbours where there is much traffic, as the shipping and unshipping of so many logs of timber can hardly take less than a quarter of an hour—a delay which might in many cases be attended with serious consequences.

Stilling basin for the waves.

It is very desirable, and in some cases essential, that there be either a considerable internal area, or else a separate basin opposite the entrance for the waves to destroy or *spend* themselves. Such a basin should, if possible, be made so as to preserve a portion of the original shore for the waves to break upon, and when circumstances render this impossible, there should at least be a flat talus of 2 or 3 to 1. Talus walls of 1 to 1, or steeper, will not allow the waves to break fully, but will reflect them in such a manner as might in some cases make the entrance difficult or even dangerous of access, and the berthage within unsafe. There are many instances of harbours being materially injured by the erection of a quay wall across a beach where the waves were formerly allowed to expend their force.

It may be observed that when there is an inner harbour or stilling basin, the elliptical form seems to be the most promising. Let one focus be supposed to be on the middle line of the entrance and to coincide with the point from which the waves in expanding into the interior radiate as from a centre (which they do approximately), and if the other focus is situated inland of high-water mark, the waves will tend to reassemble at the landward focus, and on their way will be destroyed by breaking on the beach. This appears from the well-known property of the ellipse, that if two *radii vectores* be drawn from the two foci to any point in the curve they will make equal angles with the tangent at that point; and as the angles of incidence and reflection of a wave from any obstacle are practically equal, each wave will be nearly concentrated at the focus opposite to that from which it emanated.

Evil of indiscriminate deepening at the entrance of harbours of small reductive power.

Another cause of disturbance in harbours, which is often not sufficiently considered, is the indiscriminate deepening of the entrance without a proportionate enlargement of the internal area, or the execution of other works for counteracting the effect. As the depth of the water is more and more increased, waves of greater height become possible at the entrance, so that larger waves gain admission to the interior. The writer has had repeated proofs of this in the course of his practice. At the port of Sunderland Mr D. Stevenson recommended the removal of nearly the whole of the south stone pier, and the substitution of works of open framework in order to tranquillize the interior. These works, which have been quite successful, were rendered necessary by the frequent dredging of the channel at and near the entrance.

Artificial scouring.

The preservation of the depth of harbours where there is a tendency to deposit is often attended with great difficulty and expense. Where the deposit of silt is confined to the space between high and low water marks, the scouring by means of salt or fresh water is in general comparatively easy, but where there is a bar outside of the entrance the case becomes most materially changed. The efficacy of the scour, so long as it is not impeded by encountering stagnant water, is kept up for great distances but soon comes to an end on its meeting the sea. Probably the only way in which this difficulty might to some extent be obviated would be by conducting the water in iron pipes to the bar, a plan which the author proposed in 1843 for Hynish harbour, but the expense was considerable and the success doubtful. The same plan was proposed by Mr Alexander Swan for Kirkcaldy some years later. When the volume of water liberated is great compared with the *alveus* or channel through which it has to pass, the objection based on the stagnancy of the water originally occupying the channel does not hold to the same extent as when the scouring is to be produced by a sudden *finite momentum*. In the one case the scouring power depends simply on the quantity liberated in a given space of time, while in the other it depends on the propelling head and the direction in which the water leaves the sluice. Mr Rendel's scheme for Birkenhead was on the former principle. The first example of artificial scouring in this country seems to be due to Smeaton who used it effectually at Ramsgate in 1779.

At Bute Docks, Cardiff, designed by Sir W. Cubitt, the access to the outer basin is kept open most successfully by means of artificial scouring on a gigantic scale. The entrance was cut through mud banks for a distance of about three-fourths of a mile seaward of high-water mark. The initial discharge when the reservoir is full, is stated to be 2500 tons per minute. The writer has known even so limited a discharge for an hour to two as one ton a minute, produce very useful effects in keeping a small tidal harbour clear of sand.

Floating breakwaters.

Many proposals have from time to time been made for mooring in the open sea floating frameworks of timber with the view of sheltering the space inclosed by them. The objections to floating breakwaters are so great and obvious that there seems little chance of their ever being much used. From what was stated on the subject of booms, it will be recollected that it is a requisite that they should fit closely to a sill piece at the bottom, otherwise the *run* is found to extend into the harbour. From what will be afterwards stated regarding the liability of timber to speedy destruction from the marine worm, and to iron by chemical action, it is obvious that floating structures of wood, connected by iron and moored by iron chains, cannot possibly be of long duration. If to all these sources of evil we add the risk of their being broken by the sea we think the case may be almost regarded as hopeless. No doubt green-heart might be employed so as to resist the ravages of the worm, but its high specific gravity and its great expense would prove bars to its employment.

Suspension piers.

In some situations where there is a long shallow beach, a harbour or pier of timber or masonry may be made at or near the low-water mark, which may be connected with the shore by means of a suspension bridge. The inducements to adopt the suspension principle are its economy, and the free passage it affords to the currents which in this way are prevented from forming accumulations of sand, silt, or gravel. These advantages are, however, much reduced by the great wear and tear consequent upon the perishable nature of the structure. The late Sir Samuel Brown erected two chain piers, the one at Brighton, and the other at Newhaven, near Edinburgh, both of which are still in existence.

Advantages of two entrances to a harbour.

In every situation where it is easily practicable to make two entrances to a harbour, it will be found well worth the extra expense, provided they can be so placed that the one shall be available when the other has become difficult of access. In harbours which have but one mouth, vessels are often detained for a great length of time by the continuance of the wind in the direction which throws a heavy sea into the entrance. Whereas if there are two entrances situated as we have supposed, vessels are at once able to take their departure by the sheltered side. At the port of Peterhead, the north and south harbours were some years ago united by a canal, according to the writer's plans, and there the advantage has been of the most marked description. Vessels can now clear out as soon as loaded, either by the north or south mouth, according to the state of the sea. Some caution is necessary, however, as the *run* is apt to extend from the one harbour to the other unless there be a considerable area.

Harbour repairs.

There is generally much prudence required in the alteration or repairs of existing marine works. The risk of having the whole structure destroyed by a gale coming suddenly on while there is an open breach in the works, must be obvious; and in one instance, where the exposure of the place was great, and the evil was a hidden one, the writer could not recommend the facework being disturbed. The cause of failure in this instance was supposed to be the decay of the backing, which having deprived the face-stones of support allowed them to be driven inwards by the force of the waves. Instead of removing the facework, the only recommendation that could be given was to inject the whole pier with fluid cement, so as, if possible, to render the mass *monolithic*. An alternative of this kind is obviously of very doubtful success, and can be regarded as nothing short of a last resort, for there is but a small chance of getting the injected fluid to permeate the whole mass of the pier. The system of permeating the masonry with fluid matter could, however, be employed with more chance of success in the *formation* of a pier, while each course lies open to view. In 1844, at a harbour that had stood for very many years, two or three faulty stones had been incautiously taken out of the facework by a mason who intended to replace them by others, when a sudden gale came on, and nearly the whole of the work was levelled with the beach.

Register of Height of Waves for 1852 *observed at Lybster, Caithness-shire.*

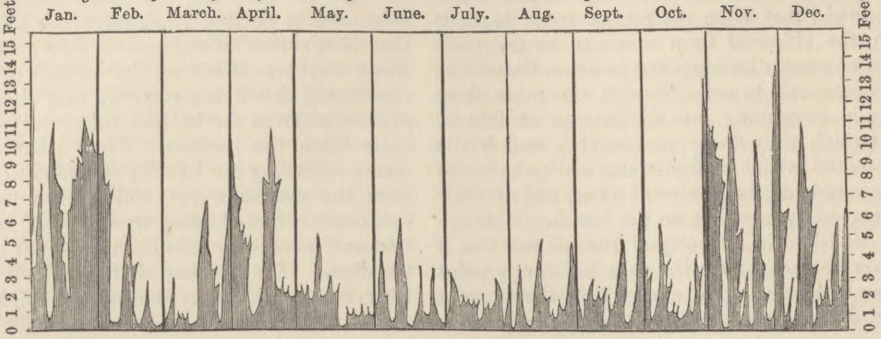

Fig. 2.

As an example of the suddenness with which our eastern coast is visited by gales, and as indicating graphically the relative eligibility of the summer and winter months for carrying on harbour works, we give the accompanying diagram of the heights of waves, as observed for the writer, by Mr William Middlemiss, resident engineer at Lybster harbour.

Timber piers.

In landlocked bays, where a deep-water landing-place is all that is required, and where the bottom is sandy or soft, timber may be employed with great advantage. Even in exposed situations, timber can also be used, but the fatal disadvantage attending its employment in most places where there is no admixture of fresh water, is the rapid destruction occasioned by marine worms.

The damage occasioned to harbours in this way is noticed by Semple in his treatise *On Building in Water* in 1776, and very probably by much earlier writers. Indeed, the ravages of the *Teredo navalis* are very ludicrously described by Hector Boece in his *Croniklis of Scotland*, printed at Edinburgh *circa* 1536. In the Atlantic Ocean the *Teredo navalis*, and at many places in the German Ocean the *Limnoria terebrans*, are the animals which are found to destroy any structure of timber which is exposed to the water. They are found to eat most rapidly between the bottom and low-water mark, but above low-water the damage is not so great; and what is singular, they do not appear to exist at all below the bottom where the pile is covered with sand. These observations do not, however, quadrate with Mr Hartley's at Liverpool, for he found the parts which were alternately wet and dry to decay faster than the parts which were constantly immersed. Even solid limestone is often destroyed by the persevering efforts of another marine animal called the *Pholas*.

The late Mr R. Stevenson made several experiments on the ravages of the *Limnoria terebrans* at the Bell Rock in 1814, 1821, 1837, and 1843, by fixing pieces of different kinds of timber to the rock, and getting regular reports on their decay. From those experiments it appeared that green-heart, beef-wood, and bullet-tree, were not attacked by the worms, while teak stood remarkably well, although suffering at last. The kyanizing fluid and other preparations have been tried, but were not found to be of permanent service. In addition to these experiments on timber, no fewer than 25 different kinds and combinations of iron were tried, including specimens of galvanized irons. Although separate specimens of each were tried in places where they were always under water, and also in places where they were alternately wet and dry, yet all the ungalvanized specimens were found to oxidize with much the same readiness. The galvanized specimens resisted oxidation for three or four years, after which the chemical action went on as quickly as in the others.

The following Table shows the different kinds of Wood which were made the subject of experiment at the Bell Rock in 1814, 1821, 1837, 1843, *with their relative durabilities.*

Kind of Timber.	Decay first observed.		Unsound and quite decayed.		Quite sound for		Remarks.
	yrs.	mo.	yrs.	mo.	yrs.	mo.	
Green-heart	...		...		13	0	
Teak-wood	...		...		13	0	Affected in one corner.
Do.	5	6	...		...		Nearly sound 7½ years after being laid down.
Do.	4	7	12	0	...		
Treenail of locust	...		5	0	3	0	
Beef-wood	...		...		13	0	
Treenail of Bullet-wood	...		...		5	0	
African Oak	4	11	10	0	...		
Do. do.	5	6	...		...		Nearly sound 7½ years after being laid down.
English Oak	1	1	3	1	...		
Do. do.	2	4	4	7	...		
British Oak	1	6	5	0	...		
English Oak, kyanized	4	7	10	0	...		
American Oak	2	11	4	7	...		
Do. do.	1	6	5	0	...		Decaying but slowly 5 yrs. and 7 months after being laid down.
Do. do., kyanized	4	3	...		...		
Italian Oak	1	1	3	6	...		
Dantzic Oak	1	1	2	6	...		
Scotch Oak	2	4	...		...		Much decayed when first observed.
Baltic Oak	2	4	4	3	...		Decaying but slowly 5 yrs. and 7 months after being laid down.
Plane Tree	2	11	...		...		
Do.	1	6	5	0	...		
British Ash	3	0	5	0	...		
Ash	2	11	4	3	...		
English Elm	2	11	4	7	...		
Do. do.	1	1	1	6	...		
Scotch Elm	3	0	5	0	...		
American Elm	1	9	3	1	...		
Canada Rock Elm	1	1	1	6	...		Nearly sound 3½ yrs. after being laid down. Washed away 6 months later.
Honduras Mahogany	2	1	...		...		
Do. teak treenails.	1	6	5	0	...		
Beech	1	6	5	0	...		
Do.	1	9	3	1	...		A little holed at one end underneath.
Do. Payne's patent pro.	10	7	...		...		
Cedar of Lebanon	1	1	2	6	...		
Scotch Fir, teak treenails	1	6	3	0	..		
Do. from Lanarksh.	1	6	3	0	...		
Do. do.	1	6	3	0	...		
Do. locust treenails	1	6	3	0	...		
Memel Fir	1	6	5	0	...		
Riga Fir	1	1	1	6	...		
Dantzic Fir	1	1	1	6	...		
Norway Fir	2	4	3	1	...		
Baltic Red Pine	2	9	4	3	...		A good deal decayed when first observed.
Do. kyanized	2	4	4	7	...		
Pitch Pine	2	4	4	3	...		
Do.	1	6	2	6	...		Going fast when first observed.
Virginia Pine	1	1	1	6	...		A good deal gone 18 mths. after being laid down.
Yellow Pine	1	1	1	6	...		
Red Pine	1	1	1	6	...		Swept away by the sea 7 months afterwards.
Cawdie Pine	1	1	1	6	...		A good deal decayed when first observed.
American Yellow Pine	2	4	3	7	...		
Do. locust treenails	0	8	3	0	...		
American Red Pine	2	4	3	1	...		
Do. do. kyanized	2	4	4	7	...		
Larch	2	4	4	3	...		
Polish Larch	1	1	1	6	...		Going fast when first observed.
Birch, Payne's patent pro.	0	10	1	10	...		

Green-heart timber is now generally had recourse to in places where the worms are destructive. It appears to have been first used by Mr J. Hartley of Liverpool, who published in the *Minutes of Institution of Civil Engineers* an account of its virtues in 1840, as ascertained at the Liverpool Docks. Its cost is considerably greater than memel or than most of the other timbers generally used. Memel logs for the inner piles of piers might perhaps, from their not being exposed to abrasion from ships, be clad with green-heart planking at those parts which are exposed to the worm. Copper sheathing and scupper nailing are often and successfully employed as protections for piles in exposed situations. *Breaming* or scorching the wood, and afterwards saturating it with train oil, also forms a partial protection.

It is much to be regretted that timber is so expensive in this country, and that some simple and economical specific against the worm has not been discovered for protecting memel and the cheaper kinds of pine. The grand desideratum in harbour works, which is the *want of continuity in the structure*, would then be supplied. It follows, from the known laws of fluids, that each individual stone in a pier which is equally exposed throughout its whole length, is subjected to a force which it can only resist by its own inertia, and the friction due to its contact with the adjoining stones. The stability of a whole hydraulic work may therefore be perilled by the use of small stones in one part of the fabric, while it is in no way increased by the introduction of heavier stones into other parts. By the use of long logs of timber carefully bolted together a new element of strength is obviously obtained. A pier could be erected almost free of sea risk if constructed of rectangular or other shaped prisms, consisting of logs of timber treenailed and bolted together, so as to form boxes, say 10 feet square and 30 or 40 feet long. The interior of the boxes would be filled with rubble or *beton*. The first layer would be arranged across the pier, so as to fit the irregularities of the bottom, and above that, they might be arranged lengthways of the pier, so as to form its outer and inner walls, the space between being filled with common rubble or *beton*.

Deposit of silt, sand, &c., and sea-bars.

In many ports the original depth has been decreased by the deposit of silt, sand, and gravel. This is, indeed, a great evil, and one which unfortunately is most difficult of cure. So obscure and apparently capricious are the causes which lead to the formation of shoals, that in the present state of our knowledge it would be little short of *quackery* to lay down any general rules for the guidance of the engineer. In fixing on the site for a harbour, all existing obstructions should be examined to ascertain whether there be a tendency to deposit, and the works should be kept as far as possible from places where the tendency is most strongly developed. The agents which occasion bars at the mouths of harbours are the waves, the tide currents, and land streams where they exist. Rivers are often more pernicious than beneficial in their effects, especially where they intersect a gravelly soil; but in some cases the descending gravel may be successfully intersected by the erection of weirs from which the accumulations must be from time to time removed. We agree with Sir H. De la Beche in believing that the bars at the mouths of rivers are most generally formed by the constant tendency of the waves to preserve the *continuity* of the beach profile. It is therefore not to be wondered at, that heavy gales should distort and fill up the narrow trench which the back waters cut in gravelly or sandy beaches. The erection of breakwaters on each side has undoubtedly a good effect in protecting the channel, but still a bar is very apt to form outside of the breakwaters. In some cases the depth of the track might probably be maintained by driving, on each side of the mid-channel, dwarf piles to which continuous walings should be attached so as to confine the current at low-water. The timber framework should not project more than a foot or two above the bottom, which in some cases might be planked. This, however, is but a hint, and has, so far as the author is aware, never been tried. The principle on which the proposal is based is that of contracting the low-water channel to a smaller width than that of the high-water channel, and thus by fixing the low-water track, to prevent a tortuous channel. The same principle was adopted by the writer with success in controlling and fixing the meanderings of a gravelly river, which is subject to very sudden and heavy freshes.

Advantages of government supplementing local funds.

The want of sufficient funds occasions a great national loss in the construction of our harbours. The history of a large majority of those ports which have been erected by private or local enterprise, presents but a record of the building of piers at one period when the funds were small, and of taking them down at another when the trade had increased and more room and accommodation were required. Want of funds often prevents the original works from being carried within deep water, and in consequence the most expensive part of the protecting breakwater is often put down just in the very place which has afterwards to be converted, at great expense, into a deep water access or berthage. Sometimes, indeed, a whole line of pier is, from motives of economy, placed in such a manner as to interfere most materially with what might have been by far the best and safest berths for shipping, so that in the further extension of the works a great part of the old harbour has to be demolished. Want of a proper marine survey has also often led to very serious errors in the position of the piers.

To such an extent has this system prevailed, that were an engineer called on to value many of our works as they exist at present, his estimate, however fairly and fully made out, would fall lamentably short of the actual cost. This estimate would proceed on a measurement of what he sees, while the actual cost would include the building of piers and jetties which had long since ceased to exist. For these reasons we conceive there could hardly be a more advisable expenditure of the public money than by a system of grants for supplementing the local funds on a liberal scale. With such aid the authorities on the spot would be enabled to protect and improve the existing physical advantages which the shores possess, by preventing the construction of proposed improvements on too narrow a scale. But a comparatively slight increase of the means would, in instances of which the writer is aware, have inclosed a great extra area, and secured a deeper access with superior internal tranquillity, the want of which now cripples the trade, and is the subject of lasting regret to all frequenting the harbours.

For other subjects connected with harbours *vide* articles on DOCKS, and PORTS.

Reference may be made to *Brit. Assoc. Rep.* 1850 (Scoresby); *Min. Inst. Civ. Eng.* 1848 (Rankine); Do. 1847 (Scott Russell); Do. 1844 (Bremner); Smeaton's *Reports, passim. Rep. Com. on Waves by Brit. Assoc.*, J. S. Russell, Lond. 1848. *Researches on Hydrodynamics*, J. S. Russell,—*Trans. Roy. Soc. Edin.*, vol. xiv. 1837. *Account of Experiments on Force of Waves of Atlantic and German Oceans*, Thomas Stevenson,—*Trans. Roy. Soc. Edin.*, vol. xvi. 1845. *On Reduction of Height of Waves after passing into Harbours*, T. Stevenson,—*Edin. New Phil. Journ.*, 1852. *Account of the Plymouth Breakwater*, by Sir J. Rennie, London 1848. Belidor's *Architecture Hydraulique*, Paris. Semple's *Treatise on Building in Water*, Dublin, 1776. *Royal Tidal Harbour Commissions Reports* (Captain Washington), London 1845–6. The Article on Tides and Waves in the *Encyclopædia Metropolitana*, by G. B. Airey, Astronomer Royal. *Report by Commissioners of Harbours of Refuge*, with the *Protest*, by Sir Howard Douglas.

(T. S.)

HARBURG, a seaport town of Hanover, province of Lüneburg, on the left bank of the southern branch of the Elbe, opposite Hamburg which stands on the right bank of the northern branch of that river. The distance between Harburg and Hamburg is about 4½ miles, and regular steam communication is maintained between them at least six or eight times a day. Harburg communicates also with Hanover by railway, and carries on a considerable trade, chiefly transit, between Hamburg and the countries south of the Elbe. It has manufactures of linen, hosiery, soap, starch, refined wax, leather, &c. It is a place of some strength, being surrounded by walls, and defended by a citadel. Pop. 5500.

HARDERWYK, a town of Holland, province of Guelderland, on the Zuyder Zee, 30 miles E. of Amsterdam. It is fortified on the land side, and has a barrack, a Calvinistic and a Roman Catholic church, two orphan asylums, and a gymnasium. The inhabitants are chiefly engaged in fishing and in the corn trade. Pop. 4400.

HARDICANUTE, Hardecanute, or Hardiknute, the eldest son of Canute the Great, by Emma the "Flower of Normandy," whom he had married after the death of her first husband, Ethelred II. At the time of Canute's death, Hardicanute, his eldest legitimate son, happened to be absent in Denmark, which country had been entrusted to him as his father's viceroy, and his half-brother Harold usurped the throne. Hardicanute being of an easy and self-indulgent nature, remained quietly in Denmark, giving himself no concern about his political interests. At the instance of his mother Emma, however, he had just begun to fit out a fleet for the purpose of recovering his rights, when a deputation of English barons brought him the news that the usurper was dead, and that the crown was in his gift. His reign extended over little more than two years; and was not distinguished by any event of importance. He spent his time chiefly in eating and drinking, in both of which he indulged to excess. His inglorious career was terminated by a stroke of apoplexy, June 8, 1042.

HARDNESS, that property in bodies by which they resist abrasion from the impression of any other substance. The method pursued in constructing tables of the hardness of different substances is by observing the order in which the articles tried are capable of cutting or scratching one another. The following table, extracted from Magellan's edition of Cronstedt's *Mineralogy*, was taken from Quist, Bergman, and Kirwan:—

	Hardness.	Spe. grav.		Hardness.	Spe. grav.
Diamond from Ormus	20	3·7	Sardonyx	12	2·6
Pink diamond	19	3·4	Occidental amethyst	11	2·7
Bluish diamond	19	3·3	Crystal	11	2·6
Yellowish diamond	19	3·3	Carnelian	11	2·7
Cubic diamond	18	3·2	Green jasper	11	2·7
Ruby	17	4·2	Reddish yellow ditto	9	2·6
Pale ruby, from Brazil	16	3·5	Schoerl	10	3·6
Ruby spinell	13	3·4	Tourmaline	10	3·0
Deep blue sapphire	16	3·8	Quartz	10	2·7
Ditto paler	17	3·8	Opal	10	2·6
Topaz	15	4·2	Chrysolite	10	3·7
Whitish ditto	14	3·5	Zeolite	8	2·1
Bohemian ditto	11	2·8	Fluor	7	3·5
Emerald	12	2·8	Calcareous spar	6	2·7
Garnet	12	4·4	Gypsum	5	2·3
Agate	12	2·6	Chalk	3	2·7
Onyx	12	2·6			

A similar but shorter table is now generally used, in which diamond is rated at 10.

HARDOUIN, Jean, better known as Pere Hardouin, one of the most learned, and at the same time most singular men whose names are to be found in the history of letters, was born at Quimper, in Brittany, in 1646. His youth gave little promise of his future distinction, and it was with difficulty that he was admitted into the order of the Jesuits. After the usual preliminaries he went to Paris to complete his theological studies. He there undertook to edit the *Natural History* of Pliny for the series of the Delphin Classics. In trying to determine the positions of the towns mentioned by Pliny, he became sensible that a knowledge of medals would assist him in clearing up different points of ancient geography; and with this view he immediately applied to the study of numismatics, in which he soon rendered himself profound. His edition of Pliny was completed in five years, and, when it appeared, made his name known to all Europe. This work, which, according to Huet, would have occupied any five ordinary scholars fifty years, met with so flattering a reception, that Father Hardouin could not enjoy his success with moderation. The commendations which poured in upon him from all quarters intoxicated him with pride; and he no longer spoke of other antiquaries, except with the utmost contempt. The latter in their turn depreciated his merits, and exaggerated his faults. Hardouin replied with bitterness, and at length had recourse to the wildest paradoxes in his attempt at self-defence. In one of his works, *La Chronologie expliquée par les Médailles*, he ventured to maintain that ancient history had been entirely recomposed by the monks of the thirteenth century, and that the only genuine remains of Latin antiquity were the works of Cicero and Pliny, the Georgics of Virgil, and the satires and epistles of Horace. In 1708 his ecclesiastical superiors compelled him to retract this opinion, but his retractation made no real change in his views. He died at Paris, September 3, 1729, in the eighty-third year of his age. His principal works are:

Nummi antiqui Populorum et Urbium illustrati, de re monetaria veterum Romanorum ex Plinii Secundi sententia, Paris, 1684, in 4to; *Antirrheticus de Nummis antiquis Coloniarum et Municipiorum ad Jo. Foy-Vaillant*, ibid. 1689, in 4to; *C. Plinii Secundi Historiæ Naturalis, libri xxxvii.*, Paris, 1689, in five vols. 4to; *S. Joannis Chrysostomi Epistola ad Cæsarium monachum, notis illustrata*, Paris, 1686, in 4to; *Chronologiæ ex Nummis antiquis restitutæ specimen primum*, Paris, 1696, in 4to; *Opera Selecta*, Amsterdam, 1709, 1719, in folio; *Conciliorum Collectio Regia Maxima*, Paris, 1715 and the following years; *Apologie d'Homère, où l'on explique le véritable dessein de l'Iliade, et la Théo-mythologie*, Paris, 1716, in 12mo; *Opera Varia Posthuma*, Amsterdam, 1733, in folio; *Commentarius in Novum Testamentum*, Amsterdam, 1742, in folio; *Prolegomena ad censuram Scriptorum veterum*, London, 1766, in 8vo; and a very great number of Dissertations, chiefly on Medals, in the *Mémoires de Trevoux.*

HARDWICKE, Earl of. See Yorke, *Sir Philip.*

HARE. See index to Mammalia.

HARE, Julius Charles, M.A., an eminent clergyman and dignitary of the Church of England, was born at Herstmonceux, in the county of Sussex, on the 13th of September 1795. His father, the Rev. Robert Hare, who was a younger son of Bishop Hare, held, along with the family living of Herstmonceux, the rectory of Barton Stacey, and in his later years was a prebendary of Winchester. His mother was a daughter of Dr Shipley, Bishop of St Asaph. Their family consisted of four sons, of whom the subject of this notice was the third. The oldest, Francis, and the youngest, Marcus, died early, and without having acquired distinction; the second, Augustus William, who became a fellow of New College, Oxford, and rector of Alton Barnes, Wiltshire, though prematurely cut off in 1834, has secured for himself a permanent reputation, partly as the associate of his younger and more famous brother in one of his most widely circulated publications, partly by two volumes of sermons published after his death, and of which a very impartial and competent critic has said, that "for an illiterate audience—an audience of rustics—they appear in point of diction perfect models of what discourses ought to be."[1]

The Rev. Robert Hare died while his sons were yet young. Their early education was superintended by their mother, a woman of cultivated mind, and who added to an energy derived from her father, a grace and beauty of character peculiarly her own. To her and to her sister, Lady Jones, widow of the celebrated orientalist, the subject of this notice owed much of his early training. Of his juvenile life a considerable portion was spent on the Continent, and there, it is presumed, were laid the foundations of several peculiarities both of style and sentiment by which he was afterwards characterized. After passing through the usual course at the Charter-house, he was removed to Cambridge, in 1812, where he remained, with a brief interval, for twenty years. He became a Fellow of Trinity College in 1818, and in 1822 he assumed the duties of assistant-tutor of the college. During his residence at Cambridge he was engaged in amassing that treasure of classical and philological learning which formed the basis of his intellectual furniture, and in forming that habit of mind and tendency of thought by which he was afterwards peculiarly distinguished. To this the study of German literature, and of the writings of Coleridge and Wordsworth, contributed, along with that of the literary treasures of ancient Greece and Rome. Nor were there wanting the plastic influences of congenial society and the collision of kindred minds, for Trinity College numbered then among its members, who were Mr Hare's contemporaries, not a few whose names have since added splendour to the ancient glories of that foundation. We have Mr Hare's own testimony to the effect that he owed "the building up of his mind, and much happiness for more than twenty years, to the friends he found amongst the members of Trinity College;"[1] and one of the most distinguished of these friends has recorded that when Mr Hare left Cambridge it was to his "great sorrow and that of many more."[2]

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[1] *Edinburgh Review*, vol. lxxii., p. 86.

Whilst at Cambridge, Mr Hare published a work in two volumes, under the title of *Guesses at Truth, by Two Brothers*. Part of this work, which consists of apophthegms and reflections in various departments of knowledge, was contributed by his elder brother, but the greater part was furnished by himself. There, too, he, in conjunction with his friend the Rev. Connop Thirlwall, now Bishop of St David's, executed the translation of the first two volumes of Niebuhr's *History of Rome*, of which vol. i. was published in 1828, and vol. ii. in 1832. He also united with the same friend and some others in publishing the *Philological Museum*, a periodical of which only two volumes were completed, but which contributed much to introduce a profounder habit of studying ancient literature than had previously for several generations characterized English scholars. To this journal Mr Hare contributed largely, both by translations from the German and by original articles. Among the latter are some intended to vindicate those departures from the ordinary mode of spelling some words in which he indulged, and the uncouth appearance of which, together with some roughnesses of style, led a facetious critic to designate him punningly Julius Hirsutus.

The family living of Herstmonceux having become vacant in 1832 by the death of his uncle, Mr Hare quitted Cambridge to assume the duties of rector of that parish. Before entering upon these, however, he availed himself of the opportunity to pay a visit to the Continent, in the course of which he spent some time at Rome. Here commenced his intimacy with the Chevalier Bunsen, an intimacy which was afterwards ripened into the most cordial friendship when the latter came to reside in England as the representative of the Prussian court. When he published his great work on *Hippolytus and his Age*, the learned diplomatist dedicated part of it to Mr Hare, "as a monument of a life-long friendship;" and in the body of the work he addresses him thus,—"My dearest friend, together with whom for nearly twenty years I have had the happiness of thinking and inquiring, and in whose love of truth I have found no less comfort than in your erudition and critical judgment."[3]

At Herstmonceux, Mr Hare devoted himself with laudable fidelity to the duties of his office. He laboured to accommodate his style of thinking and speaking to his rustic auditors, with a perseverance deserving of all praise, though without, we fear, any large measure of success; at any rate, if the two published volumes of his Parish Sermons may be taken as a specimen of his ordinary teaching, the peasantry of Herstmonceux must possess a taste for "painful preaching" exceeding even that of the Puritans, if they did not many a time weary for the close of his discourse. Nor did he much excel in the more private duties of a parish minister. The truth is, he was not quite in his place in such a sphere. His habits and the peculiar cast of his mind fitted him rather for the study than the pulpit, and for intercourse with the learned and the thoughtful than for acting the part of a teacher or a comforter of the illiterate. He had collected a magnificent library, to which he went on continually adding, until it had covered nearly all the inside walls of his rectory; and it was his delight to pursue, amidst these treasures of literature, with painstaking minuteness, researches into those departments to which he had addicted himself, and which, besides philology, embraced history, philosophy, and theology. The stores thus accumulated he delighted also to communicate to all who were privileged to enjoy his friendship, though it must be confessed that the stream sometimes came forth with a volume and a rapidity that made it impossible for less capacious minds to sustain themselves under it. As a preacher he was more in his place at Cambridge, where he delivered the two courses of sermons afterwards published under the title of *The Victory of Faith*, 8vo, 1840, and *The Mission of the Comforter*, 2 vols. 8vo, 1846; but even with such an audience there was something in his style of thought and expression that stood in the way of his success; and it is even recorded that on one occasion the spirit of undergraduate impatience found utterance, and his sermon "was closed amidst the audible scrapings and shufflings of a multitude of invisible feet on all sides of the eloquent preacher."[4] When in 1840 he was appointed Archdeacon of Lewes, a still more congenial and suitable sphere was secured to him for the exercise of his peculiar powers, in the periodical charges which it formed part of his official duty to deliver to the clergy of that archdeaconry; though it must be confessed that even here also the acceptibility and usefulness of his addresses were not a little marred by that excessive prolixity which was the besetting sin of his written discourses. "If I had been one of his clergy," said an eminent prelate, after looking over one of his published charges, "and been *charged* in that style, I should have been like a gun—I should have *gone off*."

Sometime after settling at Herstmonceux, Mr Hare married a sister of his friend and former pupil, the Rev. F. D. Maurice. This union was a source of unfailing happiness to him, as well as in some respects of spiritual enlightenment and comfort. An internal disorder, to which he was subject, and under which his strength gradually sank, rendered invaluable the society and the tender care of such a partner. To her it was given to "cast a steady sunshine over his life" during its latest years. These years were years of unremitting toil, though also of frequent suffering and progressive decay. He delivered his last charge to his clergy in the autumn of 1854; he spoke with difficulty, and all could see that the hand of death was upon him; but he lingered on till the 23d of January 1855, when he peacefully expired in the arms of his wife. He was buried at Herstmonceux on the 30th of the same month.

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[1] Dedication of *The Victory of Faith*.

[2] Whewell's Dedication of *Four Sermons on the Foundation of Morals*.

[3] Vol. i., p. 330, 2d edit.

[4] *Quarterly Review*, No. 193, p. 14.

The works of Archdeacon Hare are chiefly theological and controversial. His translation of Niebuhr, and his contributions to the *Philological Museum*, constitute the whole of what he did of a purely literary character, if we except some early and unacknowledged translations from the German, and a few portions of the *Guesses at Truth.* His theological writings consist almost exclusively of sermons preached either in the ordinary course of parish duty or on special occasions. The most important in every point of view is his *Mission of the Comforter*, a series of discourses on John xvi. 7–11, followed by an immense mass of notes. His published charges are numerous, and relate to almost all the more prominent topics of public interest affecting religion which have been before the mind of the public during the last fourteen years of his life. Besides these, most of which are of a controversial character, he was the author of several publications on controverted topics; and at the time of his death he was engaged on the revisal of the largest and perhaps the weightiest of these, his *Vindication of Luther*, which had first appeared as a note to the *Mission of the Comforter.* So many of these controversial publications were devoted to the vindication of others, that he used to say playfully that he should one day collect them all in one volume, under the title of "Vindiciæ Harianæ, or the Hare with many friends,"[1] a witticism which, though not original, was one to which he had a hereditary right, the title of the old fable having been jocularly applied by the famous Duchess of Gordon to his relative, James Hare. His *Life of Sterling* may be regarded as coming under the head of these friendly vindications.

As a writer, Archdeacon Hare is distinguished by breadth of view, copiousness and accuracy of learning, massiveness of conception, and an earnest but not very dexterous handling of his materials. His writings have been defrauded of their proper influence and reputation, partly by his orthographical peculiarities, principally by his rugged and operose style. Though thoroughly, almost fastidiously, English in respect of words and idioms, his style was German rather than English in respect of the construction of sentences. This was especially unfavourable to him as a controversialist. The great defect of his writings in this department is their want of point. An intelligent reader cannot but see that the true answer which the side espoused by the writer demands is there, but it is so involved in the mass of matter that it fails to tell as it otherwise might. In spite of such drawbacks, however, these writings contain such a vast amount of sound and wise thinking, are so pervaded by an almost boundless learning, and indicate such a truth-loving, just, and earnest spirit, that they cannot fail to secure for their author a permanent place among the theological writers of his age and country.

As a churchman, Archdeacon Hare belonged to what has been called the Broad Church, not so much from any latitudinarianism on the part of those composing it, as from the eclectic tendency of their theological studies. With the spirit of this party he was deeply imbued. He sought truth wherever it was to be found, and he embraced it when found with a simple and loving spirit. Standing aloof alike from Puseyite and Evangelical, he sought to admire what might be good in either party, or to learn from either whatever it had to teach that was true. On the cardinal truths of Christianity his opinions, as expounded in his writings, are very much those of the Evangelical Arminian school; though on some points, such as the nature of the atonement, his views seem vague and indefinite. See *Quarterly Review*, No. 193, and *British and Foreign and Evangelical Review*, No. V. (W. L. A.)

HAREM. See CONSTANTINOPLE, TURKEY.

HARFLEUR (*Harfloricum*), a small town of France, department of Seine-Inférieure, on the Lézarde, about a mile from its confluence with the Seine, and 4 miles E.N.E. of Havre, on the railway between that town and Paris. It has a fine Gothic church, surmounted by a beautiful tower and spire; and has some manufactures of earthenware, and a sugar refinery. In the middle ages it was an important fortress and harbour. It was taken in 1415 by the English, who expelled the inhabitants and re-peopled the town. In 1433 it was recovered by the French; in 1440 it was again stormed by the English, but was about ten years afterwards finally captured from them by Charles VII. of France. The fortifications have been demolished, and the harbour is now dried up. Pop. about 1700.

HARIHARA, a town and fortress of Southern Hindustan, at the N.E. quarter of the native kingdom of Mysore, on the S.E. bank of the Toombuddra River. In the fort there is a celebrated temple of Vishnu, and among the inhabitants there are many of low caste. The British cantonment here is situate on an extensive plain, 1500 yards from the river, towards which the ground gently slopes. The water of the river is good, but the distance renders it inconvenient to resort to it for a supply, so that it is generally obtained from wells, being usually found at a depth of about 40 feet. The elevation of the cantonment above the sea is about 1900 feet. The place being formerly situated on the confines of two countries, has often changed masters. After the defeat of Ram Rajah, and the destruction of the Bijanagur sovereignty, it became subject to the Adil Shahee dynasty of Bejapore. On the destruction of the dynasty by the Moguls, it fell into the hands of the nabob of Savanoor, from whom it was afterwards taken by the rajah of Ikery, who was expelled by the Mahrattas; and these, after a period of fifteen years, were driven out by Hyder. On the death of Tippoo, and the division of his country, it was one of the districts ceded to the British, and is now included in the state of Mysore. E. Long. 75. 51., N. Lat. 14. 31.

HARINGTON, SIR JOHN, an English poet, was born at Kelston, near Bath, in 1561, instructed in classical learning at Eton School, and thence removed to Cambridge, where he took his degree in arts. At the age of thirty, he published a translation of the *Orlando Furioso*, which, though executed without spirit or even accuracy, enriched our poetry with new stores of imagery and romance. Harington was knighted in the field by Essex, to the great displeasure of the queen, who wished all such honours to emanate from herself; and in the reign of King James he was created a knight of the Bath. He was a favourite of Prince Henry, to whom he presented a manuscript, directed chiefly against married bishops. This production was intended for the private use of the prince; but being afterwards published, it raised a great clamour against the author, who had otherwise incurred suspicion, if not odium, by supporting Raleigh in his suit for the manor of Banwell, belonging to the bishopric of Bath and Wells, on the presumption that the actual incumbent had incurred a *præmunire* by marrying a second wife. Sir John died in 1612. His epigrams, which were the most popular of his works, though possessing little poetical merit, appeared first in 1618, and afterwards in 1625. The *Nugæ Antiquæ*, a miscellaneous collection of his works, was published in 1792, and again in 1804, with illustrative notes and a memoir of the author.

HARLEQUIN, in the Italian comedy, a buffoon dressed in parti-coloured clothes, and answering to our merry-andrew or jack-pudding. Harlequin has also been introduced upon our stage, and is one of the standing characters in the modern pantomime. The term, according to Ménage, took its origin from a famous Italian comedian who appeared at Paris in the time of Henry III., and, from frequenting the house of M. de Harlay, was called by his companions *Harlequino*, little Harlay.

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[1] *Quarterly Review*, No. 193, p. 24.

HARLEY, Robert, Earl of Oxford, was born in 1661. His father, Sir Edward Harley, was the head of a great Puritan family in Herefordshire, who had distinguished himself in the long parliament, and commanded a regiment under Essex, but who, when Cromwell and his party had crushed every thing that stood in their way, had gone into opposition, and when at length the Restoration was mooted, did his best to promote it. For his services he was made governor of Dunkerque. His son, Robert, entering parliament at the Revolution as member for Tregony in Cornwall, and afterwards for Radnor, distinguished himself at first as an intolerant and vindictive Whig. It was soon noticed, however, that his favourite companions were men whose political creed was exactly the opposite of his own. He called himself a Whig of the old stamp, and professed to hold kings generally in abhorrence. The cavaliers hated the reigning king, whom they called a usurper: and thus it was that Harley combined with them in thwarting William whenever occasion offered. He was thus cautiously paving the way for a change which he had long meditated. After the general election of 1690, he began gradually, though almost imperceptibly, to identify himself with the Tory party, with whom he now voted almost regularly. Though a man of mean capacity, and a poor speaker, he yet possessed many qualities which made him a valuable partizan,—indefatigable industry, a large extent of reading, especially of the antiquarian kind—and as, unlike most of the political celebrities of that day, he had no very scandalous vices, his moral weight was a great deal higher than it deserved to be. As was natural he soon rose; he was made speaker under the Tory administration of Godolphin in 1701; in the next parliament he was re-appointed, and held the office till he was made Secretary of State in April 1704. His elevation he is known to have owed in good part to the intrigues of Mrs Masham, whose marriage Harley had brought about, and who requited the favour by exerting on his behalf her interest with the Queen. That influence was now daily on the ascendant; and the once colossal power of the Marlboroughs was waning fast. An accident, however, once more changed the aspect of affairs. A clerk of Harley's was detected in a treasonable correspondence with the French Court, and was condemned to death. The popular outcry was strong against Harley, who may perhaps at this time have been innocent; and Marlborough and Godolphin, taking advantage of it, compelled the Queen to dismiss her favourite. His disgrace, however, was of short continuance, for, aided again by the favour of Mrs Masham, Harley was in 1710 made Chancellor of the Exchequer, in room of Godolphin, who resigned in that year with all his followers, and left the field open to an administration completely Tory. The influence of Mrs Masham was now supreme with Anne, and the whole Marlborough clique was discarded from court, as well as from office. Very opportunely for Harley's interests, an unsuccessful attempt made upon his life by a French agent, calling himself the Marquis de Guiscard, quieted the doubts of the Tories, who had again begun to doubt his loyalty. Two months after the outrage on his person, Harley was made Lord High Treasurer, and was rewarded with the earldom of Oxford and Mortimer, and invested with the Garter. But by far the most memorable act of his administration was the peace of Utrecht, concluded May 5, 1713. This had hardly been effected when Harley and Bolingbroke, who had hitherto acted in concert, and to whom the credit of the peace, such as it was, was chiefly due, turned into open rivalry the secret jealousy which had been fermenting between them for some time before, and began to plot each other's ruin. Harley, thinking himself independent of Mrs Masham, ceased to pay court to her as before. His rival took advantage of the mistake, and procured his dismissal July 27, 1714; but did not long enjoy his triumph, for the Queen's death a few days after terminated the public career of both. It was not known then, though the researches of Sir James Mackintosh have now put it beyond a doubt, that both Harley and Bolingbroke had been latterly in treasonable correspondence with the court of Versailles. It is not unlikely that that charge might have been made good had the trial been proceeded with when both were impeached in the August of 1715. But Bolingbroke escaped to France; and Harley, after pining for about two years in the Tower, was acquitted and set at liberty. After this he retired into private life to enjoy the society of his literary friends, and his books and MSS., to which he was deeply attached. He died May 21, 1724. The brilliant analysis of Harley's character given by Macaulay (*Hist. Eng.*, vol. iv., pp. 463-4-5), does not seem to account sufficiently for the power which Harley attained, and the influence he exercised among the men who surrounded him, who were nearly all alike unprincipled.

Harley, as has been already said, loved books and the society of men of genius and learning. He even aspired himself to shine as a wit and poet; but his works, both in prose and verse, have small chance of immortality. He was the author of a letter to Swift *On Correcting and Improving the English Tongue;* an *Essay on Public Credit*, which he seems to have little understood in practice;—for he organized government lotteries, granted monopolies, &c.;—and a *Vindication of the Rights of the Commons of England.* For an account of his splendid collection of books and MSS. see Museum, *British.*

HARLINGEN, or HAARLINGEN, a fortified seaport town of Holland, province of West Friesland, on the entrance to the Zuyder-Zee, 16 miles W. of Leeuwarden, with which it is connected by a canal. It is intersected by numerous canals, bordered with trees, and the streets are generally regular and clean. It has a neat town-hall, six churches, a synagogue, an orphan asylum, and numerous schools. There is a good harbour, but on account of sandbanks at its entrance it is not accessible to large vessels. Harlingen has manufactures of sail-cloth, gin, bricks, paper, salt, and an extensive foreign trade. Among its exports are cattle, butter, cheese, fruit, vegetables, flax, hemp, and wool. Pop. (1850) 8591.

HARMATTAN, the name of a dry hot wind which blows periodically from the interior of Africa towards the Atlantic Ocean. It prevails in December, January, and February, and is usually accompanied by a haze which often obscures the sun for several days together. It has a withering effect on vegetation, and even affects the human body so as to cause the skin to peel off. See Physical Geography.

HARMODIUS, whose name is always associated with that of his friend Aristogeiton, was regarded by the Athenians, after the expulsion of the Pisistratids, as one of their noblest patriots. The circumstances, however, which led them to the murder of Hipparchus were entirely of a personal, and not of a political nature; and when divested of all the romance attached to them by the song and ballad writers of Greece, prove that the friends are entitled to rank no higher than common assassins. The real relations subsisting between them are fully described by Thucydides, Book vi., chap. 54.

HARMONIA, in *Grecian Mythology*, the wife of Cadmus, was the daughter of Mars and Venus, or, as others say, of Jupiter and Electra. On the day of her marriage all the gods came from Olympus to witness the ceremony. The necklace and the *peplus*, or robe, which her husband presented to her on that occasion obtained a sad renown in the old mythology, from the evils they brought upon all who wore them. Polynices, into whose hands it passed, used it to bribe Eriphyle to disclose the retreat of her husband, Amphiaraus, who had hidden himself that he might escape from the Theban expedition, in which it had been foretold that he would perish. He did perish, and his son Alcmæon, hearing how his fate had been accomplished, slew his mother Eriphyle. The fatal necklace next passed to Arsinoë, then to Pronous, and Agenor, and was finally dedicated in the temple of Minerva at Delphi by Amphoterus and Acarnan, the sons of Alcmæon. Even then, however, it did not lose its powers of working mischief. The tyrant Phyllus stole it from the temple, and gave it to his mistress, who wore it for a time. Her son, however, was struck with madness, and in a frenzy set fire to the house in which his mother was. She was burnt to death, and all her treasures were consumed in the same fire which destroyed herself.

HARMONICA, a musical instrument, consisting of a number of glass cups fixed upon a revolving spindle, and made to vibrate by friction applied to their edges. Mr Puckeridge, an Irishman, is said to have been the first to use a set of drinking-glasses, fixed on a table, and tuned to form a scale by putting more or less water into each. They were made to sound by passing a wet finger round their edges. These were improved by Mr Delaval, and still further by Dr Franklin, and were called "the musical glasses." Their tone is sweet and melancholy, and of a peculiar *timbre*, which produces a painful effect on the nerves of some persons. It appears, however, that the use of musical drinking-glasses was described in a work (*Mathematische und Philosophische Erquickstunden*) published by G. P. Harsdorfer, at Nuremberg in 1677. What was called a harpsichord-harmonica, in which finger-keys like those of a pianoforte were used instead of direct contact of the fingers with the revolving glasses, was invented by Röllig at Vienna, and Klein at Presburg. Another harmonica was invented by the Abate Mazzucchi, who employed the friction of a hair-bow to produce the sounds of the glasses. A stringed harmonica was invented at Augusta, in 1788, by John Stein, an eminent organ-builder. It consisted of a double stringed (wired) pianoforte, combined with a sort of spinet, to be used together or separately. Its effects are said to have been remarkable. (G. F. G.)

HARMONICS. See Acoustics, vol. ii., p. 107.

Harmonics (acute), their production and ratios. See Music, §§ 1 and 2.

HARMONIUM, a musical instrument recently constructed by Alexandre of Paris. It has a key-board, like a pianoforte, and the sounds (which resemble those of organ-pipes) are produced by thin plates of metal, fixed at one end and free at the other, and which are caused to vibrate by means of a current of air from bellows. It is so constructed as to play either *legato* or *staccato* passages, and can swell or diminish the sounds at pleasure. Many years ago an instrument of the very same kind, called an *Eolodicon*, was invented by Eschenbach, and constructed by Voigt, a musical-instrument maker at Schweinfurt in Franconia. It was a handsome-looking instrument, and easily transportable, weighing only about 150 pounds. Its tones were beautiful, and it had the great advantage of never getting out of tune. The Eolophone is an instrument of a similar kind. (G. F. G.)

HARMONY, in *Music*. See Music, § *Harmony*.

HARMOSTÆ, in English Harmosts, were the magistrates sent by the Lacedæmonians after the Peloponnesian War to administer the government among the towns which at that time fell into their power. The limits of their power and the length of their tenure of office do not seem to have been very strictly defined. Though their commission, therefore, was to prepare the conquered cities for the re-enjoyment of their ancient liberties, they were never called to give any account of their government, which was generally more harsh and oppressive than that of the Spartans themselves.

HARO, anciently *Castrum Bilium*, a secular town of Spain, in the province of Burgos, and bishopric of Calahorra. It contains two parish churches, one Augustinian convent, one hospital, and one house of refuge; and is the centre of one of the most beautiful and fertile spots in Spain. Pop. 6235.

HAROLD I., surnamed Harefoot, was the second son of Canute the Great, by Alfgiva. On his father's death he usurped the English throne, which had been bequeathed to Hardicanute, and held it till his death in 1040. Nothing whatever is known with certainty about his character. The very reasons of his surname are disputed, some maintaining that he owed it to his swiftness of foot; others to the fact that his foot was covered with hair.

Harold II., the last Saxon king of England, was the second son of Godwin, Earl of Kent, and succeeded to the throne on the death of Edward the Confessor, January 5, 1066. His history is that of his country, and is given in minute detail in art. England. His life has afforded the materials for one of the best of Sir E. L. Bulwer's historical novels,—that of *Harold*.

HARP, a stringed instrument of music, traceable to a very remote antiquity, as is shown by the harps painted on the walls of tombs at Thebes, and described in Bruce's *Travels*, and in the splendid French work *Description de l'Egypte*. Jones and Parry have written upon the Welsh harp, Bunting upon the Irish harp, and Gunn upon the harp of the Scottish Highlanders. The modern double-action harp of Sebastian Erard has a compass of six octaves, from E to E, with all the semitones, and even quarter tones. For some observations on the harp, and especially the Irish harp and its scale, see G. F. Graham's Dissertation prefixed to Wood's *Songs of Ireland*, 1854.

HARPAGINES (ἁρπάγη), in *Antiquity*, grappling-irons which were flung with violence against the rigging of an enemy's ship, and, when entangled there, were used to drag the ship within reach, so that it might be boarded to more advantage, or destroyed.

HARPE, Jean François de la, a distinguished French littérateur of the eighteenth century, was born at Paris in 1739. Some Sisters of Charity found him abandoned by his parents in the Rue de la Harpe, whence he took his name. They took care of his early years, till he was admitted as a bursar into the Collége d'Harcourt, where he distinguished himself by his zeal and success in his studies. On leaving it he wrote a pasquinade against the masters, and was especially severe on his own old tutor, from whom he had experienced nothing but kindness. This ingratitude landed him in the house of correction at For l'Evêque, where he was detained for some months. Society was now closed against him, both by the accident of his birth and his own misconduct, and he betook himself to literature as the only career open to him. In 1763 he produced his tragedy of *Warwick*, which had great success on the stage. Grimm characterized it very truly when he said of it, "On dirait que c'est le coup d'essais d'un jeune homme de soixante ans. J' aimerais bien mieux y remarquer plus d'inégalité et de force et moins de sagesse." His other works in the same vein, *Timoléon*, *Pharamond*, and *Gustave Wasa*, were total failures. On the strength of his *Warwick*, La Harpe had married in 1764, and he now went to Ferney and lived there with Voltaire, who described him as "un four qui chauffe toujours, et ne cuit jamais." A quarrel with the patriarch of French literature, however, once more drove him to Paris, where he earned a precarious livelihood by writing éloges and essays on subjects open to competition, as well as a large number of dramas and translations from the Greek and English. In 1770 La Harpe became editor of the *Mercure de France*, and involved himself in quarrels with many fellow-littérateurs from the bitterness and personality of his criticisms. These qualities were especially manifest in his correspondence with the Grand Duke Paul of Russia, in which he dwells with acrid bitterness on all his rivals, while he expatiates with an amusing self-complacency on his own merits. But the work which above all the rest has preserved La Harpe's name, is his *Lycée, ou Cours de Littérature.* Till within a few years past, the dearth in French literature of what are called *ouvrages de haute critique*, maintained La Harpe's work in its high place; but it is now being gradually superseded. Even still, however, it is a useful guide to students of French literature, of which it traces the history from the earliest times to the beginning of the nineteenth century. The first part of the work is of little value, and the portion devoted to contemporary writers is worse that valueless. Malebranche professed to see all things in God; in the men of his time La Harpe could see nothing except through the distorting prism of his vain and intolerant jealousy. Grimm said of him in 1779,—"La Harpe has much more wit than knowledge, much less wit than talent, and much less imagination than taste." It is unfortunate that circumstances have always forced him to waste his time in speaking evil of his neighbours, and in defending himself from the enemies whom he thus raised up against himself every day. When the Revolution broke out, it had no more ardent supporter than La Harpe. But when on his refusal to countenance the extremes to which the republicans were going he was cast into prison, his views experienced a complete change, and he became a staunch supporter of church and crown. His new politics he soon found more dangerous than his old, and he was at length forced to fly for his life. After the 18th Brumaire, he resumed his lectures at the Lycée, which he continued till within a short time of his death. His boldness of speech displeased the First Consul, who appointed him his future residence at Orleans. La Harpe, however, soon after returned to Paris, where he died February 11, 1803.

HARPER'S FERRY, a village in the state of Virginia, North America, at the confluence of the Shenandoah with the Potomac, where the united stream breaks through the Blue Ridge, 53 miles N.W. of Washington. The scenery is highly picturesque, and the river is here spanned by a fine bridge about 800 feet in length. There is here a national arsenal containing from 80,000 to 90,000 stand of arms, and an armoury employing 250 person, and producing annually about 10,000 stand of arms. Pop. (1850) 1747.

HARPINGS, the fore-part of the wales which encompass the bow of a ship, and are fastened to the stem, being thicker than the after-part of the wales, in order to strengthen the ship in this place, where she sustains the greatest shock of resistance in plunging into the sea, or dividing it, under a great pressure of sail.

HARPOCRATES, in *Ancient Mythology*, the son of Osiris, who has been identified with Horus, the Egyptian god of the sun. He was the god of mystery and silence, and, on that account, used to be represented as having been born with his finger on his mouth. His worship was widely spread throughout Greece, and even in Rome itself, where at one time his worship was interdicted by the senate on account of the excesses which marked the mysterious festivals. He filled in the Egyptian mythology the place which Apollo occupied in that of Greece. His statue stood at the entrance of most of the Egyptian temples. The figure was that of a naked youth crowned with an Egyptian mitre, holding in one hand a cornucopia, and sometimes a lotus flower, sometimes a quiver.

HARPOCRATION, Valerius, a grammarian of Alexandria, in Egypt, respecting whose personal history nothing is known. Even the period during which he flourished is doubtful. Some have considered him to be the Greek instructor of the Emperor L. Verus, mentioned by Julius Capitolinus (*Life of Verus*, c. 2), while others have made him live so late as A.D. 360, because several passages are found in his work taken from Athenæus, who is supposed to have flourished about A.D. 300. Harpocration is the author of a very valuable lexicon on the ten orators, which contains a great deal of information on the law, history, antiquities, and general literature of Athens. The value of this work is much enhanced by the fact that all the authorities from which it has been compiled are lost. Suidas and the author of the *Etymologicum Magnum* have both borrowed from this work. Harpocration is also the author of a work entitled 'Ανθηρων Συναγωγη, a "Collection of Flowery Extracts" from various authors. The first edition of the lexicon was published along with Ulpian's *Scholia to the Philippics of Demosthenes*, by Aldus, Ven. 1503. Of subsequent editions, the best is that of Dindorf, Leipsic, 1824, 2 vols.; on which no improvements of much value will be found in the more recent one published by Bekker at Berlin in 1833.

HARPONULLY, a district in the S. of India, bounded on the N. by the Toombuddra River, and situated between the 14th and 16th degrees of N. Lat. It is a fertile country, and not so hilly as some of the adjacent districts; and it possesses the strong fortress of Ouchimadroog. The rajah of this district was tributary to the kings of Bejanagur and Bejapore, to the Moguls, and the Mahrattas; in 1774 he became tributary to Hyder, and in 1786 he was completely subdued by Tippoo, and sent prisoner to Seringapatam. On the capture of that city, Harponully was assigned to the nizam as a portion of his division of Tippoo's territory, and by him assigned to the British in 1800. It is now included in the Bellary collectorship, and is yearly improving in value. Harponully is 170 miles N.N.W. from Seringapatam. E. Long. 76. 2., N. Lat. 14. 47.

HARPOON, or Harping-Iron, a spear or javelin used for striking whales, &c. The *gun-harpoon* is a weapon used for the same purpose, but it is fired from a gun instead of being thrown by the hand. It is formed entirely of metal, and has a chain attached to it, to which the line is fastened. See Scoresby's *Arctic Regions.*

HARPSICHORD, a musical instrument in which the sounds are produced by stretched wires. The spinet and virginals, &c., preceded the harpsichord, which was an improvement on them; and all of these were derived from the harp. Each was really a horizontal harp inclosed in a sonorous case; the wires being struck by jacks moved by finger-keys. In the beginning of the eighteenth century the pianoforte was invented as an improvement upon the harpsichord. Instead of the jacks armed with crowquills which struck the harpsichord wires, hammers covered with prepared leather were used in the pianoforte. Mason, the English poet and amateur musician, introduced great improvements in the mechanism of the keys and hammers. Clementi, Broadwood, and other makers in London, have, since then, so greatly improved the pianoforte as to justify its being considered, in its latest form, almost an English instrument. See Pianoforte.

HARPYIÆ, or Harpies, in *Grecian Mythology*, fabulous monsters sometimes employed by the gods as the ministers of their vengeance. About their numbers and their parentage very various accounts are given. They are usually represented as two, or at most three in number; and as being the daughters of Neptune and Terra, or of Typhon. They are described as living in the islands called the Strophades, at the entrance of Orcus. They were originally represented as maidens, with wings and long flowing hair, and great swiftness of flight. They gradually became changed, however, into hideous monsters, of fierce and loathsome aspect, and living in an atmosphere that exhaled an intolerable stench. The most celebrated myth with which they are identified is that of the blind Phineus, who no sooner sat down to a meal than these foul creatures came swooping down and carried it off in their claws. In the midst of his distress the Argonauts came to his house, and he promised to aid them in their quest if they would rid him of his tormentors. The Boreades Calais and Zetes attacked them, and would have slain them had they not promised to molest Phineus no more.

HARQUEBUSS, an old species of gun, of the length of a musket, and cocked by means of a wheel. It carried a ball that weighed 1⅞th oz. A larger sort, called the great harquebuss, used in fortresses, carried a ball of about 3½ ounces. It is sometimes styled *arquebuse*, and *haquebut*.

HARRIER, a kind of hound, endowed with an acute sense of smell, and used in hunting hares. See Hound.

HARRINGTON, a small seaport town of Cumberlandshire, 5 miles N. of Whitehaven, of which it is a sub-port. It is of modern date and neatly built. The harbour has 8 feet water; and at the pier-head is a fixed light 44 feet high, seen 11 miles off. Its chief exports are coal and lime. It has a station on the Whitehaven Junction Railway. Pop. of parish (1851) 2169.

HARRINGTON, James, the author of the *Occana*, was sprung from an ancient family in Rutlandshire, and was born in 1611. In his eighteenth year he entered Trinity College, Oxford, as a gentleman commoner. His tutor was the famous Chillingworth. At the close of his university career (during which he lost his father) he set out to travel on the Continent. He visited France and Italy, but most of his time was spent at the Hague, where he enjoyed the friendship of the Prince of Orange, who, when Harrington returned to England, entrusted to him the care of his interests there. On reaching home Harrington retired into the seclusion of private life, chiefly for the purpose of working out his thoughts on the philosophy of politics; but in 1646 he was appointed groom of the bed-chamber to Charles I., then the prisoner of his own subjects. The king enjoyed greatly his society and conversation; but on his removal to the Isle of Wight was deprived of his pleasant companion, who was put into confinement for refusing to swear that he would not help the king to escape if he made the attempt. His devotion to his royal master was such, that on the day of his execution he went with him to the block. After Charles's death Harrington once more withdrew into private life, and devoted his time to his *Oceana*. He made no secret of the purport of this work, which was avowedly republican in its tendency; and the author soon became an object of marked suspicion both with the Royalists and the leading men of the Commonwealth. When the *Oceana* was passing through the press it was seized by order of Cromwell, but restored to its author at the instance of the Protector's favourite daughter Mrs Claypole, whose sympathies Harrington had enlisted by an ingenious ruse, of which a full account is given in his *Life* by Toland. The leading principles of the *Oceana* are, that the natural element of power in states is property, and that of all kinds of property that in land is the most important, as it possesses certain characteristics which distinguish it in its natural and political action from all other property. Carrying out this principle, he insists on what he calls an equal Agrarian law as the basis of his imaginary republic. Another feature of the *Oceana* not to be overlooked is the plan of the vote by ballot, which Harrington advocates with great power. Many answers to the *Oceana* soon appeared. The most memorable of these was Baxter's *Holy Commonwealth*, which, however, was publicly burned at Oxford in 1683, along with the political writings of Hobbes and Milton. Harrington defended himself against these attacks both by his pen and by propagating his doctrines through the medium of the "Rota," a club which he instituted, and where he nightly lectured and discoursed on the advantages of his republic. At the Restoration this club was dissolved, but its founder was seized and thrown into prison as a conspirator. He vehemently denied the truth of the charges brought against him, but it was in vain that he applied either for his freedom or a public trial. His mind at last gave way, and his liberty was then restored. By skilful treatment his health was re-established, but his faculties never recovered their tone. He now married, but survived his marriage for only a short time, dying September 11, 1677, at the age of sixty-six.

Hallam, in his *Literature of Europe* (iv. 367), remarks of Harrington, "In general it may be said of him that he is prolix, dull, pedantic, yet seldom profound; but sometimes redeems himself by just observations." This is true of the style of the *Oceana*; but it is extremely unjust to the ingenuity, truth, and depth of many of Harrington's views on political philosophy. It is not fair to deny him the praise, undoubtedly due, of having expounded and illustrated the views he adopts more clearly than any preceding writer. Harrington's complete works were published in 1700 by Toland; and a more complete edition in 1737 by Birch.

HARRIOT, Thomas, an eminent mathematician, was born at Oxford in 1560. After the usual preparatory training, he entered St Mary Hall as a commoner, and took his bachelor's degree in 1579. He then distinguished himself by his skill in the mathematics, and became preceptor in that science to Sir Walter Raleigh. In 1585 he accompanied the first colony sent out to Virginia; and having surveyed that country, ascertained its natural productions, and observed the manners and customs of the aboriginal population, he published an account of it, which was afterwards reprinted in Hakluyt's *Voyages*. On his return to England, after an absence of two years, he resumed his mathematical studies with such zeal and success, that Henry, Earl of Northumberland, the liberal and enlightened protector of the learned, assigned him a yearly pension of L.120. The same nobleman also pensioned Robert Hues, known by his Treatise on the Globes, and Walter Warner, who is supposed to have communicated to Harvey the first hint concerning the circulation of the blood. Both these persons were mathematicians; and, in 1608, when the earl was committed to the Tower for life, they, along with Harriot, were his constant companions, and usually styled his magicians. They had a table at the charge of the earl, who constantly conversed with them, to beguile the tedium of his confinement as did also Sir Walter Raleigh, who was then a prisoner in the Tower. Harriot lived for some time at Sion College, and died at London on the 2d of July 1621, at the age of sixty, after having suffered much from a cancer in the lip, occasioned by a habit he had contracted of holding in his mouth instruments of brass often charged with verdigris. He was universally esteemed on account of his learning. A manuscript of his entitled *Ephemeris Chrysometria* is preserved in Sion College; and his *Artis Analyticæ Praxis ad Æquationes Algebraicas resolvendas* was published at London in 1631, folio. Descartes has been charged with taking from this book many improvements in algebra, which he afterwards published to the world as his own; but notwithstanding all that has been said by Wallis in his account of the discoveries of Harriot, and by Zach in the *Astronomical Ephemeris* for 1788, there seems to be no good ground for the charge; and it would even appear that much that incontestibly belongs to Vieta or Descartes has been ascribed to Harriot. Montucla has reduced to their just value the services of the English mathematician, and shown that these, when truly estimated, are sufficiently important to entitle him to a place in the second rank, amongst those men who have contributed to the progress of the mathematical sciences. (See Dissertations Third and Fourth, prefixed to this work.) From some papers of Harriot, discovered in 1784, it appears that he had either procured a telescope from Holland, or divined the construction of that instrument; and that he coincided, in point of time, with Galileo in discovering the spots on the sun's disc.

HARRIS, James, a distinguished English writer on the subject of grammar, was born at Salisbury on the 20th of July 1709. He received his early education at Salisbury, whence he was removed to Oxford at the age of sixteen; and having passed the usual number of years as a gentleman commoner at Wadham College, he was entered at Lincoln's Inn as a student of law, though not intended for the bar. When he had attained his twenty-fourth year, his father died; and this event having at once freed him from all control, and placed him in the possession of an independent fortune, enabled him to exchange the study of law for other pursuits more congenial to his taste. The decided bent of his mind had always been towards the Greek and Latin classics, which he preferred to every other kind of reading; and to the study of these authors he now applied himself with unremitting assiduity during a period of fourteen or fifteen years. The first fruit of this lengthened course of application was a volume which he published in 1744, containing three treatises; one on Art, another on Music, Painting, and Poetry, and a third on Happiness. These treatises are illustrated with a variety of learned notes and observations; and one of them, that upon Art, has been commended by Lord Monboddo as containing "the best specimen of the dividing or diæretic manner, as the ancients called it, that is to be found in any modern book." But the work by which he is best known is his *Hermes*, a philosophical inquiry concerning universal grammar, which appeared in 1751, 8vo. "Those who would enter deeply into the subject" (of universal grammar), says Dr Lowth, "will find it fully and accurately handled, with the greatest acuteness of investigation, perspicuity of application, and elegance of method, in a treatise entitled *Hermes*, by James Harris, Esq.; the most beautiful example of analysis that has been exhibited since the days of Aristotle." To this eulogium, however, the philosophical grammarians of the present time are not by any means disposed to subscribe. Without questioning the learning displayed in the *Hermes*, we may venture to affirm, that the arrangement of the parts of speech into substantives, attributives, definitives, and connectives, is entirely arbitrary; that nothing whatever is gained by this departure from the ordinary classification, excepting perhaps to impart to the work an appearance of originality, which, upon examination, will be found to vanish; that, though professing to treat the subject of grammar in a philosophical manner, Mr Harris is in reality the slave of authority; and that there is no quality for which his work is less distinguished than that rigid analysis which Bishop Lowth has somewhat hastily given him credit for. This, we think, has been fully established in the article GRAMMAR of the present work, to which accordingly the reader is referred for more ample information. Mr Harris's attention seems to have been first directed to this subject by the *Minerva* of Sanctius, to which he has confessed himself indebted for much valuable information; but it is somewhat remarkable, that with the treatise of Apollonius (*De Constructione Orationis*) also before him, he should not have avoided the narrow and confined views which he has adopted on particular points, or should have missed principles which would have served to guide him through the intricacies in which he is frequently entangled. Mr Harris's other productions are, *Philosophical Arrangements*, published in 1775, being part of a larger work which he had meditated, but did not complete, on the peripatetic logic; and *Philological Inquiries*, printed in 1780, but not published till 1781, containing not so much a regular system, as a summary of the conclusions to which the philosophy of the ancients had conducted them in their critical inquiries. After severe suffering from illness, Mr Harris expired on the 22d of December 1780, in the seventy-second year of his age. In 1801, his son, Lord Malmesbury, published an edition of his works in two volumes quarto; prefixed to which is a biographical sketch of the author from the pen of the editor.

HARRIS, a district of the Outer Hebrides, comprehending the southern part of Lewis, and the small islands surrounding it, of which Bernera, Scalpey, Scarp, Anabich, Tarrinsey, Pabbey, Ensey, and Killigrey, are inhabited. The mainland of Harris is separated from the rest of Lewis by an isthmus about 6 miles across, formed by the harbours of Loch Resort on the W., and Loch Seaforth on the E. coast. It is about 20 miles in length, but of very unequal breadth, being deeply indented by arms of the sea; its general breadth, however, is from 6 to 8 miles. The surface is bleak, rocky, and unproductive; but on the shore are patches of cultivated land, and the valleys afford tolerable pasturage. Pop. of parish or district (1851) 4250.

HARRIS, Sound of, a navigable channel between Harris and North Uist. It is 9 miles in length by from 8 to 12 in breadth, and is studded with rocks, shoals, and islets.

HARRISBURG, a city in the United States of North America, capital of Pennsylvania, and the seat of justice of Dauphin county, is situated on the E. bank of the Susquehanna River, 100 miles W. by N. of Philadelphia. It stands on an elevated plain between the river and Paxton Creek. The state buildings occupy an eminence in the north part of the town. The capitol is an extensive brick building, 180 feet long by 80 feet wide, having a circular portico in front, supported by 6 Ionic columns, and surmounted by a dome. On each side of the capitol is a smaller building, uniform in design, and containing the executive chamber, the state treasury, &c. Harrisburg also contains a state arsenal, county-prison, bank, savings' bank, about twelve churches, Masonic hall, and a Lancasterian school. Among its manufactories are two extensive iron furnaces, a rolling mill, and several breweries and potteries. One daily and eight weekly newspapers are published here. The Pennsylvania railway is here connected with the Lancaster and Harrisburg railway. Harrisburg was founded in 1785, was incorporated in 1808, and in 1812 it became the capital of the state. Pop. (1853) about 8500.

HARRISON, John, the inventor of the gridiron pendulum, an ingenious recoil escapement, and the going fusee, was born in 1693 at Faulby, near Pontefract in Yorkshire. His father was a carpenter, and the son wrought for some time at the father's trade, eking out his gains by occasionally surveying land, and repairing clocks and watches. In 1700 he removed with his father to Barrow in Lincolnshire, and spent much of his time in devising improvements on the machinery of watches. In 1714 government had offered a reward of ten, fifteen, and twenty thousand pounds respectively for a method of determining the longitude at sea within 60, 40, or 30 miles. In 1735 Harrison presented himself before the Board of Longitude at London, with an instrument, which he submitted for inspection to Halley, Grahame, and others. At their instance Harrison was sent in a royal ship to Lisbon to test it, and by it he corrected the reckoning a degree and a half. The commissioners rewarded him with L.500 to enable him to carry on his experiments, which, after some failures, resulted in his producing an instrument so accurate that in the course of a voyage to Jamaica and back it was found to have gone wrong by less than two minutes. Harrison accordingly claimed the reward of L.20,000, which, after a second voyage to Jamaica, and other tests, was finally paid down to him in 1767. Harrison died in 1776 at the age of eighty-two. Till his death he never got over the defects of his early training. He could express himself with perfect clearness and precision on the subject of his art, but, like most uneducated men, he utterly failed when he tried to express his thoughts in writing. This is manifested in his

Description concerning such Mechanism as will afford a nice or true Mensuration of Times. (Hutton's *Math. Dict.; Biog. Brit.;* see also art. Clock and Watch Work.)

HARROGATE, or Harrowgate, a small town and watering-place in the West Riding of Yorkshire, 20 miles W. of York. It is indebted for its rise and importance to its medicinal springs, and is now one of the principal watering-places in the north of England. It consists of two scattered villages, called High and Low Harrogate, situated about a mile from each other, and possessing ample accommodation for visitors. The season commences in May, and continues till September. The springs of Harrogate are both chalybeate and sulphureous. Of the former the oldest is Tewit Well, which was discovered about 1576. The Old Spa, situated on the Stray, was discovered by Dr Stanhope previously to 1631. The Starbeck chalybeate is about midway between Harrogate and Knaresborough. The Saline chalybeate at Low Harrogate was discovered in 1819. The sulphureous springs are the Old Sulphur Wells at Low Harrogate; the Crown Sulphur Well, in the pleasure grounds of the Crown Hotel; and the Knaresborough or Starbeck Spa, nearly halfway between Harrogate and Knaresborough. Harrogate possesses public baths; assembly rooms; reading rooms and libraries; mechanics' institute; and a bath hospital for poor invalids, with accommodation for about 100 patients. Pop. (1851) 3678.

HARROW ON THE HILL, a village in the county of Middlesex, 10 miles N.W. of London. Harrow owes its celebrity to its free grammar school, founded in 1571 by John Lyon, a wealthy yeoman of this parish. The primary object of this school was the gratuitous instruction of boys belonging to the parish of Harrow, but it is now principally attended by sons of the nobility and gentry, and is in high repute as an educational institution. Among the celebrated men who have been educated here may be mentioned Sir William Jones, Dr Parr, Richard Brinsley Sheridan, Lord Byron, and Sir Robert Peel. The number of scholars in 1853 was about 390. It has four exhibitions of 50 guineas each to either university, and two of the same value, founded by the late Mr Sayer, to Caius College, Cambridge. On the summit of the hill on which the village stands is the parish church, surmounted by a tower and spire. Pop. (1851) 4951.

Harrow, an agricultural implement. See Agriculture, vol. ii., p. 272.

HARRY, Blind, or Harry the Minstrel, whose history is an exact modern parallel of the traditionary account of Homer, flourished in the fifteenth century. All that is known of him (and it is very little) is derived from Major the historian, who says of him—"Henry, who was blind from his birth, composed in the time of my youth the whole book of William Wallace, and embodied all the traditions about him in the ordinary measure, in which he was well skilled. By the recitation of these in presence of the great, he procured, as indeed he deserved, food and clothing." Blind Harry's work is in eleven books, and contains a great many animated and picturesque descriptions, especially of war and battle pieces. Sir Walter Scott turned his knowledge of Blind Harry to good account; though he does not seem to have attached the same importance to it as to Barbour's *Bruce*.

HART, a stag in its sixth year. See Mammalia.

HARTE, Walter, the historian of Gustavus Adolphus, was born about the beginning of the eighteenth century. He was educated at Marlborough School, and afterwards at Oxford, where he graduated in 1720. He early enjoyed the friendship of Pope, who is said to have contributed largely to his *Essay on Satire*, 8vo., 1730; and to his *Essay on Reason*, fol. 1735. He afterwards became vice-principal of St Mary Hall, and, through the influence of Lord Chesterfield, to whose natural son he had been tutor from 1746 to 1750, canon of Windsor. In 1759 he published his History of Gustavus Adolphus, in two vols. 4to. This work, though devoid of order, and harsh and pedantic in style, yet exhibits great research and great ability. Harte, who is said to have been a man of excessive vanity, left London on the day of the publication of his book, that he might be out of the way of the great praise it was to receive; and he was ashamed to return when he found how very ill it had succeeded. His only other productions are some Sermons, and the *Amaranth*, a poem which, as he informs us, was written for his private consolation under a lingering and dangerous state of health, and which is marked by a very serious cast of feeling. He died at Bath in 1774.

HARTFORD, a city in the United States of North America, capital of Hartford county, Connecticut. It stands on the right bank of the Connecticut River, at the head of the sloop navigation, and 112 miles N.E. of New York. It is connected with East Hartford on the opposite side of the river, by a covered bridge 1000 feet in length. The city is for the most part compactly built, principally of brick and freestone. The state house, erected in 1792, is a Doric edifice, with two porticos, and a dome from which a magnificent view of the city and surrounding country is obtained. Besides the legislative halls, it contains apartments for the several courts of the state and county, and numerous public offices. Hartford is the semi-capital of the state, the legislature meeting alternately here and at New Haven. The city hall fronting the market square is a handsome Grecian building. There were here in 1852 twenty-one churches of various denominations, many of them large and elegant edifices. The educational and literary institutions are numerous and important. Trinity College, an Episcopalian institution, founded in 1824, has about eighty students, and a library of 15,000 vols. The Wadsworth Athenæum is an elegant granite edifice in the Gothic style, having apartments for the Connecticut Historical Society, with its library of 5000 vols., ancient documents and MSS., and valuable collection of historical relics; the Young Men's Institute, with lecture room, and library of about 10,000 vols.; a picture gallery, &c. The American asylum for the deaf and dumb, the first institution of the kind in the United States, was organised in 1817 by the late Rev. T. H. Gallaudet, LL.D. The average number of pupils is about 200. The lunatic asylum, founded in 1822, had during the year ending April 1, 1853, 321 patients. Hartford is situated on the great line of railways connecting the New England with the Middle, Southern, and Western States, and also on the line of the Providence, Hartford, and Fishkill railway. The more important articles of manufacture are railway carriages, fire-arms, and hardware. The value of its manufactures for year ending June 1850 was about L.723,878. The city is divided into six wards, and is governed by a mayor, elected biennially, six aldermen, chosen annually, and a common council of twenty-four members, also chosen annually. Hartford was permanently settled in 1635; but previous to that time the Dutch had explored the Connecticut, and erected a fort on what is still called Dutch Point in the S.E. part of the city. It was created a city in 1784. Pop. (1850) 17,966, estimated in 1853 at about 22,000.

HARTLAND, a market-town of England, county of Devon, 46 miles W.N.W. of Exeter. It is about 2 miles from the Bristol Channel, where there is a landing quay lying under the cliffs, much frequented by fishing vessels. The parish church stands about a mile from the town, near the sea. The inhabitants are chiefly employed in fishing or in agriculture. Of Hartland Abbey (founded by Githa, wife of Earl Godwin) some portions of the cloisters still remain. Market-day, Saturday. Pop. of parish (1851), 2183.

HARTLEPOOL, a seaport and market-town of England, county of Durham, a few miles N. of the mouth of the River Tees, and 17 miles S.E. of Durham. It stands on a small peninsula, jutting out into the sea, and formed partly by a pool called the Slake, which is dry at low water. The Normans called the place Hart-le-pol (the pool or slake of Hart), whence the modern name. A monastery, which is mentioned by Bede, was founded here at a very early period. Hartlepool is mentioned as a harbour of some consequence as early as 1171. In the thirteenth century it belonged to the Bruces of Annandale, in Scotland, the progenitors of the royal family of that name. It was erected into a borough by John, A.D. 1200. When Bruce declared his pretensions to the Scottish crown his English possessions were forfeited, and Hartlepool was granted to the Cliffords, in whose possession it long remained. It suffered severely from the Scots in 1312, and again in 1315, a year after the battle of Bannockburn. It was seized by the insurgents in the northern rebellion under the Earls of Northumberland and Westmoreland, in the time of Elizabeth. During the civil war it was taken by the Scottish army in 1644, and retained by them till 1647. Hartlepool was, during the thirteenth century, fortified by walls, which inclosed it on every side except on the east, where it was sufficiently protected by high cliffs. Considerable portions of these walls still remain. The old haven is now disused. The present harbour—formed by a pier run out on the south side of the town—is easily accessible in rough weather to laden vessels under 100 tons. Extensive docks have recently been constructed here. One, opened in 1847, contains 8 acres; and another, opened in 1852, contains 14 acres. The harbour has also been enlarged from 13 to 44 acres; and plans have been made for two more large docks, should the trade require it. A graving dock has also been formed at the west end of the new dock, capable of containing a vessel of the largest class. Hartlepool thus enjoys great facilities for trade, which its extensive railway connection opens up to it. Its coal trade is very great; fishing is extensively carried on; and it is much frequented in summer for sea-bathing. The vessels registered as belonging to the port on 31st Dec. 1854 were:—Under 50 tons—sailing, 2, tonnage 30; steam 4, tonnage 88: above 50 tons—sailing 164, tonnage 35,210; steam 3, tonnage 1080. The vessels that entered and cleared at the port in 1854 were:—Coasting trade, inwards, sailing vessels 368, tonnage 29,264; steam 2, tonnage 42: outwards, sailing vessels 6256, tonnage 827,926; steam 51, tonnage 20,604. Colonial trade, inwards, sailing vessels, British 25, tonnage 4281; foreign 8, tonnage 1054: outwards, British 91, tonnage 17,088; foreign 24, tonnage 10,570. Foreign trade, inwards, sailing vessels, British 399, tonnage 72,056; foreign 696, tonnage 79,135: steam vessels, British 55, tonnage 17,119; foreign 1, tonnage 235: outwards, sailing vessels, British 540, tonnage 100,653; foreign 1543, tonnage 166,898: steam vessels, British 53, tonnage 16,521; foreign 1, tonnage 235. Pop. (1851) 9503.

HARTLEY, a township and small seaport of England, county of Northumberland, 4 miles S.S.E. of Blyth. The harbour, about half a mile from the town, is accessible to vessels of 300 tons. A colliery, and glass and bottle works, afford employment to most of the inhabitants. Pop. of township (1851), 1627.

HARTLEY, DAVID, the celebrated author of the *Observations on Man*, was born August 30, 1705, at Armley, in Yorkshire. His father was a clergyman, and he was himself destined for the church, but, after graduating at Cambridge, and becoming a fellow of Jesus College, he changed his views, and studied medicine. He practised as a physician successively at Newark, Bury St Edmunds, London, and Bath, where he died, Aug. 25, 1757, in the fifty-third year of his age. He was twice married, and had issue by both his wives. His character, as delineated by one of his own children, is so interesting, that we give the extract entire:—"From his earliest youth his mental ambition was pre-occupied by pursuits of science. His hours of amusement were likewise bestowed upon objects of taste and sentiment. Music, poetry, and history, were his favourite recreations. His imagination was fertile and correct, his language and expression fluent and forcible. His natural temper was gay, cheerful, and sociable. He was addicted to no vice in any part of his life, neither to pride, nor to sensuality, nor to intemperance, nor ostentation, nor envy, nor to any sordid self-interest; but his heart was replete with every contrary virtue. The virtuous principles which are instilled in his works were the invariable and decided principles of his life and conduct." All extant records of the great philosopher agree in the main with this account of one who had the best means of knowing and appreciating his private worth. It is no wonder that the society of such a man should have been courted by the leading thinkers and writers of that time, as we know it to have been by Law, Butler, Warburton, and Hoadley (all bishops), Jortin, Young, Hooke, and many others. Hartley began the composition of his great work when he was twenty-five years of age; and, after working on it for sixteen years, published it, after certain delays, in 1748, in 2 vols. 8vo. It was republished in 1791, with notes and additions translated from the German of H. A. Pistorius, and a sketch of his life by his son. The *Observations on Man* are very fully discussed in the SECOND PRELIMINARY DISSERTATION (pp. 378 to 386), by Sir James Macintosh, prefixed to this work.

HARTSHORN, SPIRIT OF, a volatile alkali of a very penetrating odour, and an efficacious remedy in nervous affections. It is an impure ammonia, and derives its name from the deer's horns from which it was formerly prepared, and to which very wonderful medicinal virtues were ascribed; but it is now obtained by the destructive distillation of bone of any kind. The *salt of hartshorn*—an impure solid carbonate of ammonia, formed at the same time—is sometimes used as a remedy in fever. Under the name of *hartshorn shavings*, the scrapings or raspings of deers' horns are variously employed in medical practice. Deers' horns, when boiled in water, yield a strong and very nutritive jelly, though inferior, perhaps, to that afforded by ivory.

HARUN AL RASCHID, the famous Caliph of Bagdad, holds in oriental history very much the same place that his contemporary, Charlemagne, holds in the history of Europe. His love of peace and justice, of literature and the arts, was only equalled by his skill and success in war. His reign is the golden age of the Mohammedan dominion, and furnished the materials for some of the best stories in the *Arabian Nights*. He died in 808, after a reign of twenty-two years. See BAGDAD.

HARUSPICES, an order of priests among the Romans. Their name is derived, according to Donatus (Ter. *Phorm.* iv. 5), from *haruga*, a victim, though others have referred its origin to the word *ara*, an altar. Dionysius (ii. 22) explains it as a corruption of the Greek word ἱεροσκοπος, *inspector of the victims*, and states that Romulus appointed three, one from each tribe. This number was gradually increased, till it became an important body in the state, was regarded as a collegium, and its president was called Summus Haruspex, or Magister Publicus. In the flourishing period of the republic it enjoyed great influence from the explanation it was called on to give of omens, which were taken at the commencement of any important undertaking; but in proportion as the doctrines of the Greek philosophers spread amongst the Romans, the Haruspices gradually lost their influence, at least amongst the higher ranks. Cato used frequently to say that he was surprised the Haruspices did not laugh when they met one another in the street. (Cic. *Nat. Div.* i. 26.) The Emperor Claudius made an attempt to revive their importance, and the Pontifices received an order to report as to the best way of accomplishing this object; but how far he succeeded we have no means of discovering. (Tacit. *Ann.* xi. 15.) Alexander Severus appointed fixed salaries to the members of this body, and teachers, who should instruct the young in the arts of soothsaying (Lamprid. 44); and they continued in this state till Constantine put an end to their functions, by forbidding, under the penalty of death, the continuation of their superstitious practices. (Codex Theodos. 9, tit. 16.) The duties of the Haruspices were to examine the entrails of victims sacrificed, and thence to derive omens of futurity. They also attended to the flame, the smoke, whether the victim came to the altar willingly, stood quietly, fell by one stroke, and many other circumstances of the same kind. Their knowledge of this art was derived from the Etruscans; and in early times the young nobility used to be sent to Etruria to be instructed in this art. (Cic. *Div.* i. 2, 41.)

HARVEST (probably from a Saxon word signifying *herb feast*), that season of the year when the corn is reaped and gathered into barns.

HARVEY, WILLIAM, the discoverer of the functions of the heart, and of the mode of circulation of the blood, was born at Folkstone, in Kent, on the 1st April 1578. He was the eldest of seven sons and two daughters. His father, a Kentish "yeoman," must have been in some degree wealthy, as his sons were brought up to pursuits for the successful practice of which capital is necessary. Five of the younger brothers were Levant merchants of wealth and standing in the city of London. John, the second son, was attached to the court as king's footman, was one of the king's receivers for Lincolnshire, and sat in Parliament as member for Hythe; and William, the eldest, went to Cambridge to be educated for the practice of physic.

At the age of ten years Harvey went to the grammar-school at Canterbury, where he was doubtless initiated into a knowledge of the Greek and Latin languages. He remained there five or six years; and at the age of sixteen was entered a pensioner of Caius' College, Cambridge, the 31st May 1593. At nineteen he took his B.A. degree, and left Cambridge to study medicine at the University of Padua, then of wide celebrity as a medical school. Here he had the advantage of cultivating the medical sciences under the ablest masters of the day, inasmuch as amongst the eminent men there congregated were the celebrated Fabricius of Aquapendente, Julius Casserius, and J. T. Minadorus. To the first-mentioned Harvey doubtless owed his philosophic spirit of inquiry, and that inductive method of research which led him to the greatest discovery in physiology.

Having passed five years at Padua, Harvey, then aged twenty-four (1602), graduated as doctor of medicine, and received his academic authority to practise and to teach his science and art. In the same year he returned to England, and graduated again in his own University of Cambridge. His next step was to commence practice, and settle for life. To these ends he took up his residence in London, and married the daughter of Dr Lancelot Brown, a physician of the day. In both these steps he was probably guided by a wise discretion, feeling assured that a professional father-in-law, and five brothers, influential and esteemed city merchants, would be valuable aids to him in getting into practice. He was now in his twenty-sixth year.

Harvey's connection with the Royal College of Physicians of London seems to date from the earliest period of his professional career, for his name is on the roll of candidates for the fellowship of the college in 1604; and three years afterwards (1607) he was duly admitted a fellow of the college.

In the beginning of 1609, the health of Dr Wilkinson, physician to St Bartholomew's Hospital, beginning to fail, Harvey, being in his thirty-second year, sought the reversion of the office, as was then customary, and in support of his application brought forward testimonials of fitness from the president of the College of Physicians, Dr Adkinson, and "diverse others doctors of the auncientest" of the college, together with the king's letters commendatory. His application was granted, and Dr Wilkinson having died in the course of the year, he was formally elected to the vacant office (which he filled for thirty-four years), on the 14th October 1609. At the time of his election, the steward of the hospital was bound under an obligation to Harvey for a debt of L.52, 10s., due to his brother John, at that time attached to the court, and had law proceedings taken against him for the recovery of the money.

From this time may be dated Harvey's rise to distinction. In 1615 he was appointed to deliver the course of lectures on anatomy and surgery at the College of Physicians founded by Dr Richard Caldwal, and in the month of April of the following year fulfilled the duties of his office. It is generally thought that in this first course he presented an exposition of his views of the circulation of the blood, and which continued to be one of the subjects of the lectures on anatomy which he delivered for several successive years at the college. It was not, however, until the year 1628 that he published, at Frankfort, in 4to, his *Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus*, dedicating it to the king.

About this time he must have become connected with the court more closely as physician-extraordinary to James I., an office he filled during the remainder of that monarch's reign. Five or six years after his death (1632) he was appointed physician to his successor, Charles I. Previously to this, 1630, he had been sent by the king to travel with the Duke of Lennox, at which time he resigned the office of treasurer to the Royal College of Physicians.

Charles I. gave his royal patronage to Harvey's scientific researches, as well as to his practical skill. He seems to have taken great interest in the former, for he had several demonstrations made before him by Harvey of the *punctum saliens* in the embryo chick and deer, and to have shared Harvey's anatomical researches on the does he placed at the disposal of the latter.

From this time Harvey's movements were closely connected with those of the court. In 1633 he accompanied Charles on his journey into Scotland, and in 1636 he went with Thomas Howard, Earl of Arundel, whose physician he was, on his embassy extraordinary to the Emperor of Germany. It was on this occasion that, in May of this year, he gave a public demonstration of the circulation at Nuremberg, to satisfy the doubts of the distinguished Professor of Nuremberg, Casper Hoffmann, but who, however, remained incredulous. In 1639 he accompanied Charles on his first hostile expedition into Scotland, and again in the following year. He was also present with his king at the battle of Edgehill. During the fight he had the prince and the Duke of York entrusted to his care, and he told Aubrey that he withdrew with them under a hedge, and took a book out of his pocket to read; but he had not read very long before a bullet of a great gun grazed on the ground near him, and made him remove his station.

After the battle of Edge-hill, Harvey went with the king to Oxford. Here he busied himself with his researches into generation; for Dr George Bathurst of Trinity College had a hen to hatch eggs in his chamber, which he and Harvey opened daily. He was received and entertained at Oxford with great distinction, and honoured with the degree of M.D. In 1645 he was made warden of Merton College, in place of Sir Nathaniel Brent, who had left his college to join the popular party. In the following year Oxford surrendered to the parliamentary forces, and Brent was reinstated. While Harvey was at Oxford a motion was made in the House of Commons, February 12, 1644, for the appointment of Dr Micklethwayte as his successor in the office of physician to St Bartholomew's Hospital, on the ground that Harvey had "withdrawn himself from his charge, and is retired to the party in arms against the Parliament."

Harvey.

Harvey returned to London in 1646, after the surrender of Oxford, and seems to have followed the fortunes of his king no longer. He was now sixty-eight years old, and had little taste, doubtless, for the varied fortunes of civil broil. His wife was probably still alive, and to her repose would be grateful; and having no children he seems to have avoided the responsibilities of house-keeping by having his own apartments furnished with his own furniture at the houses of two of his surviving brothers, Eliab and Daniel. In 1649 (if Aubrey's statement is to be believed) he visited the Continent, travelling as far as Italy, accompanied by his friend, Dr Ent, an accomplished physician and scholar. In the beginning of 1651 he published his second great work—namely his *Exercitationes de Generatione Animalium*, 4to, London. The year after, when Harvey was looked upon by common consent as the most distinguished anatomist and physician of the age, the College of Physicians placed a statue of him in their hall, with the following inscription:—

GULIELMO HARVEIO
VIRO MONUMENTIS SUIS IMMORTALI
HOC INSUPER COLLEGIUM MEDICORUM LONDINENSE
POSUIT.
QUI ENIM SANGUINI MOTUM
UT ET
ANIMALIBUS ORTUM DEDIT.
MERUIT ESSE
STATOR PERPETUUS.

About this time Harvey commenced a handsome addition to the college buildings, comprising a common hall and library, the latter of which he furnished with books. In 1654 he was elected to the chair of president of the College of Physicians, but declined to serve on the ground of his age and infirmities. He continued, however, to deliver his lectures till within a year or two of his death. He died on the 3d June 1657, of paralysis, having completed the eightieth year of his age.

Harvey was a ripe and finished scholar, and an inductive philosopher of a class as high as his illustrious contemporary and patient, the Lord Chancellor Bacon. He was acquainted with all the men of letters and of science of his day—Hobbes, Boyle, Dryden, Cowley, &c.; and although the treatment he experienced by his contemporaries has often been quoted by empirics as an instance of the martyrdom which men of genius and of original views have to encounter, it does not appear that his views were met with any unusual hostility from the great body of the learned. It is true one or two foreign anatomists indulged in some foolish abuse; and, if we may believe Aubrey's tattle, he "knew several practitioners in this town that would not have given threepence for one of his bills [prescriptions]; and that a man could hardly tell by his bills what he did aim at." But, in opposition to this gossip, we have it on record that Harvey was not only physician to the Court, but also had the confidence of many of the most distinguished among the nobles and men of eminence of the time. He lived to see his discoveries universally acknowledged, and to be deeply revered by his brethren.

His moral character was of the highest, and may be judged of by what he has himself enjoined on the College of Physicians. Having endowed it handsomely with his paternal estate, he left funds for a meeting and collation once a month, and for a general annual feast of all the fellows, at which should be delivered an oration in commemoration of the benefactors to the college, and "an exhortation to the members to study and search out the secrets of nature by way of experiment, and for the honour of the profession to continue mutually in love." The College of Physicians of London would have enjoyed a fairer fame, and British medicine a higher reputation, if that body had more faithfully followed the example and written precepts of their immortal benefactor. Harvey had refined feelings and a strong sense of duty. He returned not railing for railing when he encountered his depreciators in controversy. He was faithful to his sovereign, devoted to science, sedulous for the advancement of his profession, munificent to his college, kind and considerate to his relatives. The public voice of his day fully acknowledged his merits, and its verdict has never been questioned. (T. L.)

Harwich
||
Haslingden.

HARWICH, a municipal and parliamentary burgh and seaport town of England, county of Essex, on the extremity of a tongue of land projecting into the estuary of the Stour and Orwell, 15 miles N.E. of Colchester. It consists of three principal streets, well paved and lighted with gas. The church of St Nicholas is a large brick edifice, in the perpendicular style, with stone buttresses and steeple, erected in 1821. There are also chapels for Independents, Wesleyan-Methodists, and Baptists; a grammar school; town-hall; gaol; theatre; assembly-rooms; baths; and custom-house. Shipbuilding and the fisheries are extensively carried on; and Roman cement is largely manufactured from a stone dredged at the mouth of the harbour. In summer it is much frequented for sea-bathing. The harbour is one of the best on the E. coast of England, being at once safe and capacious, and having water sufficient to float the largest ships of war. The entrance is, however, encumbered with rocks, and dangerous without a pilot. It is marked by two lighthouses, and is defended by a strongly-garrisoned fort and battery. It has been made a harbour of refuge. On 31st December 1854, the vessels registered as belonging to the port were—under 50 tons, 66, tonnage 1974; above 50 tons, 53, tonnage 5068. During that year 519 vessels of 37,069 tons entered, and 425 of 19,896 tons cleared, in the coasting trade; 1 vessel of 28 tons entered, and 11 of 535 tons cleared, in the colonial trade; and 70 vessels of 5869 tons entered, and 169 of 9494 tons cleared, in the foreign trade. Harwich is governed by a mayor, 4 aldermen, and 12 councillors, and returns 2 members to parliament. Pop. (1851) 4451.

HARZ, or Hartz Mountains, the most northerly range in Germany, run E.S.E. and W.N.W., between N. Lat. 51. 30. and 52., and E. Long. 10. and 11. 30. They are 55 miles long by 19 broad, and cover an area of above 1000 square miles. The water-shed between the basins of the Weser and the Elbe divides the whole range into two parts; the eastern is called the Lower Harz, and the western the Upper Harz. The range exhibits a collection of irregular heights, chiefly covered with pine; on the Lower Harz are also found ash, elm, oak, and beech. The chief summit is the Brocken or Blocksberg, 3740 feet above the level of the sea. Snow lies upon the higher parts of the range during eight months of the year. The chief mineral district is the Upper Harz; it contains lead, silver, and copper mines, affording work for between 15,000 and 20,000 labourers annually. Geologically, the Harz mountains consist of granite and mica slate, which underlies graüwacke, clay-slate, limestone, gypsum, &c.

HARZGERODE, a town of Central Germany, duchy of Anhalt-Bernburg, 7 miles S.W. of Ballenstedt. It has an old castle, built in 1552, and a forest school. In the vicinity are silver, copper, vitriol, and iron-works, including the Victor Frederick silver-works, and the Magdesprung iron-works. Pop. 2500.

HASLEMERE, a small town of England, county of Surrey, 8 miles S.S.W. of Godalming. It is an ancient borough, and, previous to the passing of the Reform Act, by which it was disfranchised, it returned two members to parliament. The parish church is an ancient edifice with a low square tower. Pop. of parish (1851) 955.

HASLINGDEN, a market-town of England, Lancashire, 7 miles S.E. of Blackburn. Part of it stands on the slope, and part at the foot of a hill; the latter being the newer portion. The houses are mostly of stone. The parish church is a large and handsome edifice of modern date, with the exception of the tower, which belonged to a previous building. It contains a fort of the time of Henry VII., as well as several monuments. There are chapels connected with Independents, Methodists, and other dissenting bodies; national and other schools; and a mechanics' institute with library. The woollen manufacture was till lately the staple of the town, but it has now in a great measure been superseded by that of cotton. The silk manufacture is also carried on here. In the vicinity are quarries of building stone and slate, and several coal mines. Market-days, Wednesday and Saturday. Pop. (1851) 6154.

HASSELQUIST, Frederic, a Swedish naturalist, and one of the most distinguished of all Linnæus' pupils, was born in 1722, at Taern-Valla, in E. Gothland. His father, who was vicar of the parish, died, leaving his family quite unprovided for; but a kind uncle had the young Hasselquist educated with his own children. After the death of this good friend, he was sent in 1741 to the university of Upsal, where his taste for the study of nature was fostered and developed by Linnæus. In 1747 he published an essay, *De Viribus Plantarum*, in which with equal boldness and ability he exposed the popular ideas of the medical virtues of many plants, and defended the old but then discarded doctrine of "like forms, like virtues." It is to this defence of Hasselquist's that the doctrine in question mainly owes the steady foot-hold it has ever since his day maintained. His scientific abilities, backed by the influence of Linnæus, now procured for him one of the scholarships for enabling students to travel, and Hasselquist set out for the Holy Land, the natural history of which was at that time very imperfectly known. After visiting part of Asia Minor, Egypt, and Palestine, he turned his face in the direction of home; but his constitution, naturally weak, gave way under the fatigues and anxieties of travel, and he died at Smyrna, Feb. 9, 1752, at the early age of thirty. His collections reached home in safety, and, five years after his death, the results of his wanderings in the east were published by Linnæus under the title of *Iter Palestrinum*, a work which contains a world of information on almost every department of the natural history of the countries visited by Hasselquist, and which has not even yet been superseded as a book of reference. The work is divided into two parts, the first consisting of the traveller's journal and letters, and the second of his remarks on the botany, zoology, and mineralogy of the countries he passed through, with observations on the prevalent diseases and their cure, and the state of industry, commerce, and the arts. The amount of genuine and solid labour and ability displayed in this work will prevent it from ever being totally superseded. Its author's name is consecrated in his favourite science by having been given to the *Hasselquistia cordata*, an oriental umbelliferous plant of the order of Apiaceæ. His travels were translated into English in 1766.

HASSELT, a town of Belgium, capital of the province of Limburg, on the Demer, 15 miles W.N.W. of Maestricht. It is the seat of the principal provincial courts, and is tolerably well built. It has several churches and chapels; a court-house, 2 hospitals; almshouse; college; and several primary schools. The chief manufactures are linen, leather, tobacco, gin, beer, and salt. It is likewise a place of considerable trade. Pop. of commune (1851) 9784.

HASTA, or *Hasta Pura*, among medallists, a headless spear, or rather a long kind of sceptre, occasionally given to all the heathen deities. The *hasta pura* is supposed to be a symbol of the goodness of the gods, and of the conduct of providence, which is equally mild and forcible.

HASTATI. See Army; § *Roman Army*, vol. iii.

HASTINGS, a parliamentary and municipal borough and market-town of England, county of Sussex, 64 miles from London by the road, and 74 by the Hastings branch of the South-Eastern railway; in official proceedings ranks as the first of the Cinque Ports. Hastings lies on the sea-coast at the mouth of the Bourne, a small stream which intersects the town. An amphitheatre of hills and cliffs shelters it on every side except the S., where it lies open to the sea. Its climate is thus both mild and equable, and annually attracts a large number of invalids. During the bathing season great crowds of visitors flock to the town, for whose comfort every provision has been made in the shape of hotels, libraries, baths, and promenades. The town originally consisted of two main streets, separated by the Bourne, but since it became a favourite summer resort many handsome streets and squares have been added to it. It has also been lighted with gas and paved, and the sewerage, at one time notoriously bad, has of late been much improved. The principal public buildings are the ancient parish churches of All Saints and St Clements, the town-hall, custom-house, and gaol. There are also chapels belonging to the Roman Catholics, Baptists, Independents, Methodists, and other sects. Besides two endowed schools, there are British, national, and infant schools. The permanent residents in the town are chiefly engaged in fishing and boat-building, in both of which they are reputed to have much skill; but much of the prosperity of Hastings now depends on the influx of summer visitors. Of late years these have so much increased in number that for their accommodation houses have been built over the whole ground extending between Hastings and the little town of St Leonards. A few years ago, St Leonards was only a small village about a mile distant from Hastings, but it is annually increasing with great rapidity, and as its population is included in that of its larger neighbour, it is now considered as forming a part of it. The most striking part of the town is the Marina, a handsome street with a covered colonnade looking towards the sea. The united parades of Hastings and St Leonards are not surpassed, if indeed they are equalled, by any other sea-walks in England. The scenery in the neighbourhood of the town is charmingly picturesque. Among the places of interest in the vicinity may be mentioned Bulverhithe, where William the Conqueror landed from France; the ruins of the old fortress on the high cliffs overhanging the town on the W.; and Battle Abbey, which, though it takes its name from the fight of Hastings, is 7 miles distant from the town. (See Battle.) The corporation consists of a mayor, 6 aldermen, and 18 councillors. The borough returns two members to parliament. Pop. of parliamentary borough (1851), 17,011; of municipal, 16,966; number of registered electors, 976.

HASTINGS, Warren, the real founder of the English empire in Hindustan, was a scion of an old and noble but impoverished family of Worcestershire, and was born Dec. 6, 1732. The best part of his education he got at Westminster School, where he had Vincent Bourne for his teacher, and Churchill, Colman, Lloyd, Cumberland, and Cowper among his school-fellows. Though he was the cleverest lad of his standing, and would infallibly have distinguished himself at the university, it was determined that he should begin life for himself without delay; and interest having been made on his behalf he obtained a writership in the service of the East India Company, then beginning to struggle into existence. His first residence in India lasted for fourteen years. He went out in 1750, and he returned home in 1764. During that period he was sometimes engaged on diplomatic missions into the interior, but most of his time was spent in commercial enterprises. His opportunities of displaying his abilities were consequently few; and though he did not then attain any high rank in the service, he was silently educating himself for the great destiny that awaited him. He made himself a thorough master of the Persian and Hindustani languages, and probed to their subtlest depths the characters of the people that spoke these tongues. To this knowledge of their languages and themselves Hastings owed in great measure his power over the natives, and the final triumph of his administration. At the close of the fourteenth year of his service, Hastings returned home with a fortune so very small and so unlike those that were then made in India, that nothing more is required to prove that he must have been strictly just in his dealings with the natives. His desire was to spend the remainder of his days in the calm retirement of home, but partly by over-liberality to his relatives, and partly by mismanagement of his own, his little fortune melted away altogether; and at the end of four years he was glad to return to India, with the appointment of member of council of Madras. Three years later he exchanged this subordinate office for the chief-magistracy of Bengal, from which in 1774 he was promoted to the governor-generalship of British India. It was not long before he was called upon to show what was in him. The struggle upon which he now entered, and from which in the end he came forth a victor, was begun, not for conquest but for existence; and this, though it is far from excusing, at least palliates the extreme measures to which he had recourse. The conquests of Clive, though they had greatly extended the territorial limits of the Company's possessions, were a source of weakness rather than strength, for they had not yet been consolidated, and from their position served as a tempting bait to the cupidity of the famous Hyder Ali, the able and daring rajah of Mysore. To baffle this dangerous antagonist, and the alliances which he formed in the East; to out-manœuvre the tactics of his colleagues at the council-board, who hated and did their best to thwart him; to carry on the internal administration; and, above all, to remit regular dividends to England—to do all this, and at the same time maintain even the semblance of fair and scrupulous dealing, was plainly beyond mere human powers. It was no wonder, then, that rumours grew rife in England of cruelty, tyranny, and extortion carried on to an extent that made the blood run cold to hear of; and as little wonder that the directors of the Company were afraid to stem the tide of public opinion that ran so strong against the man to whom they owed the most part of their wealth and power. But all their anxiety to procure his removal was unable to move the proprietors, on whose support Hastings calculated in all his subsequent career. His conduct was now marked by an obstinate spirit of independence. He did not scruple to disobey the orders sent from England; reduced his refractory colleagues to silence or assent; and, with the title of a servant, swayed really a more despotic and irresponsible power over a greater population and a wider extent of country than any sultan or rajah in the Indian peninsula. In 1785 he resigned his high office and returned home. He was well aware that he would be called upon to give an account of his stewardship, and he did not shrink from the result. His trial is the most memorable in the annals of modern jurisprudence. Proceedings began in the session of 1786, and were not brought to an end before the spring of 1795. The serious business of the impeachment was entrusted to Burke, who was supported in the conduct of the case by the most eminent Whig notabilities of the day, Fox, Grey, Sheridan, and others. The counts of the indictment were finally reduced to four,—the oppression and final expulsion of the rajah of Benares; the maltreatment and robbery of the Begums of Oude; the acceptance of presents of immense value; and connivance at unfair contracts and reckless expenditure of the public revenues. The prosecution was opened by Burke in a speech of extraordinary eloquence and power, which extended over three days. He was succeeded by Fox, who in his turn gave place to Sheridan. The speech of that brilliant wit was said by the ablest among those who heard it to have been the best that was ever delivered in the English House of Commons. It certainly was one of the most telling, for it caused so much excitement that no other speaker could obtain a hearing, and the debate was adjourned. Other speakers took up the cue, and the prosecution extended over the entire sessions of 1788, 1789, and 1790, engrossing no fewer than 72 days. The defence was longer still, and was skilfully protracted till April 17, 1795, on which day the accused was acquitted by an overwhelming majority. An acquittal had been expected, and the voice of the nation approved it. The defendant had come before his judges, well aware that the feeling against him was strong. He now left the bar of the Lords with an equally unreasonable feeling in his favour. It was believed that his accusers had, of set purpose, retarded the course of justice, though by far the larger share of the blame or merit of the delay was due to Hastings himself, who foresaw the reaction in the public mind which eventually took place. He was now regarded as an oppressed and persecuted man, and therefore an object of sympathy and compassion. The bitter invective of which the prosecutors made so liberal a use was adduced to prove that their hostility was that of personal and malignant rancour. The expenses of the case were enormous. This defence cost Hastings upwards of L.76,000, and he had sworn in his trial that at no period had he ever been worth more than L.100,000. His friends of the India House felt that his claims upon them were strong, and proposed to settle on him an annuity of L.5000. Some delay occurred in passing this proposal, and Hastings was reduced to such straits that he could hardly pay his weekly bills. His allowance was at length fixed at L.4000 a-year, and the company lent him L.50,000 more for 18 years free of interest. This ought to have sufficed for the ex-governor to live in luxury, but he was a bad manager, and he had frequently to apply to his old supporters for aid, which was always liberally granted. The last 24 years of Hastings' life were spent at Daylesford, in Worcestershire—an estate which had been lost to the family by the unthrift of his ancestors, and which, from his earliest years he had determined to regain. He amused himself with embellishing his grounds, and endeavouring to naturalize in England some of the animals and vegetables of India. The peerage, which he not unnaturally looked for as the reward of his services, and of which it was said that the patent had even been made out, was from some unexplained cause or other withheld, and Hastings never rose beyond the rank of privy-councillor, to which he was raised shortly before his death, which happened Aug. 22, 1818, when he was in his eighty-sixth year. It was proposed that he should be buried in the abbey of Westminster, but permission was refused; and his dust was consigned to its last resting-place in the chancel of the parish church of Daylesford, in earth which already held the bones of many chiefs of the house of Hastings. "On that very spot, probably," writes the most eloquent chronicler of his strange career, "four-score years before, the little Warren, meanly clad and scantily fed, had played with the children of ploughmen. Even then his young mind had revolved plans which might be called romantic. Yet, however romantic, it is not likely that they had been so strange as the truth. Not only had the poor orphan retrieved the fallen fortunes of his line; not only had he repurchased the old lands, and rebuilt the old dwelling;—he had preserved and extended an empire; he had founded a polity; he had administered government and war with more than the capacity of Richelieu; and had patronized learning with the judicious liberality of Cosmo. He had been attacked by the most formidable combinations of enemies that ever sought the destruction of a single victim; and over that combination, after a struggle of ten years, he had triumphed. He had at length gone down to his grave in the fulness of age—in peace, after so many troubles; in honour, after so much obloquy."

Those who look on his character without favour or malevolence will pronounce that in the two great elements of all social virtue—in respect for the rights of others, and in sympathy for the sufferings of others—he was deficient. His principles were somewhat lax. His heart was somewhat hard. But while we cannot with truth describe him as either a righteous or a merciful ruler, we cannot regard without admiration the amplitude and fertility of his intellect; his rare talents for command, for administration, and for controversy; his dauntless courage; his honourable poverty; his fervent zeal for the interests of the state; his noble equanimity, tried by both extremes of fortune, and never disturbed by either.

(*Essay on Warren Hastings*, by T. B. Macaulay; *Memoirs of the Life of Warren Hastings*, by G. R. Gleig, M.A.; Mill's *History of British India*, which last contains a very full and impartial statement of Hastings' case, and able summing up of the evidence of both sides, and a sentence qualified, yet, on the whole, favourable to him, who, as he was the first, was also the ablest of all the men to whom the destinies of our great empire in the East have ever been entrusted.)

HAT is a term of Saxon derivation, from *haet*, a cover for the head. It is sometimes called *castor*, from its being made of the fur of the castor or beaver. As a piece of dress, the period of its introduction is not certain, although it may with great probability be referred to the early distinctions of Roman Catholic dignitaries. Froissart chronicles, that it was "saide to the cardynals, Sirs, advyse you if ye delyvere us a Pope Romayne, we be content, or els we woll maike your heddes reeder than your hattes be;" from which, and from many other documents, it appears that at this period, as well as for some centuries after, hats were generally of a scarlet or red colour, and made of "a fine kinde of haire matted thegither." A "hatte of biever," about the middle of the twelfth century, was worn by some one of the "nobels of the lande, mett at Clarendom;" and Froissart describes hats and plumes which were worn at Edward's Court in 1340, when the Garter order was instituted. In the Diary of Henry's secretary, there is "ane scarlet beever hatte" presented on new year's day 1443. Even at this early period hats were of various shapes, both in the crowns and the brims; the latter being chiefly broad, sometimes narrowing towards the back, and a little bent up and scooped in front. In Henry's privy purse expenses, during his congress with Francis I. in 1520 or 1521, there is "peid for a hatte and plume for the king, in Boleyn, xv^{s}.;" and in Wolsey's inventory, taken on his resigning the great seal to Sir Thomas More, there are no fewer than five mentioned. The fashion of this article was then much more diversely capricious than even now, as will appear from an extract from Stubbs' *Anatomie of Abuses*, published about 1585: "Sometimes they use them sharpe on the crowne, pearking up like the spire or shaft of a steeple, standing a quarter of a yard above the crowne of theire heads; some more, some lesse, as please the fantasies of their inconstant mindes. Othersome be flat, and broade on the crowne, like the battlements of a house. Another sorte have rounde crownes, sometimes with one kind of bande, sometimes with another; now black, now white, now russed, now redde, now grene, now yellow; now this, now that; never content with one colour or fashion two daies to an end. And as the fashions be rare and strange, so is the stuffe whereof their hattes be made divers also; for some are silk, some of velvet, some of taffetie, some of sarsnet, some of wool, and, which is more curious, some of a certaine kinde of fine haire; these they call bever hattes, of xx. xxx. or xl. shillings price, fetched from beyonde the seas, from whence a great sorte of other vanities doe come besides; and so common a thing it is, that every servyng man, countreiman, and other, even all indifferently, doe weare of these hattes." About the beginning of 1700, the crowns of hats were mostly round, much lower than before, and had very broad brims, resembling what are now occasionally called Quakers' hats, the protrusive encumbrance of which soon suggested the convenience of their being turned up in front; fashion dictated the upbending of another side or flap, and ultimately a third, so that by this progress, in 1704, the regular three-cocked hat became the order of the day, when feathers ceased to be usually worn. Near the middle of the eighteenth century, a round-edged but flat-topped and full-brimmed hat got into very general use, and the flat and other cocked hats now dwindled almost into a mere distinction of real or assumed rank. Twenty-five years after this, a very near approach to that of the present times became fashionable, and, within ten years, altogether superseded the ordinary use of the cumbrous and antique cock.

Plumes, jewels, silk loops, rosettes, badges, gold and silver bands and loops, have at various periods ornamented this article of dress; metal bands and loops being now esteemed proper only to naval and military "men of honour," and the humble liveried attendants on state, rank, and official dignity. The *opera* or soft-folding hat is the only relic at present in general use of the hats worn by our grandfathers, although it is not improbable that the mutations of fashion may re-introduce the elegant Spanish hat as the precursor perhaps of various other styles, as well as the cocked hat, which are not yet entirely discarded.

In the Great Exhibition of 1851 several very novel styles of hat were introduced by British exhibitors. It is remarked in the Jury Report respecting them that "in an article of fashion and of such constant use as hats, it does not appear to be easy to change the habits and tastes of the wearers, or to induce them to adopt a new costume."

Until recent times hats were chiefly produced by the art of felting, an art which some persons suppose to have been practised by the nations of antiquity. It is thought that *lana coacta*, used for soldiers' cloaks and for Lacedemonian hats, was felted wool, but others state that it was only knitted wool. In Roman Catholic countries St Clement is the reputed inventor of felt. This personage is said to have put carded wool into his sandals to protect his feet during a pilgrimage, and that the effect of the moisture, warmth, and friction converted the wool into a felted cloth. The hatters' annual festival is on the 23d November, St Clement's Day.

HAT-MAKING embraces two distinct kinds of manufacture, viz., of *felted*, and *covered* hats; the covering of the latter being generally plush. *Felted* hats comprehend two classes, differing chiefly in the materials used in making, the processes being nearly identical. The lower class is marked by inferior ingredients, unmixed with beaver, and embraces *wool*, *plated*, and *short nap* hats. *Wool* hats are made entirely of coarse native wool and hair stiffened with glue. Before the emancipation act these hats were largely exported for negroes' wear; but the manufacture is now almost extinct. *Plates* have a *nap* or pile rather finer than their body, and are sometimes *waterproof* stiffened. *Short naps* are distinguished from *plates* by additional kinds of wool, viz., hare's back, seal, neuter or nutria, musquash (Muscovy cat), and are all waterproof stiffened.

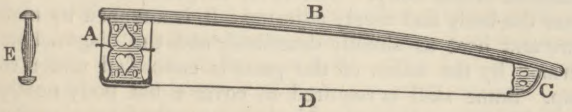
The second class may be said to comprehend two orders, called *stuff* and *beaver* hats. The first includes mottled and stuff bodies. The latter term is not used generally, as all *stuffs* are understood to be of this sort when *mottled* is not expressed. *Mottled bodies* are made chiefly of fine Spanish wool, and inferior rabbit down or coney wool. *Stuff bodies* consist of the best hare, Saxony, and red wools, mixed with Cashmere hair and silks. *Stuff* hats are *napped*, that is, covered with pile of mixed seal, neuter, hare-back, inferior beaver, and musquash. *Beaver* hats are, or ought to be, napped with beaver only; the lower priced qualities with *brown wooms* taken from the back; the more valuable kinds with *cheek* and *white wooms*, such being the finest parts of the fur found on the belly and cheeks of the beaver.

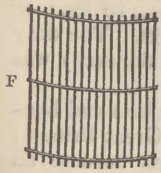
The manufacture of a beaver hat involves a number of curious and interesting processes, the most important of which is *felting*, or the art of combining animal fibres in such a way as to form, without weaving, a thick compact cloth. The felting property of animal fibres depends on their peculiar structure, which, as revealed by the microscope, appears to be notched or jagged at the edges with teeth directed from the root towards the extremity. Wool in the yolk, or with the natural grease adhering to it, does not readily felt, the jagged portions being smoothed over or filled up with the oil; but when the fibres of clean wool or hair are made to undergo a gentle friction under the influence of moisture and heat they readily felt together.

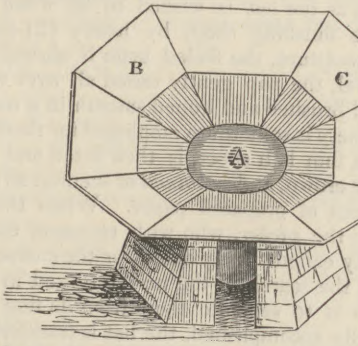
Several of the furs mentioned above (see also Fur Trade) are used for hats. The beaver has been so assiduously hunted during many years that it is now becoming a rarity, and the fur of other animals is substituted for it. The coypu furnishes nutria skin; the musquash or musk-rat, the hare, and the rabbit, yield fur for the nap of the hat, while the body is made of lamb's wool, or of the woolly hair of the llama or vicuna.

A beaver hat, properly so called, has a body or foundation of rabbits' fur, with a beaver nap, although the beaver, for the reason above stated, is often mixed with a more common fur. Such a hat has a pleasant softness and plasticity, and readily moulds itself to the shape of the head, presenting a marked contrast to the hard, horny, silk hat, which has nearly superseded it. Still, however, there must always be certain persons who, not objecting to the price, will continue to keep alive this the most interesting branch of the hat manufacture, and it is our duty to describe its processes.

The beaver hat, with the body of rabbits' fur and a beaver nap, may be regarded as the highest achievement of the hatter. A cheaper kind has the body of lambs' wool, and the nap of some fur cheaper than beaver. Such is the *plate* hat, so called from an analogy with plated metal goods, the exposed surface being of the more valuable material upon an inferior base or foundation. A notice of the mode of preparing a plate hat will sufficiently show the nature of the processes concerned in the manufacture of a beaver hat. In preparing this fur plate, the hatter weighs out an ounce of beaver down, a quarter of an ounce of musquash, and a quarter of an ounce of cotton wool, which last ingredient serves the temporary purpose of preventing the surfaces of the beaver from felting together instead of adhering to the body. These three substances are spread out and combined by the operation of bowing. The bow or stang, ABC, is about seven feet long, and is usually of ash: A is called the *breech*, and C the *cock*. The stang is suspended by a string over the bench where the operation is performed. It stretches a single cord of cat-gut, D, which the workman vibrates by means of a wooden pin, E, furnished with a half knob at each end. Holding the bow in his left hand, and the pin in his right, he causes the vibrating string to come in contact with the heap of tangled fur, which does not cover a space greater than that of the hand. At each vibration some of the filaments start up to the height of a few inches, and fall away from the mass, a little to the right of the bow, their excursions being restrained by a concave frame of wicker-work F, called the *basket*. In the course of a few minutes the fibres are completely separated, and spread over a considerable space. They are then divided as nearly as possible, and one half laid aside, whilst the other is again bowed. In this second operation, partly by the bowing, but chiefly by the *gathering*, or patting use of the basket, the stuff is loosely matted into a conical figure, about fifty by thirty-six inches, called a *bat*. In this formation care is taken to work about two-thirds of the wools down towards what is intended for the brim, which being effected greater density is induced by gentle pressure with the basket. It is then covered with a wettish linen cloth, upon which is laid the *hardening skin*, a piece of dry half-tanned horse hide. On this the workman presses or *bakes* for seven or eight minutes, until the stuff adheres closely to the damp cloth, in which it is then doubled up, freely pressed with the hand, and laid aside. By this process, called *basoning* (from a metal plate or bason, used for like purposes in making *wool* hats), the bat has become compactly felted and thinned toward the sides and point. The other half of the flocked stuff is next subjected to precisely the same processes; after which, a cone-shaped slip of stiff paper is laid on its surface, and the sides of the bat are folded over its edges to its form and size. It is then laid paper-side downward upon the first bat, which is now replaced on the hurdle, and its edges are transversely doubled over the introverted side-lays of the second bat, thus giving equal thickness to the whole *body*. In this condition it is re-introduced between folds of damp linen cloth, and again hardened, so as to unite both halves, the knitting together of which is quickly effected. The paper is now withdrawn; and the body, being folded into three plies, is removed to the plank or battery room.







The battery consists of an open iron boiler or kettle A, with shelves B, C, partly of mahogany and partly of lead, sloping down to it. The liquor in the battery is of a scalding heat, and consists of pure soft water, about half a gill of oil of vitriol as an astringent, and a full handful of oatmeal to correct its corrosive tendencies. Herein the body is imbued, and then withdrawn to the plank to partly cool and drain, when it is unfolded, rolled gently with a pin tapering towards the ends, turned, and worked in every direction, to toughen, shrink, and at the same time prevent adhesion of its sides. *Stopping* or thickening the thin spots which now appear on looking through the body, is carefully performed by dabbing on additional stuff in successive supplies from the hot liquor, with a brush frequently dipped into the kettle, until the body be shrunk sufficiently (about one half), and thoroughly equalized. When quite dried, *stiffening* is performed with a brush dipped into a glutinous pulpy composition, and rubbed into the body; the surface intended for the inside having much more laid on it than the outer, while the brim is made to absorb many times the quantity applied to any other part. This viscous matter contains *proofing*, or those ingredients which render the hat waterproof.

On being again dried, the body is ready to be *covered*, and is once more taken to the battery. The first cover of beaver or napping, which has been previously *bowed*, is strewed equally over the body, and patted with the brush charged with the hot liquor, until incorporated; the *cut* ends only inserting themselves. The body is now put into a coarse hair-cloth dipped and rolled in the hot liquor, until the beaver is quite worked in. This is called *rolling off*, or *ruffing*. A stripe for the brim, round the edge of the inside, is treated in like manner, and is thus prepared for the second cover, which is applied and worked in similarly; the rolling, &c., being continued until the whole has become incorporated, and a clean, regular, close, and well-felted *hood* is the result. The dry hood, after having the nap beat up and freed, is clipped to the desired length by means of shears, or by the clipping machine, which is preferable on account of its performing the work with greater speed and regularity. When the nap is thus disposed of, the hood is soaked in the battery kettle, then *drawn down* on a block to the size and shape wanted, and firmly tied at the bottom with a cord, around which the brim is left in a frilled condition.

Dyeing is the next step. A *suit*, or six dozen, all mounted on the crown-blocks and hung round a circular frame, are put into the dye kettle, and allowed to remain three-quarters of an hour in the liquor, which is kept as near as possible one degree below the boiling point. These being taken out and set in the yard to cool, another suit is introduced for a like period; and the various suits are so treated at least twelve times in successive order. Each of the first four steepings of every suit is accompanied by about 7 lbs. of copperas, and 2 lbs. of verdigris. The body is then washed and brushed out in changes of hot water, until it ceases to give off colour. When thus thoroughly cleansed, it is steamed on a block, shaped as the hat is wished to be when complete; and in the finishing shop, by heavy (21-pound) heated irons and moisture, the frilled brim is shrunk until rendered quite level, the nap gently raised all over with a fine wire card, and brushed and ironed smooth in a uniform direction. Machinery is sometimes employed for these purposes. The tip, a thin lath sheet, is then fitted and stuck to the inside of the crown, and *robbined* or secured all round the edges by stripes of prepared paper. When thus *got down*, it is sent to the *picker*, who with tweezers extracts the *kemps*, vulgarly called "grey hairs," or the coarse hairs that have escaped the search of the machine used in blowing the beaver, so as to separate them from its fine parts. This being carefully accomplished, the hat is transferred to the finisher, who, with a plush cushion or *velure*, a brush, and hot iron, imparts to it a bright sleeky lustre. The *shaper* then rounds the brim with a knife and notched segment to the breadth wanted; and shapes it in varied styles by means of a hot iron and damp, with about a foot length of rope, over which the *curl* is laid. The *trimming* is next done, when the *tipper off* corrects the twists, smooths the ruffled nap caused by trimming, and *papers* it up with tissue and cartridge, which completes it for the retailer.

Dye-stuffs for a gross of beaver hats.—About 180 gallons of pure soft water, 1½ cwt. of best Campeachy logwood, 8 lbs. of oxide of copper, and 30 lbs. of copperas. It is to be observed, however, that some put the chips, others only the juice, of the logwood into the dye-kettle. Galls are now disused. *Stiffening stuffs.*—Makers differ in the proportions, but the ingredients are shell-lac, rosin, mastic, sandarach, and elemi, all churned until dissolved. A quantity of this is then melted over steam, sieved, put in hot, and well mixed. *Cleaning stuffs.*—These are now seldom considered necessary. Half a pound of borax, diluted in five gallons of water, into which the stiffened nap is dipped, and then well brushed.

The trade is now almost exclusively occupied in the manufacture of silk hats, which forms a distinct branch; and scarcely in any respect in its earlier stages, resembles the beaver hat manufacture. The hat body may consist of wool, stuff, willow, straw, cambric, woollen cloth, or calico: linen or calico are very common. For the latter material the body is moulded on an oval block generally made up of five segments; a piece of calico is first folded round the block and the edges secured with a solution of shell-lac or some adhesive compound. The surface of the calico is next coated with the shell-lac solution, and another layer of calico is wound round and coated as before, the edges of the top being turned down to form a portion of the crown; other layers of calico are similarly put on, until the desired thickness is attained. The crown consists of disks of calico, and the brim is formed by attaching an oval piece of calico to a piece of twilt; the centre of the oval is now cut away to the size of the hat, and the brim thus formed is secured to the hat body by cementing one of its loose edges to the inside, and the other to the outside of the body, the brim being further secured by a strap of calico, called a *band-robbin*, saturated with cement, and passed round near the juncture. The tip being fitted and robbined, the whole of the exterior is covered with cement, and when quite dry, the proper width of the brim is adjusted by means of a gauge and a knife, the gauge consisting of the segment of an oval attached to a straight rod at right angles with the longer axis, and furnished with notches for the reception of the back of the knife at the proper distance. The body is now ready for covering with silk plush, which is woven like velvet and has a nap or shag on one side; it is partly supplied to this country from Lyons, whence this kind of hat is called a *French hat*, but it is also manufactured at Banbury, Coventry, and in Spitalfields. It is cut into threes, namely, a circular piece for the crown of the hat, a rhomboidal piece for the side, and a long slip for the brim. The latter is cut of greater width than is sufficient to cover both sides of the brim, and the two ends are sewn together; the crown and the side piece are also sewn together, the sloping opening at the side being left unsewn. The hat body being smoothed with sand-paper, the strip for the brim is put on, wetted with a sponge, and the adhesion completed by means of a hot iron, the moisture and heat temporarily dissolving a portion of the shell-lac. In fitting on the brim-strip the workman is furnished with a brass wire attached to a rope stirrup; this wire serves him as a third hand, for he can gather up under it, and hold fast the various puckers that are formed, while both hands are at liberty to make the required adjustment, and when once he is satisfied, the wet sponge and the hot iron fix his work. The superfluous portions above the wire are either cut off, or, for the under part of the brim, are turned inside the hat and attached to the body. The cover of plush is next drawn over the body and nicely adjusted; it is attached by moisture and heat as already described, and the diagonal line formed by the union of the parts is concealed under the nap. Some skill is required to cover a hat body neatly; but this being done, the plush is smoothed by a carding comb, a box-wood dummy, and a velvet cushion. After the hat has been trimmed and lined by women, the brim receives its shape, and the body itself may also be considerably modified by the aid of a stove-heat. Loose or imperfect filaments are now removed by means of a steel picker, the hat is once more polished up, and being packed in paper is ready for the market.

The exports in 1854 of hats manufactured in the United Kingdom amounted to 138,060 dozen; the declared real value of these being L.252,102. In the same year the quantity imported of silk plush for hats was 144,116 lbs.; of which the computed real value was L.86,469. The duty on imported hats (at one time as high as 10s. 6d. each), was reduced in 1853 to 1s.

HATS, *Straw*. The manufacture of straw hats and bonnets has only existed for about a century in Great Britain; yet it has attained great perfection, and has become an important branch of industry. In no other part of the world, except North America, is the custom of wearing bonnets so universal as among the women of this country. A constant demand is thus created for the article; and to this may partly be attributed the progress of the home manufacture. Large importations were formerly made of the beautiful straw hats of Leghorn and Tuscany, which were celebrated two centuries ago; but this commerce, being disturbed by political troubles, gradually declined, while our own manufacture from indigenous grasses received encouragement. Still the fine rich colour of the Tuscan straw, its smoothness, and beauty, caused it to be much valued, and imported hither to be worked up by our own people after the Italian method. By this method a broad flat plait is produced in the following manner:—A certain number of straws, frequently thirteen, equal in colour and fineness, are tied together at one end. They are then divided into two bundles, six turned to the left and seven to the right. The seventh, or outer straw, on the right, is then turned down, and brought under two straws, over two, and under two. There are now seven straws to the left, where the outer straw is again taken and turned down under two, over two, and under two. Thus, backwards and forwards, the plaiting proceeds, until a straw is used up. Another straw is then put in under the short end in the middle of the plait, and is fastened by the crossing of the other straws over and under it. This kind of plait is formed in pieces of great length, which are adjusted, according to the Italian method, in large coils, so as to form *flats*, as they are called, the edges being cleverly knitted together by a thread, which is run strait along in the interior, and entirely concealed. The demand for this kind of plait is now very limited, the fashion having been superseded by fancy straw-plaits like those of Switzerland, which are now produced in such great variety in this country. The chief seats of manufacture of British straw-plait are the counties of Bedford, Hertford, and Buckingham, and in these and some other counties a population of about 70,000 persons is said to be employed in this trade, producing a yearly return which has been reckoned at from L.800,000 to L.900,000. In the end of the last century, *straw-plaiting* was successfully introduced into the Orkneys and other parts of the N. of Scotland. In the case of British-grown straw, the process is as follows:—The best and whitest straws are selected, cut into equal lengths, bleached by exposure to fumes of burning sulphur, and split lengthways into several segments. The splitting is performed by means of a wire, having four, six, or eight sharp, cutting edges, which is passed up the middle of the straw. The slips of straw are then softened in water, and are in a convenient state for plaiting. As the plait is formed it is passed between wooden rollers to make it flat and hard. The hat or bonnet is formed by winding this plait on a wooden shape in a spiral direction, leaving a little overlap, which is sewed to the part beneath, and then pressed with a hot iron. At the present time, however, the taste for fancy bonnets has lessened the demand for simple straw bonnets of this kind. Various new materials—Brazilian grass, whalebone, shavings, &c.—are introduced into the manufacture; and mixtures of straws, British and foreign, are invented to gratify the love of novelty. This manufacture is healthy and domestic, and is of great value as an employment for women and children.

The description of straw used, which is cultivated solely for the purposes of the manufacture, and not for the grain, is the *Triticum turgidum*, a variety of bearded wheat, which seems to differ in no respect from the spring wheat grown in the vale of Evesham and other parts of England. (*Trans. of Soc. of Arts.*) After undergoing a certain preparatory process, the upper parts of the stems (being first sorted as to colour and thickness) are formed into a plait of generally thirteen straws, which is afterwards knitted together at the edges into a circular shape called a "flat," or hat. The fineness of the flats is determined by the number of rows of plait which compose them, counting from the bottom of the crown to the edge of the brim, and their relative fineness ranges from about No. 20 to 60, being the rows contained in the breadth of the brim, which is generally eight inches. They are afterwards assorted into first, second, and third qualities, which are determined by the *colour* and *texture*; the most faultless being denominated the first, whilst the most defective is described as the third quality. These qualities are much influenced by the season of the year in which the straw is plaited. Spring is the most favourable, not only for plaiting, but for bleaching and finishing. The dust and perspiration in summer, and the benumbed fingers of the workwomen in winter, when they are compelled to keep within their smoky huts, plaiting the cold and wet straw, are equally injurious to the colour of the hats, which no bleaching can improve. The flats are afterwards made up in cases of ten or twenty dozen, assorted in progressive numbers or qualities, and the price of the middle or average number governs the whole. The *Brozzi* make bears the highest repute, and the *Signa* is considered secondary; which names are given to the flats, from the districts where they are plaited. Florence is the principal market, and the demand is chiefly from England, France, Germany, and America; but the kinds mostly required are the lower numbers; the very finest hats, particularly of late, being considered too expensive by the buyers. (C. T.)

HATCH, in *Mining*, an opening into a mine, or in search of one. The term *hatches* is also applied to the earthen dams used in Cornwall to prevent the water that issues from the stream-works and tin-washes from running into the fresh rivers.

HATCH, or *Hatches*, properly the grate or frame of cross-bars laid over a ship's deck, now denominated "hatch-bars." The lid or cover of a hatchway is also called hatches. Hatch is sometimes applied to the opening in the ship's deck; but this is properly called the hatchway.

HATCHEL, a tool (of various degrees of fineness) used for dressing and combing flax and hemp. It resembles a card, consisting of sharp-pointed iron pins or teeth set regularly in a board.

HATCHMENT, a corruption of *atchievement*, in *Heraldry*, the coat-of-arms of a person dead, usually placed on the front of a house, by which the rank of the deceased may be known; the whole being distinguished in such a manner as to enable the beholder to know whether he was a bachelor, a married man, or a widower. There are similar distinctions for women.

HATCHWAY, a square or oblong opening in the deck of a ship, affording a passage into the hold, or from one deck to another. Hatchway is also applied to the passage through a falling door in the top of a house. In ships, the main-hatchway is placed before the mainmast, and is the largest in the ship; the fore-hatchway is a little abaft the foremast, or at the break of the forecastle; and the after-hatchway between the mainmast and the mizzen.

HATFIELD, or BISHOP'S HATFIELD, a market-town of England, county of Hertford, on the side of a hill, 19 miles N.N.W. of London. The parish church is a handsome edifice, with an embattled tower and spire; but the most remarkable edifice here is Hatfield House, the magnificent seat of the Marquis of Salisbury, erected in the beginning of the seventeenth century. The old house was the residence of Prince Edward, afterwards Edward VI., immediately before his accession. Princess (afterwards Queen) Elizabeth lived here, under the charge of Sir T. Pope, during the latter part of the reign of her sister Mary. Hatfield was, soon after the accession of James I., made over, in exchange for Theobalds, to Sir R. Cecil, afterwards Earl of Salisbury, in whose family it has since remained. The gateway and end of the old palace are still standing. The present building was erected by Sir R. Cecil. In November 1835 the left wing was destroyed by fire, on which occasion the Dowager Marchioness of Salisbury perished in the flames. The grounds are beautifully laid out. Market-day, Wednesday. Pop. of parish (1851) 3862.

HATHERLEIGH, a market-town of England, county of Devon, on a branch of the Torridge, 28 miles W.N.W. of Exeter. It is mean and irregularly built, and the inhabitants are chiefly engaged in agriculture. Some are still engaged in the woollen manufacture, though this branch of industry has of late years declined. Market-day, Friday. Pop. of parish (1851) 1710.

HATRAS, a town of Hindustan, in the district of Allyghur, under the jurisdiction of the lieutenant-governor of the N.W. provinces. At the commencement of the Mahratta war, in 1817, the hostile demeanour of the petty chief of this place was fraught with danger, and it became necessary to dislodge him. Dya Ram, who held the place at that time was accordingly summoned to surrender the fort. Trusting in the defences, which had been strengthened in imitation of those of the neighbouring fort of Allyghur, by preparing a covered way and raising a glacis, the occupant refused compliance; whereupon, on the 23d February 1817 the town was breached and evacuated, and on the 1st March fire was opened on the fort from forty-five mortars and three breaching-batteries of heavy guns. At the close of the same day a magazine in the fort exploded, and caused such destruction that Dya Ram, terror-struck, abandoned the place in the course of the night. The population of this town, which is the chief mart for the cotton produced in the province, is returned at 20,504. N. Lat. 27. 36., E. Long. 78. 9.

HATTEMISTS, a modern Dutch sect, who adopted the principles of Pontian Van Hattem. They believed in uncontrollable necessity, denied human depravity and the distinction between good and evil, as well as that Christ made expiation for sin. They made religion to consist in suffering cheerfully whatever happens by the will of God, who punished men not for, but by their sins. Their founder seems to have broached his system principally under the influence of Spinoza.

HAUBERK, a coat of chain or of ringed mail, with wide sleeves reaching a little below the elbow, and having a hood. In France this species of armour was a mark of dignity, and appropriated to knights, esquires being restricted to a simple coat of mail, without the hood and the hose of mail.

HAUKSBEE, or HAWKSBEE, FRANCIS, an ingenious natural philosopher of the eighteenth century. His contributions to science are noticed particularly in the historical part of the article ELECTRICITY, and in the Fifth Dissertation prefixed to this work.

HAUNCH, the hip, or that part of the body between the ribs and thigh.

HAURIANT, in *Heraldry*, a term applied to fishes when placed upright, as if sucking in the air.

HAUTBOY (Ital. *Oboe*), a wind instrument of the reed kind; of a pleasing and rather melancholy *timbre*. Anciently there were hautboys of different sizes. For the compass and use of the modern hautboy, see MUSIC. In some organs there is a stop called the hautboy-stop, consisting of reed-pipes.

HAUY, RÉNÉ JUST, an eminent French mineralogist, was born at St Just, in the department of Oise, Feb. 28th, 1743. His parents were in an humble rank of life, and were only enabled by the kindness of friends to educate their son. He was sent to Paris to the College of Navarre, and afterwards to that of Lemoine, where he finished his course amid incredible privations and difficulties. He escaped from these, when, in 1764, he was himself appointed one of the teachers in the first of the above-named colleges. He began to devote his leisure hours to the study of botany, but an accident directed his attention to another field in natural history. Happening to let fall a beautiful specimen of calcareous spar belonging to a friend, he discovered, by examining the fragments, the geometrical law of crystallization. (See CRYSTALLIZATION.) Daubenton and Laplace immediately recognized the scientific value of the discovery, which, when communicated to the Royal Academy, secured for its author a place in that society. When the Revolution broke out, Haüy was thrown into prison, and his life was even in danger, when he was saved by the intercession of Geoffroy St Hilaire. Under Napoleon, he became professor of mineralogy at the Museum of Natural History. He also obtained other scientific preferment, of which he was deprived by the feeble and fanatical government of the Restoration, though his royalism had been a serious bar to his promotion under the Empire. His latter days were consequently clouded by the poverty which had threatened to blight his early career. But the courage and high moral qualities which had helped him forward in his youth did not desert him in his old age; and, as France is a country where poverty does not necessarily entail neglect or contempt, Haüy lived cheerful and respected till his death, June 3, 1823. The following are his principal works:—

Essai d'une Théorie sur la Structure des Cristaux, 1784, in 8vo; *Exposition raisonnée de la Théorie de l'Electricité et du Magnétisme, d'après les Principes d'Æpinus*, 1787, in 8vo; *De la Structure considérée comme Caractère Distinctif des Minéraux*, 1793, in 8vo; *Exposition abrégée de la Théorie de la Structure des Cristaux*, 1793, in 8vo; *Extrait d'un Traité Elémentaire de Minéralogie*, 1797, in 8vo; *Traité de Minéralogie*, 1802, 4 vols. in 8vo, et planches in 4to; *Traité Elémentaire de Physique*, 1803, in 12mo, deuxième edition, in 1806, 2 vols. 8vo; *Tableau Comparatif des Résultats de la Cristallographie, et de l'Analyse Chimique relativement à la Classification des Minéraux; Traité des Pierres Précieuses*, 1817, in 8vo; *Traité de Cristalographie*, 1822, 2 vols. with engravings. M. Haüy also contributed papers to various scientific journals, particularly the *Journal d'Histoire Naturelle*, *Annales de Chimie*, the *Journal de Physique*, the *Magasin Encyclopédique*, the *Annales du Muséum d'Histoire Naturelle*, and the *Journal des Mines*. He also communicated several memoirs to various other scientific journals.

HAVANA (HABANA), the capital of Cuba, and the most important commercial city in the West Indies, is situated on the northern side of the island, in N. Lat. 23. 8. 15., W. Long. 82. 22. 5. It stands on the W. side of the entrance of a magnificent land-locked harbour, capable of accommodating with safety 1000 vessels. The entrance, between the Moro and Punta castles, which protect it, is 1500 yards long, by, and at its narrowest point, 350 wide; and has a depth of 8 fathoms water. A continuous series of batteries run along both shores; and the town is defended by walls, a strong citadel, and fortifications on the neighbouring heights. The streets of the city are narrow and dirty, but straight, and cross each other at right angles. In the matter of cleanliness, however, a great improvement has lately taken place. The houses are constructed of stout masonry, generally of one storey, and many of the private residences are costly and magnificent structures. The suburbs are considerably larger than the town itself, and are better laid out; that of Regla is on the opposite side of the harbour. Among its most conspicuous buildings are—the cathedral (in which the remains of Columbus now lie), the government palace, admiralty, post-office, royal tobacco factory, and the *casa de beneficiencia*. There are numerous churches, convents, and schools in the city, a university, ecclesiastical seminary, theatre, and other places of public amusement. Havaña is connected by railway with Batabana, Matanzas, &c. Pop. (1850) 150,561. See CUBA.

HAVANT, a small market-town in Hampshire, at the head of Langston harbour, 21 miles E. by S. from Southampton. The principal building is the church, a cruciform edifice, surmounted by a tower; some portions of it are very old. There is also a district church, dedicated to St John; a Baptist, and an Independent meeting-house. Havant possesses no trade, and no manufacture beyond that of a little parchment. Market-day, Saturday. Pop. of parish (1851), 2416.

HAVEL, a navigable affluent of the Elbe, rising in several lakes in the S.E. part of Mecklenburg-Schwerin, flows through several lakes in its course, and joins the Elbe below Havelberg. The chief towns on its banks are, Oranienburg, Spandau, Potsdam, Brandenburg, Plane, Rathenow, and

Havelberg. Its chief affluents are—on the left, the Spree, Nuthe, Plane, and Stremme; on the right, the Rhin and the Dosse. It is about 180 miles in length, is navigable for boats through its entire extent, and for ships from Fürstenberg.

HAVERCAMP, Sigibert, a distinguished Dutch scholar, was born at Utrecht in 1683. He succeeded Gronovius as professor of Greek at Leyden, and held at the same time the chairs of rhetoric and history. He was undoubtedly a learned man and a laborious scholar, but his works, which were written for the most part hastily and carelessly, are now forgotten. The most important of them are his—

Editions of the *Apologetica* of Tertullian, 1718, in 8vo; of Lucretius, 1725, in 2 vols. 4to; of the History of Josephus, 1726, in 2 vols. folio; of Eutropius, 1729, in 8vo; of Orosius, 1738, in 4to; of Sallust, 1742, in 2 vols. 4to; and, lastly, of Censorinus, 1743, in 8vo; *Dissertationes de Alexandri Magni numismate quo quatuor summa orbis terrarum imperia continentur, et de nummis contorniatis*, Leyden, 1722, in 4to; *Thesaurus Morellianus*, Amsterdam, in 2 vols. folio; *Universal History explained by Medals*, in Dutch, Leyden, 1736, in 5 vols. folio, incomplete; *Sylloge Scriptorum qui de Linguæ Græcæ vera et recta pronunciatione Commentaria reliquerunt*, Leyden, 1736–1740, in 2 vols. 8vo; *Introductio in historiam patriæ a primis Hollandiæ comitibus usque ad pacem Ultraject. et Radstad* (1714), Leyden, 1739, in 8vo; *Introductio in Antiquitates Romanas*, ibid. 1740, in 8vo; *Museum Wildianum in duas partes divisum*, Amsterdam, 1740, in 8vo; *Museum Vilebrochianum*, ibid. 1741, in 8vo; *Bronze Medals*, large and small, in the Cabinet of Queen Christina, Hague, 1742, in folio.

HAVERFORDWEST, in Welsh Hwlffordd, a market-town, seaport, and parliamentary and municipal borough of Wales, in Pembrokeshire, and the capital of that county. It stands on a declivity descending to the banks of the West Cleddan. Some of the streets are wide and handsome; but in the older parts of the town they are narrow, and generally very steep. Viewed from a little distance, the aspect of the town is very picturesque. The majority of the shops and houses have an air of wealth and comfort, arising from the fact that many persons of independent means have been attracted to the town by its character for cheapness. The principal public buildings are the Guildhall market-house; the three parish churches; the various dissenting chapels; a Free school; an almshouse; and a large union poorhouse. A literary and scientific institution was established in 1847; and one newspaper, the *Pembrokeshire Herald*, is published weekly.

Haverfordwest was at one time strongly fortified, but all traces of its walls and towers have long since disappeared. On a rock overhanging the river was a strong castle, built in the reign of Stephen by Gilbert de Clare, first Earl of Pembroke. In the insurrection of Owen Glyndwr, it was successfully defended against the French troops in the Welsh service. In the civil war of the 17th century it was held by the royalists. The only remaining vestige of the castle is the keep, which has been largely added to, and converted into the county gaol. In the neighbourhood of the town are the ruins of a priory, dating from the 12th century, and dedicated to St Mary and St Thomas.

On the N. side of the river is the suburb of Prendergast, where are the remains of a very ancient mansion, formerly occupied by a family of that name. The river itself is navigable at spring tides as far as the quay, where there is a custom-house, subordinate to that of Milford. The town exports in some quantity coal, oats, butter, and cattle. The only manufactory of importance is a large paper-mill. The market held on Tuesday and Saturday is one of the largest in Wales; the supply of fish in particular is very abundant. The assizes and quarter-sessions for Pembrokeshire are held in Haverfordwest, which, with the contributory boroughs of Fishguard and Harberth, returns one member to parliament. Registered electors (1851) 686; pop. 6580.

HAVERHILL, a small market-town of England, county of Suffolk, 25 miles N. of Chelmsford, and 59 miles from London. It was formerly a place of greater importance than at present, and had considerable manufactures of checks and fustians, which have now dwindled away. The weaving of silk, cotton, &c., is still to some extent carried on. The parish church is a large and ancient edifice. Pop. of parish (1851) 2535.

Haverhill, a flourishing village in the United States of North America, Massachusetts, on the N. bank of the Merrimac River, at the head of its navigation, and about 15 miles from the ocean. It stands on the Boston and Maine railways; and has manufactures of boots and shoes, woollen goods, bricks, silver-ware, hats, &c. Pop. (1853) about 3500.

HAVRE, LE, or Havre de Grace, the principal commercial seaport on the west coast of France, and a sub-prefecture and chief town of the department of Seine-Inférieure. It stands on the N. bank of the estuary of the Seine, in N. Lat. 49. 29. 14., and W. Long. 0. 6. 38.; by railway 143 miles from Paris, 127 from Poissy, 108 from Mantes, 55½ from Rouen, and 32 from Yvetot. It is the port of the Seine and of Paris, and one of the most thriving maritime towns of France. It is quite modern in its construction, chiefly built on a low alluvial tract of ground, and divided into two parts by its outer port and basins. It has no fine buildings or historical monuments; its streets run chiefly in straight lines and at right angles with one another; and they are grouped round the basins or docks which communicate by lock-gates, and are placed so as to form a triangle entered from the outer port.

Havre is a fortified town of the third rank; a maritime prefecture, with a tribunal of the first instance and of commerce; an exchange and a chamber of commerce; a hydrographic school of the first class; a maritime arsenal, &c. The mouth of the harbour, formed in the flat alluvium of the Seine, is kept open by the aid of a reservoir of water, regulated by sluices. During only four hours each tide can vessels enter the port, which is left dry at low water. The three old docks are capable of containing from 200 to 300 vessels; the third, the Bassin de Vauban, the largest of all, situated outside the walls, and finished in 1842, is a magnificent work with a fine masting machine, and warehouses of the best construction. At the extremity of the reservoir has been constructed a fifth dock for steamers.

Napoleon said that "Paris, Rouen, and Havre, formed only one city, of which the Seine was the highway." This briefly accounts for the prosperity of Havre. It is the place of import of all foreign articles required for the supply of the French capital, as well as of cotton for the manufacturers of Rouen, Lille, St Quentin, and Alsace, which cities again export through Havre their manufactured goods. Like Liverpool, it is the point of communication between the continent of Europe and America; and a great trade has been here carried on with the United States since the declaration of their independence. Though Havre is much inferior in size to Marseilles, Bordeaux, or Nantes, the other great mercantile ports of France, yet it yields to none of them in activity. Its imports, though only half the weight of those of Marseilles, nearly equal them in value. The chief imports from America by Havre are coffee, indigo, hides, peltry; but above all, cotton for the Rouen and Mulhausen factories. From Spain are imported wine, oil, barilla, and timber; from Sweden and Norway, deals, planks, masts, pitch, and tar.

The manufactures of Havre are not numerous or extensive. They consist mostly of chemicals, starch, oil, tobacco, tar, cordage, sailcloth, cables, earthenware, furniture, and lace. The Havre station of the Paris, Rouen, and Havre railway covers an area of 36 acres. Pop. (1851) 26,410.

In 1509 Louis VII. founded Havre; and Francis I. took it under his special protection, bestowing upon it the name of Franciscopolis; but a chapel dedicated to Notre-Dame de Grace ultimately conferred on it its present name. The French East India Company and the Companies of Senegal and Guinea made it their entrepôt and the chief seat of their commercial operations. In 1759 (during the Seven Years' War) preparations were made here for an invasion of England, which led to the bombardment of the place by Admiral Rodney. In 1794 and 1795 it was again bombarded by the British.

In 1485 Henry of Richmond embarked at this place for Milford Haven and Bosworth Field with 4000 men, furnished by Charles VIII., to aid his enterprise. The town was delivered over to the keeping of Queen Elizabeth by the Prince de Condé, leader of the Huguenots, in 1562, and the command of it was entrusted to Ambrose Dudley, Earl of Warwick; but the English were expelled within a year, after a most obstinate siege, the progress of which was pressed forward by Charles IX. and his mother, Catherine de Medici, in person.

Havre is the birthplace of Bernardin de St Pierre, author of *Paul and Virginia;* and of Mademoiselle Scudery, and of Casimir Delavigne.

HAW, in farriery, an excrescence resembling a gristle, growing under the nether eyelid and eye of a horse, which, if not timely removed, destroys it.

HAW, a small parcel of land, as a *Hemphaw*, or *Beanhaw*, lying near the dwelling-house, and enclosed for these uses. But Sir Edward Coke, in an ancient plea concerning Feversham in Kent, says *hawes* are houses.

HAWAII. See POLYNESIA.

HAWARDEN, a small market-town of North Wales, Flintshire, 12 miles W.N.W. of Chester. It consists of little more than one street, about half a mile in length. The collieries, potteries, and iron-works in the vicinity afford employment to the inhabitants. Hawarden Castle is a handsome modern edifice, with an extensive park, in which are the ruins of the ancient castle, supposed to have been built by the Britons. Pop. of parish, which is extensive (1851), 6203.

HAWASH, a river of Abyssinia. See ABYSSINIA.

HAWES, STEPHEN, the author of the *Pastime of Pleasure*, flourished in the reign of Henry VII. Little is known of his personal history, except that he was a native of Suffolk, and that he styled himself "gentleman and grome of the chamber to the famous prynce and seconde Solomon, Kynge Henrye the Seventh." He is known to have been a great favourite with the king, who took much pleasure in his recitations from the old English poets. A common admiration of the literature of France, in which both were proficients, cemented their feelings of mutual esteem. The dates of Hawes' birth and death are alike unknown. The *Pastime of Pleasure*, for which he is chiefly remembered, is a long and somewhat tedious allegory; exhibiting, however, more invention than any similar work of that day. The poem describes the life and adventures of the Prince Graunde Amour, who is enamoured of La Bel Pucell, and who, to make himself worthy of her, studies, in the Tower of Doctrine under the Ladies Grammar, Logic, Rhetoric, Arithmetic, and Music. He then visits the Tower of Geometry, and finally that of Chivalry; and, after proving his valour by various exploits, he at length gains the hand of La Bel Pucell, with whom he spends the rest of his life. The details of the allegory are wrought out with very considerable skill, and the poem is useful as showing the advancement of the language towards that perfection which it reached under the master-minds of the Elizabethan era.

HAWICK, a town in the county of Roxburgh, Scotland, 10 miles S.W. from Jedburgh, the county town, and 53 miles S.S.E. from Edinburgh by the Hawick branch of the North British railway. It stands on the S. bank of the Teviot, and is divided into nearly equal parts by a wild and irregular stream, the Slitrig, which has been known to rise more than 20 feet above its ordinary level, sweeping away houses, and leaving the foundation rock without a vestige of building-material or soil. Hawick is of undoubted antiquity, being mentioned in the *Chronicles of Melrose* as early as 1214; and the name itself is of Saxon derivation. But the strongest testimony to the early settlement of the spot is afforded by an artificial mound at the upper end of the town, called the Moat, having 312 feet circumference at the base, an elevation of 30 feet, and a nearly level top of 117 feet in circumference. Its origin is entirely lost; but Mr Jeffrey, whose acquaintance with the historical memorials of the Scottish border is perhaps unparalleled, throws out the conjectures, in his *History and Antiquities of Roxburghshire*, that "the children of the Gadeni may have used it as a burying-place for their dead, and their descendants afterwards have converted it into a moathill; or it may have been used from a very early period as a place for enacting as well as administering laws. . . There can be no doubt (he adds) that in later times the flat top of the Hawick Moat was used by the judge of the day for hearing the rude suitors of the district." Another illustration of past modes of life in the district is afforded by the building now used as the Tower Inn, which was at one time a fortress of the barons of Drumlanrig, from one of whom the town charter (circa 1537) was derived. Eight years after this baronial grant, the corporate privileges were confirmed by Queen Mary, who was gratified with the hospitality she received here. The government of the town is vested in two bailies and a council; the former being elected annually by the burgesses, the latter consisting of fifteen life members and fourteen representatives of incorporated trades. The bold and enterprising spirit which characterized the borderers prior to the union of the Scottish and English crowns is now specially distinctive of the inhabitants of Hawick; and having, about the middle of last century, embarked in the manufacture of wool beyond the wants of the district, they have steadily developed a trade that at the present time gives employment in the town to a capital of L.180,000 and to 3689 hands. The carpet manufacture was the first attempted (1752), and was soon followed by the manufacture of inkle and cloth; but these have given way to the hosiery manufacture, which was first set on foot by Bailie Hardie in 1771. The bailie employed 5 men and 6 women, who produced annually, from 4 looms, about 2400 pairs of coarse stockings. Twenty years later (1791), 14 men, 51 women, and 8 looms, turned out 3500 pairs lambs' wool and 600 pairs cotton stockings—the population of the town being 2320. About the commencement of this century machinery was introduced; and in 1816 there were 7 mills, 44 engines, 100 hand jennies, and 510 stocking frames, from which 1044 operatives worked up 288,000 lbs. wool into 328,000 pairs of stockings. The subsequent progress of the trade may be seen in the following table; the statistics for 1838 and 1850 being taken from the *Annals of Hawick*, by James Wilson, town-clerk; those for 1856 being made up from returns obtained from the several manufacturing houses:—

	1838.	1850.	1856.
1. Carding Mills...	11 (1 partly by steam)	11 (6 water and steam)	12
2. Engines or Scribbling Machines	...	106 engines or 53 sets	60 sets.
3. Spinning Jennies...	...	...	74 pairs.
4. Annual consumption of Wool...	2,595,888 lbs. value £65,000	2,016,000 lbs. value £142,100	2,116,357 lbs. value £264,544
5. Quantity of Yarn Manufactured...	854,462 lbs.	1,209,600 lbs.	1,617,768 lbs.
6. Number of Stocking Frames......	1209	1200	1611
7. Number of Stockings made.........	1,049,676 pairs	...	1,670,168
8. Articles of Under-Clothing	12,552	120,000	563,104
9. Number of Weaving Looms......	226	268	332

	1838.	1850.	1856.
10. Number of Operatives	1788 (besides females)	3465	3689
11. Quantity of Soap consumed	102,899 lbs.	207,378 lbs.	191,397 lbs.
12. Annual Amount of Wages.........	£48,726	£81,650	£81,689
13. Value of Property employed in Manufactures.........	£101,861	£185,616	£178,604
14. Value of Manufactures	£140,000	£280,904	£333,217
15. Quantity of Coal consumed	...	10,000 tons	4261 tons.

As the policy of the Duke of Buccleuch, to whom nine-tenths of the soil of the parish belongs, is adverse to manufactures, this steady growth of the staple trade of the town has only been accomplished in the face of great difficulties in regard to mill sites. Though the chief manufacture is in articles of hosiery, there are also produced tweeds, shawls, blankets and flannels; and the preparation of leather, and the manufacture of gloves and candles, are carried on extensively. On Thursday there is a weekly market, principally for grain; and several fairs and hiring markets are held during the year. The trade of the town is assisted by branches of the British Linen, Commercial, and National banks, besides which there is a savings' bank. A newspaper, a literary institution, two reading-rooms, a trades' library, and some minor libraries, are evidences of the mental activity of the people; and their religious character may be judged of by the fact that there are 10 places of worship, with accommodation for the entire population of the town. These places of worship are,—2 Established, 1 Free, 3 United Presbyterian, 1 Episcopal, 2 Congregational, 1 Baptist, 1 Roman Catholic, and 1 Quaker. The ancient buildings of the town are fast disappearing, and in their stead are rising handsome modern buildings. The principal street is broad, well paved, and clean; and two bridges crossing the Slitrig render intercommunication easy, whilst an excellent bridge across the Teviot gives access from the country. Pop. of parish (1801), 2798; (1841), 6573; (1851), 7801; of town (1851), 6683. (W. E—S.)

HAWK. See index to ORNITHOLOGY.

HAWKER (German *höker*), an itinerant retailer of wares of any kind. Hawkers and pedlars are classed together, and are subject to the same regulations; but the former are supposed to carry on business on a larger scale than the latter. The legislature has always regarded this class of dealers with some degree of suspicion; and accordingly stringent enactments have been made from time to time with a view to prevent the dishonest practices so common in itinerant trading. All hawkers and pedlars must take out an annual license, the duty on which amounts to L.4; and for each horse, ass, or other beast employed by them in the transport of goods, there is an additional duty of L.4.

HAWKESBURY, a river of New South Wales, formed by the junction of the Nepean and Grose, and falling into Broken Bay 20 miles N. of Sydney. It has a course of about 130 miles, and is navigable for vessels of 150 tons to Windsor, 40 miles from the sea in a direct line, but upwards of a 100 by the windings of the river.

HAWKESWORTH, JOHN, LL.D., a distinguished *littérateur* of the eighteenth century, was born in London in 1715, or, as some say, in 1719. He was apprenticed first of all to a clockmaker, and afterwards to an attorney, but ended by adopting the profession of letters. In 1744 he succeeded Dr Johnson as redacter of the parliamentary debates for the *Gentleman's Magazine.* Eight years later he started, in company with Johnson, Bathurst, and Warton, a periodical which he called the *Adventurer.* This journal had a great success, and ran to 140 numbers, of which 70 were from the pen of Hawkesworth himself. It aimed at a high standard of moral teaching; and as it was believed to exercise a wholesome influence, its editor was rewarded by the Archbishop of Canterbury with the degree of LL.D. This distinction turned his head for a time, and his overbearing conduct alienated some of his best friends, Johnson in the number. The doctor was not unwilling to renounce his old ally, who had been honoured, as he believed, at his expense; and in truth Hawkesworth was nothing more than an imitator of Johnson, though he certainly was a good imitator. After producing some fairy tales and minor pieces, which had great success at Drury Lane, Hawkesworth published in 1761 an edition of Swift, with a life prefixed, to which Johnson bore most honourable testimony in his *Lives of the Poets.* This and other pieces of literary work which he executed gained him so much credit that he was selected to redact Captain Cook's papers relative to his first voyage. This work appeared in 1773, in 3 vols. 4to, and comprised a good narrative of the previous voyages of Byron, Wallis, and Carteret, with maps, charts, &c. The compiler received from government L.6000 as the reward of his labours, and the work was at first warmly received by the critics. It was soon discovered, however, that in his preface the editor had expressed some ideas apparently at variance with the established religion, especially on the subject of a special providence. Hawkesworth was now suspected of having aimed a secret blow at Christianity, and his simple and naïve descriptions of savage life were represented as dangerous and immoral. The real truth, however, was, that his success had made him many enemies among the critics who were jealous of his rise; and the epigrams and pasquinades of which he became the subject were in reality a tribute to his genuine merits. It is said, though with no great show of reason, that the severity with which his work came at length to be treated shortened his days. He died in November 17, 1773, and was buried at Bromley in Kent, where a monument has been erected to his memory.

HAWKING, the practice of taking wild-fowl by means of hawks. The method of reclaiming, manning, and bringing up a hawk to this exercise is called *falconry.*

Falconry is of high antiquity; but at what period hawks were first trained to this sport does not appear. The Asiatics seem to have been acquainted with it from beyond the date of history. In the time of Ctesias foxes and hares were hunted in India by means of rapacious birds; and we are told by Aristotle that "in Thrace they go out to catch birds with hawks." Also in another work, ascribed to Aristotle, the same account is to be found, with two remarkable additions—namely, that the hawks appear when called, and that they brought whatever they had seized to the fowlers, who rewarded them with part of the spoil. (*De Mirabilibus Auscultat.*, c. 128.) Whether or not the sport of hawking was practised by the Greeks has been much controverted; but it seems probable that they employed the rapacity of some of the feathered tribe in hunting and fowling.

The original Britons, with a fondness for the exercise of hunting, had also a taste for that of hawking, and every chief maintained a considerable number of birds for that sport. To the Romans this diversion was scarcely known in the days of Vespasian, but it was introduced immediately afterwards. Most probably they adopted it from the Britons; but we know certainly that they greatly improved it. In this state it appears among the Roman Britons in the sixth century. Gildas, in a remarkable passage in his first epistle, speaks of Maglocunus, on his relinquishing the sphere of ambition, and taking refuge in a monastery, and proverbially compares him to a dove, which hastens away at the noisy approach of the dogs, and with various turns and windings takes her flight from the talons of the hawk.

In after times hawking was the principal amusement of the English. A person of rank scarcely stirred out without his hawk on his hand; and in old paintings this is the criterion of nobility. Harold, afterwards king of England, when he went out on a most important embassy into Normandy, is painted embarking with a bird on his hand, and a dog under his arm; and in an ancient picture of the nuptials of Henry VI. a nobleman is represented in much the same manner. In those days, "it was thought sufficient for noblemen to winde their horn, and to carry their hawk fair, and leave study and learning to the children of mean people." The former were the accomplishments of the times. Spenser makes his gallant Sir Tristram boast,

> "Ne is there hawk which mantleth her on pearch,
> Whether high tow'ring, or accoasting low,
> But I the measure of her flight doe search,
> And all her prey, and all her diet know."

In short, this diversion was, in the good old times, the pride of the rich, and the privilege of the poor. No rank of men seems to have been excluded from the amusement. We learn from the book of St Alban's that every degree had its peculiar hawk, from the emperor down to the holy-water clerk. Vast was the expense which sometimes attended this sport. In the reign of James I. Sir Thomas Monson is said to have given L.1000 for a cast of hawks. We need not wonder, then, at the rigour of the laws tending to preserve a pleasure which was carried to such an extravagant pitch. In the 34th of Edward III. it was made felony to steal a hawk; and to take its eggs, even in a person's own ground, was punishable with imprisonment for a year and a day, besides a fine at the king's pleasure. In Queen Elizabeth's reign the imprisonment was reduced to three months; but the offender was to find security for his good behaviour for seven years, or lie in prison till he did so. Such, then, was the enviable state of the times of old England. During the whole day the gentry gave their attention to the fowls of the air and the beasts of the field; in the evening they celebrated their exploits with the most brutish sottishness; and the inferior classes, by the most unjust and arbitrary laws, were made liable to capital punishments, to fines, and loss of liberty, for destroying the most destructive of the feathered tribe.

According to Olearius, the diversion of hawking is more followed by the Tartars and Persians than ever it was in any part of Europe. "Il n'y avoit point de hutte," says he, "qui n'eust son aigle ou son faucon."

The larger falcons are used to pursue antelopes, bustards, cranes, &c.; the smaller and less powerful birds are employed to fly at pigeons, partridges, quails, and the like. The gyrfalcon, which is one-third larger than the peregrine, is imported from Tartary, and sold at Constantinople, Aleppo, and Damascus.

The falcons or hawks which were in use in this kingdom are still found in Wales, and in Scotland and its isles. The peregrine falcon (a species very generally diffused over the world) inhabits the rocks of Caernarvonshire. The same species, with the gyrfalcon, the gentil, and the goshawk, are found in Scotland, and the lanner in Ireland. But we may here notice that the Norwegian breed were, in old times, in high esteem in England, and were thought bribes befitting a king. Jeoffrey Fitzpierre gave two good Norway hawks to King John, to obtain for his friend the liberty of exporting a hundredweight of cheese; and Nicholas the Dane stipulated to give the king a hawk every time he came into England, that he might have liberty to traffic throughout the king's dominions. Hawks were also made the tenures by which some of the nobility held their estates from the crown. Thus Sir John Stanley had a grant of the Isle of Man from Henry IV. to be held of the king, his heirs, and successors, by homage and the service of two falcons, payable on the day of his or their coronation. And Philip de Hastang held his manor of Combertoun, in Cambridgeshire, by the service of keeping the king's falcons.

Hawking, though an exercise now much disused, furnishes a great variety of significant terms which still obtain in our language. Thus, the parts of a hawk have their proper names, the legs, from the thigh to the foot, are called *arms;* the toes, the *petty singles;* the claws, the *pounces;* the wings, the *sails;* the long feathers of the wings, the *beams;* the two longest, the *principal feathers;* and those next thereto, the *flags;* the tail, the *train;* the breast feathers, the *mails;* and those behind the thigh, the *pendant feathers.* When the feathers are not yet full grown, the falcon is said to be *unsummed;* when they are complete, it is *summed.* The craw or crop, is called the *gorge;* the pipe next the fundament, where the fæces are drawn down, the *pannel;* the slimy substance lying in the pannel, the *glut;* the upper and crooked part of the bill, the *beak;* the nether part, the *clap;* the yellow part between the beak and the eyes, the *sear* or *cere;* the two small holes therein, the *nares.*

As to the furniture, the leathers, with bells buttoned on the legs, are called *bewits;* the leathern thong by which the falconer holds the hawk, is called the *lease* or *leash;* the little straps, by which the leash is fastened to the legs, *jesses;* and a line or packthread fastened to the leash, in disciplining the bird, a *creance.* A cover for the head, to keep the falcon in the dark, is called a *hood;* and a large wide hood, open behind, to be worn at first, is called a *rufter hood.* To draw the strings, that the hood may be in readiness to be pulled off, is called *unstriking the hood;* the blinding a hawk just taken, by running a thread through her eyelids, and thus drawing them over the eyes, to prepare her for being hooded, is called *seeling;* a figure or resemblance of a fowl, made of leather and feathers, is called a *lure;* the resting-place, when off the falconer's fist, is called the *perch;* the place where the meat is laid is called the *hack;* and that in which the bird is set, whilst the feathers fall and come again, the *mew.*

Anything given to a hawk, to cleanse and purge the gorge, is called *casting;* small feathers given to make the bird cast, are called *plumage;* gravel given to help to bring down the stomach, is called *rangle;* the throwing up of filth from the gorge after casting, is called *gleaming;* the purging of grease, or other matter, *enseaming;* being stuffed is called *gurgiting;* inserting a feather in the wing in lieu of a broken one, is called *imping;* giving a leg, wing, or pinion of a fowl to pull at, is called *tiring.* The neck of a bird the hawk preys on is called the *inke;* and what the hawk leaves of its prey is called the *pill* or *pelf.*

There are also proper terms for the several actions of the bird. When a hawk flutters, as if striving to get away, either from the perch or hand, it is said to *bate;* when, standing too near, they fight with each other, it is called *crabbing;* when the young ones quiver and shake their wings in obedience to the elder, it is called *cowring;* when the bird wipes its beak after feeding, it is said to *feak;* when it sleeps, it is said to *jouk;* from the time of exchanging the coat, till the bird turn white again, is called *intermewing:* treading is called *cawking;* when the hawk stretches one wing after the legs, and then the other, it is called *mantling;* the dung is called *muting;* when the hawk mutes a good way behind, it is said to *slice;* when it does so directly down, instead of jerking backwards, it is said to *slime,* and if it be in drops, it is called *dropping;* when the bird as it were sneezes, it is called *sniting;* when it raises and shakes itself, it is said to *rouze;* and when, after mantling, it crosses its wings together over its back, it is said to *warble.*

When a hawk seizes, it is said to *bind;* when, after seizing, it pulls off the feathers, it is said to *plume;* when it raises a fowl aloft, and at length descends with it to the ground, it is called *trussing;* when, being aloft, it descends to strike the prey, it is called *stooping;* when it flies out too far from the game, it is said to *rake;* when, forsaking the proper game, it flies at pyes, crows, and the like, it is called *check;* when, missing the fowl, the bird betakes itself to the next check, it is said to *fly on head.* The fowl or game it flies at is called the *quarry;* the dead body of a fowl killed by the hawk is called a *pelt.* When the bird flies away with the quarry, it is said to *carry;* when, in stooping, it turns two or three times on the wing, to recover itself ere it seizes, it is called *canceliering;* when it hits the prey, yet does not truss it, it is called *ruff.* The making a hawk tame and gentle, is called *reclaiming;* the bringing one to endure company, *manning;* an old stanch hawk, used to fly and set example to a young one, is called a *make-hawk.*

The reclaiming, manning, and bringing up a hawk to the sport, cannot easily be brought under any precise set of rules. It consists in a number of little practices and observances, calculated to familiarize the falconer to his bird, and the latter to the falconer.

When the hawk comes readily to the lure, a large pair of luring bells are to be put on; and the more giddy-headed and apt to rake out the hawk is, the larger must the bells be. Having done this, and the bird being sharp-set, ride out in a fair morning, into some large field unencumbered with trees or wood, with the hawk on your hand; then having loosened the hood, whistle softly, to provoke her to fly; unhood, and let the bird fly with its head into the wind; for by that means it will be the better able to get upon the wing, and will naturally climb upwards, flying in a circle. After the hawk has flown three or four turns, then lure her with your voice, casting the lure about your head, having first tied a pullet to it; and if your falcon come in and approach near you, cast out the lure into the wind, and if she stoop to it, reward her.

You will often find, that when she flies from the hand, she will take stand on the ground. This is a fault which is very common with soar-falcons. To remedy it, fright her up with your wand; and when you have forced her to take a turn or two, take her down to the lure, and feed her. But if this does not succeed, then you must have in readiness a duck seeled, so that she may see no way but backwards, and that will make her mount the higher. Hold this duck in your hand, by one of the wings, near the body; then lure with the voice to make the falcon turn her head; and when she is at a reasonable pitch, cast your duck up just under her; when, if she strike, stoop, or truss the duck, permit her to kill it, and reward her by giving her a reasonable gorge. After you have practised this two or three times, your hawk will leave the stand, and, delighted to be on the wing, will be very obedient.

It is not well, for the first or second time, to show your hawk a large fowl; for it frequently happens that a large bird escapes from the hawk, which gives the falconer trouble, if it do not also involve the loss of the hawk. But if she happens to pursue a fowl, and, being unable to recover it, gives it over, and comes in again directly, then cast out a seeled duck; and if the bird stoop and truss it across the wings, permit her to take her pleasure, rewarding her also with the heart, brains, tongue, and liver. But if you have not a quick duck, take her down with a dry lure, and let her plume a pullet and feed upon it. By this means a hawk will learn to give over a fowl that rakes out, and on hearing the falconer's lure, will make back again, and know the better how to hold in the head.

If your hawk be a stately high-flying one, it ought not to take more than one flight in a morning. When she is at the highest, take her down with your lure: and when she has plumed and broken the fowl a little, feed her, by which means you will keep her a high-flyer, and fond of the lure.

So much for the technicalities of hawking, which, from change of times and manners, has now in a great measure fallen into disuse, though frequent attempts have been made in England during the last few years to revive it. The reader will find some admirable descriptions of this national sport in the novels of Scott, who, on this as on many other subjects, has brought the past as it were before us, rendering us familiar with its habits, customs, and amusements, and engaging our sympathy in favour of the feelings, notions, and even prejudices, with which these were associated. Among the most celebrated treatises on this subject, once so universally interesting, may be mentioned *The Book of St Albans* by Juliana Berners, 1486; *La Fauconnerie*, by Charles d'Esperon, Paris, 1605; Latham *On Falconry*, 1658.

HAWKINS, Sir John, a celebrated English seaman, was born at Plymouth about 1520. From his father, who, like himself, was a sailor, he learned the advantages of the trade with Africa. After spending his youth in trafficking with Spain and Portugal he visited the coast of Guinea, embarked a cargo of negroes (obtained partly by force and partly by purchase), and made a large fortune by selling them to the Spaniards of Hayti. He made a second voyage to the same place on the same errand in 1564, and with equal success. His third and last voyage (1567), however, was very unfortunate. He was attacked by the Spaniards in the port of St John de Ulloa, and only saved two ships of all his squadron. How different the sentiment was regarding the slave-trade in those days and in our own, may be learned from the fact that Queen Elizabeth approved all that Hawkins had done, allowed him to assume as his crest a demy-Moor in his proper colour, bound with a cord, and made him treasurer of the navy. In 1588 he was made vice-admiral of the *Victory*, and fought with such distinction against the Spanish Armada, that he was knighted by the queen. In 1595 he accompanied Drake on an expedition against the Spanish colonies in the West Indies, but he quarrelled with his colleague, and died Nov. 21st, without again distinguishing himself. There are some very interesting notices of Hawkins in Hakluyt, and also in Purchas.

Hawkins, *Sir John*, the historian of music, was born in London in 1719. His father was a builder and surveyor, and it was intended that the young Hawkins should adopt the same profession; ultimately, however, he was apprenticed to an attorney. At the expiry of his apprenticeship he began business for himself, and by industry and integrity, soon raised himself to wealth and station. In his earlier days he had been a hard student, and now in virtue of his acquirements he was admitted into the best literary society in London. Dr Johnson himself (in whose life by Boswell there are numerous and not always very respectful notices of Hawkins) admitted him into his favour, and helped forward his literary views. Hawkins was at this time a frequent contributor to the *Gentleman's Magazine* and other periodicals. His well-known taste for music gained him admittance into the Madrigal Society. In 1753 he married a lady who brought him a considerable fortune, which subsequent events so much increased, that in 1759 he retired from business and settled at Twickenham. He distinguished himself greatly as a county magistrate, and was so valuable a public servant, that in 1772 he was rewarded with knighthood by the king, to whom he had been presented as "the best magistrate in his dominions." Four years after this event appeared his *General History of the Science and Practice of Music.* The literary merit of this work is unquestionably very small, but its value as a storehouse of useful learning on the subject of music is very considerable. But Dr Burney, the rival historian of music, believing that Hawkins was trenching on a province which he considered peculiarly his, had put all the machinery of the press in operation before Hawkins' work appeared. When at last it was published it met with nothing but abuse from the entire press, and its sale was completely stopped. The next age did Hawkins the justice denied him by his own, and his work now fetches a higher price than when it was first published. The valuable musical library which he had amassed in the composition of this history, he made over to the British Museum. In 1760 Hawkins undertook an edition of Walton's *Complete Angler*, which has been frequently reprinted; but his only other work of any value, besides his *History* is his *Life of Dr Johnson*, which is rather a tribute to that great man's memory than a requisite to his fame. Hawkins himself died, May 21, 1789, and was buried in Westminster Abbey. (See the *Memoirs* and *Anecdotes* of Lætitia M. Hawkins; *Boswell's Life of Johnson*, &c.)

HAWLBOWLINE, a small island in Cork harbour. See CORK COUNTY.

HAWSE, the situation of the cables before a ship's stem, when she is moored with two anchors out forward, viz., one on the starboard, and the other on the larboard bow. This term also denotes any small distance a-head of a ship, or between her head and the anchors employed to ride her; as, a vessel sails athwart the hawse, or anchors in the hawse of another vessel.

HAWSE-HOLES, the holes in the bows of a ship on each side of the stem, through which the cables pass.

HAWSER, a large rope, intermediate between the *cable* and *tow-line* of the ship to which it belongs. It is used for various purposes, as warping, for a spring, &c.

HAY, or as it is often called, WELSH HAY, or THE HAY, a small market-town of Wales, in the parish of Hay, hundred of Talgarth, and county of Brecknock. It stands on the River Wye, near the point where the counties of Radnor, Brecknock, and Hereford converge. The town is well lighted and paved, and contains, besides various dissenting meeting-houses, a handsome parish church, rebuilt in 1838 in the early English style. It has also British and national schools, and a savings bank. The vestiges of a Roman camp near the church point to an ancient origin. The castle of Hay, a very old building, was destroyed by Henry II.; afterwards restored, and finally dismantled by Owen Glyndwr. Between two and three miles from the town is Clifford Castle, the birth-place of the celebrated Jane Clifford, better known as the "fair Rosamond," the favourite of Henry II., who built for her the maze at Woodstock, where she perished by the cruel jealousy of Queen Eleanor. There are six annual fairs at Hay, besides a weekly market on Thursday. Pop. (1851) 1238.

HAYDN, FRANCIS JOSEPH, a celebrated musical composer, born at Rohrau, a small town fifteen leagues from Vienna, in 1732. His father was a cartwright, and his mother before her marriage had been cook in the family of Count Harrach, the lord of the village. Haydn's father had a fine tenor voice, and played a little on the harp. On holidays, after church, he used to accompany his wife whilst she sung; and, when only five years old, Haydn was wont to stand by his parents and join the concert in his own way, with two pieces of wood, one of which served for a violin and the other for a bow. When loaded with years and honours, the great symphonist would often recall the music of this domestic performance; so deep an impression had its simple strains made on his soul. A cousin of the cartwright, whose name was Frank, a schoolmaster at Haimburg, came to Rohrau one Sunday, and assisted at the *trio*. He remarked that the child, then scarcely six years old, beat the time with astonishing exactness and precision. Frank was well acquainted with music, and proposed to his relations to take little Joseph to his house and teach him. They accepted the offer with joy, hoping to succeed more easily in getting Joseph into holy orders if he should understand music. Chance brought to Frank's house Reuter, *maestro di capella* of St Stephen's, the cathedral church of Vienna. He was in quest of children to recruit his choir. The schoolmaster soon proposed his little relation to him; and when he came, Reuter gave him a *canon* to sing at sight. The precision, purity of time, and spirit with which the child executed it, surprised him; but he was more especially charmed with his voice, which was naturally sonorous and delicate. He only remarked that he did not shake, and asked him the reason with a smile. The boy smartly replied, "How should you expect me to shake, when my cousin does not know how to do it himself?" "Come here," said Reuter, "and I will teach you." He then took the young Hadyn between his knees, showed him how he should rapidly bring together two notes, hold his breath, and agitate the palate. The child immediately made a good shake. Reuter, enchanted with the success of his scholar, took a plate of fine cherries, which Frank had ordered for his illustrious brother professor, and emptied them all into the child's pocket. The delight of the young musician may be readily conceived. Haydn often mentioned this anecdote, adding with a smile, that he fancied he had these beautiful cherries in his mouth whenever he happened to shake.

Young Haydn was now placed in the hands of Reuter, and accompanied him to Vienna. Haydn, in afterwards speaking of his studies under this master, said he did not remember to have passed a single day without practising sixteen or eighteen hours daily, and this he did of his own accord, for the children of the choir were not compelled to practise more than two hours. It was by this unwearied assiduity, aided by the inspirations of his genius, that Haydn, almost in the dawn of life, laid the foundation of his future eminence.

Mozart at twelve years of age composed a successful opera; but, less fortunate, Haydn at thirteen produced a mass, which his worthy master ridiculed. Convinced, after comparing his work with the compositions of others, that Reuter was right, and that nature without art was like an eagle unfledged, Haydn resolved to apply himself to the study of counterpoint. But Reuter did not teach composition; and none of the masters in Vienna were so generous as to instruct an unknown and unpatronized boy. But to this misfortune Haydn perhaps is indebted for his originality. Under a master he might have avoided some of the errors he has fallen into when he subsequently wrote for the church and for the theatre; but, upon the whole, he would certainly have been less original. He purchased the theoretical works of Mattheson, Fuchs, Emanual Bach, and Kirberg, which he studied most assiduously, labouring alone, and exercising every scientific intricacy; and so great was the pleasure he experienced in his pursuits, that, poor as he was, shivering with cold, and oppressed with sleep, seated by the side of an old worn-out harpsichord, he declared himself never to have been happier at any period of his life.

At eighteen Haydn's voice broke, and he left the class of *soprani* at St Stephen's. Obliged to seek for a lodging, chance threw him in the way of a poor peruke-maker named Keller, who received him as a son. Haydn, in the quiet obscurity of his new dwelling, was enabled to pursue his studies without interruption. His residence here had, however, a fatal influence on his future fortune. Keller had two daughters, and his wife and he arranged that one of them should marry Haydn, who, absorbed in his studies, and thinking little about love, made no objection to the proposal. He adhered to his engagement honourably in after life, but the union was an unhappy one.

Haydn now began to compose short sonatas for the pianoforte, which he sold at low prices to his few female pupils. He also wrote *minuets*, *allemands*, and *waltzes* for the *Ridotto*. By performing in concert with two of his friends a serenata in the streets, he attracted the attention of Curtz, the director of the theatre of Carinthia, who employed him to write music, which was performed with the happiest success. But Haydn's talent was not for the stage; he chose his own proper ground when in his twentieth year, and produced six trios, which, from their striking originality, at once brought him into notice. Shortly after this he published his first quartett, which every musical amateur soon had by heart. Leaving the house of Keller, Haydn went to lodge with Martinez, and became acquainted with Metastasio the poet, who taught him Italian, and instructed him in the fine arts.

Haydn struggled long against want, but at last his genius brought him into notice, and he received employment from Prince Antony Esterhazy, and his successor Nicholas, for whom he composed a number of pieces for the baryton, an instrument now scarcely ever used. Haydn did not forget his promise to his benefactor Keller; and being now in better circumstances, he married his daughter Ann, from whom he afterwards separated on account of her bad temper and conduct.

Placed now at the head of a full and excellent orchestra, and attached to the service of a rich patron, Haydn found himself in that happy union of circumstances which gives opportunity to genius to display all its powers. From this moment his life was uniform and fully employed. He rose early in the morning, dressed himself very neatly, and placed himself at a small table by the side of his pianoforte, where the hour of dinner usually found him still seated. In the evening he went to rehearsals, or to the opera which was performed in the prince's palace four times every week. Sometimes, but not often, he devoted a morning to hunting. The little time he had to spare on common days was divided between his friends and Mademoiselle Boselli, a singer of eminence. Such was the course of his life for more than thirty years; and this can alone account for the prodigious number of his productions in instrumental music, church music, and operas. In fifty years he produced no less than 527 instrumental compositions, and in the whole of these pieces he has never copied or imitated himself, but when it was his intention to do so.

Haydn wrote his best music with some labour, not from any want of ideas, but from the extreme delicacy of his taste, which he could with difficulty satisfy. A symphony would sometimes cost him a month, and a mass perhaps two. His manuscripts of one piece sometimes contain passages enough for three or four pieces. But although it seemed labour, it was not so; for he was wont to say that he never felt so happy as when at work. Nothing troubled him till the death of his patron, Prince Nicholas, in the year 1789, and the subsequent demise of his favourite Boselli; circumstances which induced him to come to England, upon the solicitations of Salomon. This musician was about to give concerts in London, and offered Haydn L.50 for each performance, which terms he accepted. Haydn was then fifty-nine years old, and he resided in England upwards of a year, and brought out there some of his finest instrumental pieces.

From England Haydn went to Germany, but he returned for a short time in 1794, and was complimented with the diploma of Doctor of Music from Oxford. He afterwards went to Austria, and did not return again to England. He was in his sixtieth year when he commenced his *Creation*, to which he devoted two years. When urged to hasten its completion he calmly said, he had been a long time about it because he intended it to last a long time. It was finished in 1798, and performed in Vienna with enthusiastic approbation. All Germany rang with its praises; in a few weeks it was printed, and spread over Europe with a rapidity before unheard of. Two years later he composed his oratorio of the *Four Seasons;* of which he used to say "It is not another *Creation*, and the reason is this: in that oratorio the actors are angels, in the *Four Seasons* they are peasants." This work terminated his musical career; the labour of it exhausted him, and he complained that he was forced to seek ideas which used to come to him formerly unsought. He wrote, however, subsequently a few quartetts, and arranged nearly 300 Scotch songs, a work which produced him about 600 guineas. At last he grew so weak, that a vertigo seized him the moment he sat down to the piano. He now seldom quitted his house and garden at Gumpelsdorf, and he became feeble in mind and body. On the morning of the 31st of May 1809 he died, aged seventy-eight years and two months. He was privately interred at Gumpelsdorf, for Vienna was at that time in the occupation of the French. Haydn's heir was a blacksmith, to whom he left the bulk of his fortune. His manuscripts were purchased by Prince Esterhazy. He left no posterity. Cherubini, Pleyel, Neukomm, and Weigl, may be considered as his disciples.

Haydn, in his symphonies, stands first in the list of the greatest instrumental authors. In sacred music he opened a new path, by which he placed himself on a level with the most celebrated composers for the church. In theatrical music he was least successful. In that department he was only an imitator. His instrumental music consists of chamber symphonies for a greater or less number of instruments, and of symphonies for a full orchestra. The first of these divisions comprehends duets, trios, quartetts, sestetts, octetts, and divertimentos; sonatas, *fantasie*, variations, and *capricci*. In the second are contained the symphonies for the grand orchestra, concertos for different instruments, serenades, and marches.

The *allegros* of his symphonies are in general full of life and spirit. They generally begin with a short, easy, and intelligible theme. Gradually, and by a procedure full of genius, this theme, repeated by the different instruments, acquires a character of mingled heroism and gaiety. There is more variety in the slow movements; in these the lofty style is majestically displayed. The phrases or musical ideas in his *andantes* and *adagios* are finely and nobly developed. Sometimes the composer is carried away by his copiousness and power; but this excess of vigour does not exclude passion and sentiment. His *minuets* are admirable, being rich in harmony and accumulated beauties. The general character of Haydn's instrumental music is that of romantic imagination. "Haydn," says Carpani, "è l' Ariosto della musica. Passeggia il suo genio per tutte le regioni dell' arte. La sua immaginazione apre i tesori d'ogni bellezza, e ne dispone a sua voglia." As a composer of symphonies and quartetts, he may be considered as the first who moulded them into that form which Mozart, Beethoven, and others, have adopted. The famous seven instrumental pieces called *Die Sieben Worte des Heylandes am Kreuze* were esteemed by the composer as his best works.

The oratorio of the *Creation* is replete with grandeur, sublimity, and beauty. The *Seasons*, with less sentiment and learning than the *Creation*, is equally admirable as an expressive and delightful composition. The ideal part of Haydn's masses is brilliant and dignified; the style is noble and full of fire. His *Agnus Dei* is full of tenderness; the *Amens* and *Hallelujahs* breathe all the reality of joy; the fugues display all the exultation of an enraptured mind. (*Le Haydine* de Carpani.) (A. H.)

HAYDN, *John Michael*, a younger brother of Francis Joseph Haydn, was born at Rohrau in September 1737. After learning the elements of music, and how to play on the harp and harpsichord, in his father's house, he entered the imperial chapel at Vienna as a chorister. His voice had the remarkable compass of three octaves, from the lowest contralto F up to highest soprano F in alt. The emperor and empress were so much pleased with his singing, that they took him under their protection. He next studied organ-playing and composition; and, by a constant examination of classical compositions, without lessons from any master, he soon acquired skill as an organist and composer.

In 1763 he was appointed music director in the chapel of the Bishop of Grosswardein, in Hungary; and in 1768 chapel-master to the Bishop of Salzburg, with the small salary of 300 florins, together with board and lodging. Afterwards this salary was raised to 600 florins. In the first year of his residence at Salzburg he married the daughter of Lipp, the organist. She bore him a daughter, who died in her third year; and the loss of this child deeply affected him for the rest of his life. At Salzburg he opened a school of composition, in which several distinguished artists were taught. In 1801 Prince Esterhazy gave him the title of his chapel-master, with a pension; but he still continued to reside at Salzburg. He died there, on 10th August 1806. He was considered by his brother Joseph as the best composer of church music of his time in Germany. He refused to allow any of his works to be published in his lifetime. Since his death, a number of his church compositions, and several of his symphonies, &c., have been published in Germany. Some pleasing specimens of his music are contained in Latrobe's *Selections*. (G. F. G.)

HAYDON, Benjamin Robert, historical painter and writer, was descended from an old Devon family, the Haydons of Boughwood, Cadby, and Woodbury. He was an only son and was born January 26, 1786. His mother was the daughter of the Rev. Benjamin Cobley, rector of Dodbrook, Devon, whose son, General Sir Thomas Cobley, signalized himself at the siege of Ismail. His father was a man of great literary taste, and was well known and esteemed amongst all classes in Plymouth. Haydon, at an early age, gave evidence of his taste for study, which was carefully fostered and promoted by his mother. At the age of ten he was placed at Plymouth grammar school where his love of study and painting was still further developed by the principal, himself a man of refined taste and great artistic acquirements. At the age of fourteen he was sent to Plympton St Mary school. He completed his education in this school where Sir Joshua Reynolds also had acquired all the scholastic knowledge he ever received. On the ceiling of the school-room was a sketch by Reynolds in burnt cork, which it used to be Haydon's delight to sit and contemplate. Whilst at school he had some thought of adopting the medical profession, but he was so shocked at the sight of an operation that he gave up the idea. A perusal of Albinus, however, inspired him with a love for anatomy; and Reynolds' discourses aroused within him his smouldering taste for painting, which, from his earliest childhood, had been the absorbing idea of his mind. Sanguine of success, full of energy and vigour, he started from his parental roof May 14, 1804, for London, and entered his name as a student of the Royal Academy. He began and prosecuted his studies with such unwearied ardour that Fuseli wondered when he ever found time to eat. At the age of twenty-one (1807) Haydon exhibited, for the first time, at the Royal Academy, "Repose in Egypt," which was bought by Mr Thomas Hope the year after. This was a good introduction to the young artist, who shortly after received a commission from Lord Mulgrave and an introduction to Sir George Beaumont. In this year also he finished his well-known picture of "Dentatus," which, though it brought him a great increase of fame, involved him in a violent and life-long quarrel with the Royal Academy, whose committee had hung the picture in a small side-room instead of in the great hall. Haydon saw in this act an attempt to crush him by depriving him of his due; and his subsequent conduct was disastrous chiefly to himself. In 1810 his difficulties began, though he was still receiving from his father an allowance of L.200 a-year. Bad luck also attended his struggles for professional advancement; for, though he put his name down for admission into the academy, he did not obtain a single vote. His disappointment was embittered by the controversies in which he now became involved with Leigh Hunt, with Sir George Beaumont, for whom he had painted his famous picture of "Macbeth," and Mr Payne Knight, the last of whom had denied the beauties as well as the value of the Elgin Marbles. The "Judgment of Solomon," his next production, gained him L.700, besides L.100 voted to him by the directors of the British Institution, and the freedom of the borough of Plymouth. Success rewarded his efforts. West wept on beholding the "Pale Fainting Mother;" and Miss Mitford addressed to him one of her best sonnets. To recruit his health and escape for a time from the cares of London life, Haydon joined Wilkie in a trip to Paris; he studied at the Louvre; and on his return to England produced his "Christ's Entry into Jerusalem," which afterwards formed the nucleus for the American Gallery of Painting, which was erected by his cousin John Haulland of Philadelphia. With such professional renown as he had now acquired, Haydon again aspired for admittance into the Royal Academy, and was again unsuccessful. Amid the trials and difficulties of this period of his life, he found time to write a long and elaborate essay on Painting for the *Encyclopædia Britannica*. This essay has been twice reprinted. (See article Painting.) Whilst painting "Lazarus," his pecuniary difficulties increased, and for the first time, he was arrested but not imprisoned, the sheriff-officer taking his word for his appearance. Amidst all these harassing cares he married. In 1823, Haydon was lodged in the King's Bench, where he received the most consoling letters from the first men of the day. Whilst a prisoner he drew up a petition to Parliament in favour of the Elgin Marbles, which was presented by Mr Brougham. He also produced the picture of the "Mock Election," the idea of which had been suggested by an incident that happened in the prison. The king (George IV.) gave him L.500 for this picture, and Haydon was enabled to purchase his release. Haydon's other pictures were—1830, "Eucles," and "Punch;" 1831, "Napoleon at St Helena," for Sir Robert Peel; 1832, "Xenophon, on his Retreat with the 'Ten Thousand,' first seeing the Sea at Thebes;" "Waiting for the *Times*," purchased by the Marquis of Stafford; "The First Child;" "Reading the Scriptures;" "Falstaff;" and "Achilles playing the Lyre." In 1834 he completed the "Reform Banquet," for Lord Grey—this painting contained 197 portraits; 1843, "Curtius Leaping into the Gulf;" and "Uriel and Satan." When the competition took place at Westminster Hall, Haydon sent two Cartoons, "The Curse" and "Edward the Black Prince," but had not the good fortune to succeed with either. He then painted "The Banishment of Aristides," which was exhibited with other unfinished productions under the same roof where Tom Thumb was then making his debût in London. The exhibition was unsuccesful; and the artist's difficulties increased to such an extent that whilst employed on his last grand effort, "Alfred and the Trial by Jury," overcome by debt, disappointment, and ingratitude, he wrote, "Stretch me no longer on this rough world," and put an end to his existence, June 22, 1846, in the 61st year of his age. He left a widow and three children, who, by the generosity of their father's friends, were rescued from their pecuniary difficulties, and comfortably provided for; amongst the foremost of these friends were the late Sir Robert Peel, Le Comte A. D'Orsay, Mr Justice Talfourd, and Lord Carlisle. Haydon began his first lecture on painting and design in 1835, at the Mechanics' Institution, and afterwards visited all the principal towns in England and Scotland. His delivery was energetic and imposing, his language powerful, flowing, and apt, and abounded with wit and humour; and to look at the lecturer, excited by his subject, one could scarcely fancy him a man overwhelmed with difficulties and anxieties. It has been said that the height of Haydon's ambition was to behold the first buildings of his country adorned with historical representations of her former glory. He lived to see the acknowledgement of his principles by government in the establishment of schools of design, and the embellishment of the new houses of parliament, but in the competition of artists for the carrying out of this object. The Commissioners (amongst whom was one of his former pupils) considered he had failed; and whilst employed in a series of gigantic paintings, which were executed to show to the world the falseness of their judgment, he ended his life, as we have before mentioned. Haydon was well versed in all points of his profession; and his *Lectures* which were published shortly after their delivery, showed that he was as bold a writer as he was a painter. Although many of his early productions in portrait-painting were truthful and striking (even at the early age of eighteen, he had given evidence of great talent), Haydon never pursued this branch of his art, except as a means for enabling him to carry out his ideas of high art. To form a correct estimate of Haydon, it is only necessary to read his autobiography. He there solves the mystery of his own life as unconsciously and as fully as Montaigne and Rousseau. It is one of the most natural books ever written. The author seems to have daguerreotyped his feelings and sentiments without restraint as they rose in his mind, and his portrait stands in these volumes limned to the life by his own hand. His mind was a peculiarly ill-regulated one. It was not governed by any ruling principle; his love for his art was rather a passion than a principle. He went to London to seek his fortune, believing, as young men will, in patrons. He found patrons difficult to manage; and not having the tact to lead them gently, he tried to drive them fiercely. He failed of course; abused patrons and patronage, and intermingled talk of the noblest independence with acts of the grossest servility. It was to himself, and to himself only, that he owed his frequent disappointments and his wretched life. He was self-willed to perversity, but his perseverance was such as is seldom associated with so much vehemence and passion as belonged to him. With a large fund of genuine self-reliance, he combined a vanity so boundless that it would have been ludicrous if it had not been pitiable. To the very last he believed in his own powers, and in the ultimate triumph of art, though he seems to have hoped for art only through himself as its successful champion. In taste and judgment he was alike deficient, in everything at least that concerned himself. Hence the boisterous and exaggerated tone of self-assertion which he assumed in his advertisements, catalogues, and other appeals to the public. He proclaimed himself the apostle and martyr of high art, and believed himself to have on that account, a claim on the sympathy and support of the nation. It must be confessed that he often tested severely those whom he called his friends; and few men's friends ever stood the test so well. All the money that he borrowed and begged, he, no doubt, intended to repay; and there is no reason why he should not have fulfilled his intention, as his contemporary and fellow-sufferer, Etty, did. Had he possessed even ordinary prudence, he might have reached the haven sooner and more quietly even than the other. Every reader of his autobiography will be struck at the frequency and fervour of the short prayers interspersed throughout the work—"the begging letters despatched to the Almighty," as they have been called. Haydon had an overwhelming sense of a personal, overruling and merciful providence, which influenced his relations with his family, and to some extent with the world. Whatever he may have been as an artist and a citizen, his conduct as a husband and as a father is beyond all praise.

HAYE, La, a small town of France, department of Indre-et-Loire, on the Creuse, 30 miles S. of Tours. It is only remarkable as being the birth-place of Descartes: the house in which he first saw light is still carefully preserved. Pop. about 1500.

HAYLE, a small seaport of Cornwall, on the inner basin of St Ives' Bay, 5 miles S.E. of St Ives. It has two large iron foundries and steam-engine factories. It carries on an active trade, and the harbour is accessible to vessels of 200 tons.

HAYLEY, William, the friend and biographer of Cowper, was born at Chichester in 1745. After graduating at Cambridge he embraced the profession of the law; but finding it little congenial to his tastes he abandoned it, and retired to his patrimonial estate of Earthem in Sussex. His intention was to spend the remainder of his days in rural quiet, with such a seasoning only of literary activity as might defy ennui, and give a zest to his life. In his retirement he made the acquaintance of Cowper, and this acquaintance soon ripened into a friendship that remained close and unbroken till the great poet's death. Hayley himself survived till November 20, 1820. During his lifetime Hayley was held in high estimation, partly for his literary qualities, which were not wholly contemptible, but more for his position in society, his taste and acquirements, which were both considerable, and his fortune which was large. In his prime, too, there was no one to dispute the poetic laurel with him; the great of the eighteenth century had died out, and those of the nineteenth had not yet been acknowledged; and thus the French proverb became true in his case, which says,—"Au royaume des aveugles les borgnes sont rois." His best piece is his *Triumph of Temper*, which still enjoys a share of popularity; but he also wrote with ease and elegance the *Vers de Société*, so much in vogue in his day. His prose essays on *Painting*, *History*, *Epic Poetry*, and *Sculpture*, are quite above mediocrity, and he did a real service to literature by his *Life of Cowper*. His life of himself, from which the foregoing details are chiefly taken, is a sufficiently readable work.

HAY-MAKING. See Agriculture, chap. viii., *Herbage and Forage.*

HAYNAU, or Hainau, a town in the Prussian province of Silesia, government of Liegnitz, and 9 miles W.N.W. of the town of that name. The inhabitants are chiefly employed in woollen and linen weaving. In the vicinity are some good veins of fuller's earth. Pop. (1849) 4187.

HAYTI, Haiti, San Domingo, or Hispaniola, one of the largest and most fertile of the West India islands, extending in length from E. to W. about 390 miles, and in breadth from 60 to 150 miles, is situated between N. Lat. 17. 37. and 20. 0., and between W. Long. 68. 20. and 74. 28. It is called Hayti, or the Highland country, by the natives, from the mountains with which it abounds, especially in the northern part. The country was formerly divided between the Spaniards, who were the earliest European colonists, and the French. The line of demarcation which separated these two divisions commenced on the S. side from the Pedernales or Flint River, and extended in a waving direction to the River Massacre on the N. side. The country to the W. of this line belonged to the French, while that on the E. side formed the Spanish part of the island. By far the greatest portion of the country was in the possession of the Spaniards; their division being reckoned 220 miles in length by 120 in breadth, of which, though a considerable part consists of mountains, these are said to be little inferior in fertility to the champaign country, and to be equally capable of cultivation. The French division is of an extremely irregular figure. The land is deeply penetrated by the Gulf of Gonaive, and is in some parts 170 miles in length, whilst in others it is not 30. It is nearly of the same breadth as the Spanish division.

General description of the coast.

Great part of the coast of this island is rocky and dangerous, affording but an imperfect shelter to vessels overtaken by storms. Many of the shipping-places on the southern shore are nothing more than open bays, which lie exposed to the storms and hurricanes of the autumnal months. The harbour of San Domingo, formerly thought so commodious and secure, has become too shallow to admit vessels of large burden. There are, however, besides roadsteads and several small harbours, the Bays of Neyba and Ocoa on this coast. Into the former flows the River Neyba, which receives vessels of 30 tons burden; its stream, before entering the ocean, divides itself into various channels, which, annually changing, confound the pilot, and render the navigation difficult. Ocoa Bay is a large and convenient watering-place, with several small rivers falling into it. The entrance is two leagues across, and it gradually widens to nearly six. On the E. side of this bay is the safe and capacious port of Caldera. On the S.E. coast is the great Bay of Samana, which, in point of size and situation, is one of the most important on the island. From Cape Raffael, which forms the southern point of entrance into the Bay of Samana, to the opposite side of the island or peninsula of Samana, the distance is 18 miles, which is closed in by a bulwark of rocks and sands, the entrance only being left clear, with a safe and deep channel between the shore of Samana and several detached islands. This bay is about 60 miles long, and is surrounded on every side by a fertile country, suited to all the purposes of trade. Within the compass of this bay whole fleets might ride at anchor in perfect security. The River Yuna, after being joined by the Cambu, and meandering through the rich plains of La Vega Real, falls into the Bay of Samana after a course of nearly 100 miles. Bahia Ecossaise (or Scotch Bay), which is situated on the N. side of the peninsula of Samana, is a dangerous rocky place. Thence to Puerto Plata the coast extends about 60 miles in a N.W. direction, and in this space stands Balsama Bay, which has only 14 feet depth of water, and is of difficult navigation. The harbour of Puerto Plata was first discovered by Columbus; the entrance is narrow but safe, and the neighbourhood is rich in every species of timber trees. There are several other small harbours and bays on this side of the island; but the coast is in general rocky and dangerous.

Soil and surface. A country of such magnitude as Hayti, containing mountains of great height, with valleys of corresponding extent, necessarily comprises great variety of soil. In general, however, it is fertile in the highest degree, being everywhere drained by copious streams, and yielding in abundance every species of vegetable produce which can minister either to the luxury or comfort of man. The soil consists principally of a rich clay, sometimes mixed with gravel, lying on a substratum of rock. That part of the island formerly occupied by the French is mountainous, but fertile and well wooded, and containing mines both of silver and iron. The Spanish part of the island is mountainous in many parts; whilst in other parts the country is spread out into extensive plains. These are generally in a state of nature, covered with herbage, or with woods of immense growth and the most luxuriant foliage. The mountains intersect the island in two principal chains from E. to W. From these secondary and partial ridges diverge irregularly in different directions, forming beautiful and fertile valleys, with numerous streams. The highest mountains of the interior, particularly those of Cibao, rise to the height of 7200 feet above the level of the sea. To the N. of the capital is the valley called Vega Real or Royal Plain, which is by far the largest and finest in the island. Westward it extends to the old French line of demarcation, and in this part it is drained by the River Yacki; to the E., where the River Yuna flows for the space of 50 miles, it projects to the head of the Bay of Samana, and is drained by numerous smaller streams, which cross it in various directions. This valley may be said to extend in length about 140 miles, and in breadth from 20 to 30. Other plains also, of less extent, but of equal fertility and of easy access, are everywhere found interspersed among the mountainous tracts. Westward from San Domingo, along the southern coast, is the valley of the River Banis, extending from Nisao to Ocoa. Here the pasture is good; but the country is not so well watered as in the other parts of the island; an inconvenience which is sensibly felt by the cattle during the dry months. Further to the westward and to the N. other valleys are found; but where the land, as in this island, is everywhere intersected by ranges of mountains, it is impossible, in any general sketch, to describe particularly that continual succession of hill and dale which diversifies the face of the country. Eastward from the capital are those immense plains called *Los Llanos*, which stretch out to a vast extent on a dead level. They are covered with herbage, and the eye wanders unobstructed over the wide expanse of waving grass, which is occasionally diversified by natural clumps of shrubs. These plains occupy almost one-sixth part of the island, extending nearly to its eastern coast, being a distance of more than 90 miles, by about 30 wide. They form an immense natural meadow, covered with pasture for vast herds of cattle, which belong to more than a hundred different owners.

Climate. San Domingo has a hot moist climate; but the heat is mitigated by the regularity of the sea-breeze, and by the contiguity of the mountains. In the plains the thermometer rises to 96°, sometimes to 99°; but in the mountainous tracts it seldom rises above 78°. In the most elevated parts a fire is frequently necessary. In those situations meat may be kept for several days, and in the morning hoar frost is frequent. The seasons, as in tropical countries, are divided into the wet and the dry. The rains are periodical, and are heaviest in May and June, when the rivers, which at other times scarcely supply water for a continued stream, overflow their banks, and, with an impetuous torrent, sweep over the neighbouring plains. The climate of San Domingo is unhealthy to Europeans, owing to these violent heats and heavy rains; and hence all metals, however bright their original polish, soon contract a tarnished appearance. This is more observable on the sea-coast, which is also more unhealthy than the interior of the island. Hurricanes are not frequent, but in the southern parts of the island violent gales of wind, generally preceded by a closeness and sultriness in the atmosphere, frequently occur. These, however, are not attended with such fatal effects as the hurricanes in the Windward Islands.

Rivers. The island of Hayti abounds in rivers and smaller streams, which flow from the mountains in the interior, in different directions, to the sea. Of these, the principal are the Haina, the Nigua, the Nizao, the Ozama, the Neyba, the Ocoa, the Yane, and the Santiago or river of Monte Christi. Near the S. part of the French line of demarcation is the beautiful lake of Henriquillo, which is about 60 miles in circumference; and though it is about 25 miles from the sea, its water is perfectly salt, and of the same specific gravity as that of the ocean. The same fishes are also found in it, such as the shark, seal, porpoise, &c.

Vegetable productions. The fertile soil of Hayti is distinguished by the variety of its vegetable productions, many of which are rare and valuable. The mahogany tree grows to a great size, and is of very fine quality. The manchineel tree affords a beautiful species of wood, richly veined like marble, and susceptible of the finest polish. Several species of dye-woods are produced in the forests. There is a tree called the jagua, the fruit of which is accounted a delicacy by the natives; and of which the juice, as clear as water, makes a stain on linen which is indelible. Different kinds of guaiacum are found, as also of several other woods with the same properties, which grow unnoticed and nameless in those unexplored forests. The sideroxylon or iron-wood, remarkable for hardness, as its name implies, is abundant; and the oak also, which differs in appearance from the European oak, frequently furnishes beams of from 60 to 70 feet in length. On the N. side of the island are extensive forests of pine, which is much used for the purposes of shipbuilding; and Brazil-wood is found on many parts of the coast. The satin-wood of this island is heavier than that of the East Indies, and it takes so fine a polish that it does not require to be varnished. The cotton tree is the largest of all the vegetable productions, and is formed into the lightest and most capacious canoes. Every variety of the palm tree is found in the woods, of which they form a principal ornament. The palmetto or mountain cabbage is an erect and noble tree, which grows to the height of 70 feet, with esculent leaves at the top. In the congenial soil of this fertile island the sugar-cane, cotton and coffee plants, grow in the greatest luxuriance. There is also the calabash, the fruit of which serves as a substitute for earthenware; the plantain, the staff of life in the West Indies; vanilla, which is found indigenous in the unfrequented woods; quassia or simarouba, which is a tall and stately plant, waving gracefully in the wind; sarsaparilla, indigo, tobacco, turmeric, ginger and rice plants. The fruits and nutritive roots of San Domingo are nearly the same as those of Jamaica; but they are more abundant, and extremely fine. Of these may be enumerated the choux caraib, or Indian kale, with a variety of other vegetables that come under the same denomination; the avocato or vegetable marrow, the melon, sapadillo, guava, pine-apple, bread and jack fruit, mango, nuts, rose-apple, plums, &c., of many different species. Flowers in endless variety and splendour adorn the wild scenery of the woods, and exhale their fragrance in the desert air.

Geology. Little is known of the geological structure of the island, but a limestone containing vestiges of marine shells is the prevailing formation. Mineral springs exist in several parts. The most noted in the eastern part of the island are those of Banica, Yaya, and Pargatal; and in the west the chalybeate of St Rose, the saline of Jean Rabel, and the alkaline sulphur waters of Dalmarie. The mineral products are various and rich, and include gold, platina, silver, quicksilver, copper, iron, tin, sulphur, manganese, antimony, rock-salt, bitumen, jasper, marble, opal, lazulite, chalcedony, &c. The gold mines of the Chibao Mountains, which, in the sixteenth century, were very productive, have been abandoned, and at the present day gold is obtained only from the washings in the northern rivers. None of the mines, indeed, are successfully worked, and hence these sources of wealth are reserved for the industry of future generations.

Animals. The indigenous quadrupeds of this island were confined to four species, which the Indians called Hutia, Quemi, Mohuy, and Cory. Of these, all are believed to be extinct except the first. Horned cattle, hogs, sheep, goats, horses, mules, and asses, have been introduced from Europe, and have multiplied prodigiously in the wild and extensive pastures of the interior. Wild fowl are abundant, consisting of various species of ducks, pigeons, the flamingo, the wild peacock, the mimic thrush or mocking bird, the banana bird, the Guinea fowl, the ortolan, and parrots of various species. The rivers abound with fish, some of which are very delicate. Turtle of all kinds are taken, and the land-crab is much esteemed. The serpents are not dreaded; but the centipedes, which are frequent in old buildings, are large and dangerous. The scorpion is rarely seen; but the venomous crab-spider, which is equally dangerous, is sometimes met with.

History. This island was discovered by Columbus in 1492, and was soon filled with adventurers, who crowded from Europe to the new world in search of sudden wealth. The natives were reduced to slavery by these settlers, who spread themselves over the island, and by their industry the colony increased rapidly in wealth and prosperity. But as it was chiefly by the desire of gold that settlers were attracted to this distant shore, San Domingo was in its turn abandoned for other countries of greater reputed wealth; and the country gradually declined, and, instead of yielding a revenue, became a burden on the mother country. About the middle of the sixteenth century the island of St Christopher was taken possession of by a mixed colony of French and English, who being attacked by the Spaniards, were forced to fly to the barren isle of Tortuga, where they established themselves, and grew formidable, under the well-known appellation of buccaneers. They at last obtained a firm footing in San Domingo, into which they had made only predatory incursions; and by the treaty of Ryswick that part of the island of which they had obtained possession was ceded to the king of France, who acknowledged these adventurous colonists as his subjects. The French colony languished for a while under the galling restrictions imposed on its trade by the mother country; but these being removed about the year 1722, it soon attained a high degree of prosperity, and was in a very flourishing state when the French revolution commenced in 1789. The population was composed of three classes,—whites, people of colour, and blacks. Of these the whites were the favoured class, who engrossed all public honours and emoluments. They considered the people of colour as a degraded caste, with whom it was disgraceful to associate on terms of equality. The black slaves ranked lowest in the scale, and they experienced from both classes all the evils of the most cruel bondage. A society framed of such hostile elements contained in its very constitution the seeds of hatred and contention; and in the course of the revolution which occurred in the mother country these were brought into full activity. The important discussions by which France was at that time agitated kindled a corresponding sensation in the colonies; and the hostile races of the whites and mulattoes were already violently inflamed against each other by the eagerness of their contests, when the national convention, in 1791, passed the memorable decree, giving to the people of colour the unlimited enjoyment of all the rights which were possessed by French citizens; thus at once breaking down all the distinctions which had prevailed in the colony, and which were sanctioned by custom and inveterate prejudice. This decree excited loud and general disapprobation amongst the whites, who immediately adopted the most violent measures. The national cockade, the badge of their attachment to the revolution and to the mother country, was openly trampled under foot, and the authority of the governor-general and the supremacy of the mother country were equally set at nought. The several parishes proceeded to the election of a new assembly, which accordingly met on the 9th of August, under the title of the General Assembly of the French part of San Domingo. The mulattoes in the mean time, alarmed at these proceedings, were collecting in armed bodies for their defence; and the whites were so intent on the meeting of the new colonial assembly that they offered no opposition to these assemblages.

First movements of the negroes. Such was the state of affairs between the two hostile classes of the whites and the mulattoes, when a new and more powerful party, whom all united to oppress, now suddenly combined for their own protection and for the destruction of their enemies. On the 23d of August reports reached the town of the Cape that the negro slaves in the neighbouring parishes were in arms, and that they were destroying the plantations and massacring the inhabitants. This terrible intelligence was confirmed next day in its full extent by crowds of wretched fugitives from the neighbouring country, who, having abandoned their property, were flying to Cape Town from the fury of their savage enemies. The success of this bold and deep-laid conspiracy spread universal consternation amongst the white inhabitants. The citizens in Cape Town were immediately summoned to arms, and the women and children were at the same time sent on board the ships in the harbour. Other measures were also adopted to secure the place against any sudden attack of the infuriated slaves. When these precautions had been adopted, several small detachments of troops were sent out to act offensively against the insurgents; but although partial successes were obtained in these encounters, the general result too fatally demonstrated to the white inhabitants their own weakness and the strength of their enemies. In this destructive war it was calculated that, about two months after its commencement, upwards of 2000 white inhabitants were massacred; that 180 sugar plantations, and about 900 coffee, indigo, and cotton settlements were destroyed, and a thousand families reduced from opulence to misery. Of the insurgents about 10,000 are supposed to have perished in the field, and some hundreds by the hands of the public executioner; and the rebellion, which had been hitherto confined to the northern parts of the island, now began to spread through the western districts, where the blacks were aided by the people of colour, and where, under their united devastations, the country was laid waste for an extent of more than 30 miles. At length they approached the town of Port-au-Prince with the intention of setting it on fire; and it was with great difficulty that a treaty was concluded by which the place was saved from destruction. This treaty was ratified by the colonial assembly, which also announced its intention of granting an extension of privileges to the free people of colour. But in the mean time the national assembly at home, under an impression of the ruinous consequences of their rash concessions to the people of colour, had voted a repeal of the law which gave them the same privileges as the whites; and the intelligence of this repeal reached the colonies at the time when the colonial assembly was holding out the expectation of general equality and freedom. The mulattoes, therefore, when they heard that the national assembly had repealed their former conciliating act in their favour, knew no bounds to their indignation. All thoughts of peace were now abandoned; and the war assumed a diabolical character of cruelty, each studying to outdo the other in acts of revenge. On both sides all prisoners were either massacred without mercy, or reserved for the more solemn barbarity of a public execution.

The national assembly at home, alarmed by the intelligence of these disorders, sent out three civil commissioners, with full powers to settle all disputes. But their authority soon fell into disrepute. Other commissioners were sent, and along with them 8000 troops. Unlike their predecessors, however, they adopted the most arbitrary measures; and about the beginning of the year 1793 they became absolute masters of the colony. But their severity at last provoked resistance to their authority; and having displaced the governor Galbaud, an officer of artillery, and ordered him to France, he, along with his brother, collected about 1200 seamen, with whom they landed, and being joined by other volunteers, attacked the government house, where the commissioners were posted with their force. A fierce and bloody conflict now took place, which terminated without any decisive advantage on either side, and next day the fighting was continued in the streets of the town with various success. In the beginning of these disorders, the commissioners had sought to strengthen their party by the aid of the revolted blacks; and a body of these auxiliaries, amounting to 3000, now entered the place, which immediately became a horrid and revolting scene of conflagration and slaughter. Men, women, and children were massacred by these barbarians without distinction. The white inhabitants, flying to the sea for protection, were met by a body of armed mulattoes, by whom they were put to the sword without mercy; the half of the town was consumed by the flames; and the commissioners, themselves affrighted at these disorders, escaped to the sea-shore, whence, under cover of a ship of the line, they viewed with dismay the wide-spreading mischief.

Ever since the commencement of these unhappy disorders, the white inhabitants had emigrated in great numbers to the neighbouring islands, and to the United States of America; and some of the principal inhabitants having repaired to Britain, induced the British government, by their representations, to prepare an armament with a body of troops to co-operate with such of the inhabitants as were desirous of placing themselves under its protection. At this period the military force of San Domingo consisted of from 14,000 to 15,000 effective troops, and 25,000 free negroes, mulattoes, and slaves. About 100,000 blacks had retired to the mountains to enjoy a savage independence, and in the northern districts 40,000 slaves still continued in arms. It was in these circumstances that the island was taken possession of, in September 1793, by a British force. But though the expedition gained some partial advantages, the climate soon began to make the most dreadful havoc among the troops, and prevented them from achieving any solid success. Toussaint l'Ouverture, who was appointed general-in-chief of the black armies of San Domingo in 1797, proved himself an able and an indefatigable enemy; and at length the British were obliged to evacuate the country in the year 1798. On the 1st of July 1801 the independence of San Domingo was formally proclaimed.

But the war in Europe between Great Britain and France being by this time concluded by the peace of Amiens, Bonaparte, now chief consul of France, sent out an armament, consisting of twenty-six ships of the line, and 25,000 troops, under the command of General Leclerc, his brother-in-law, for the purpose of reducing the revolted colony of San Domingo. To enter into the details of the barbarous and bloody war now begun against the unfortunate inhabitants of San Domingo would not be consistent with our limits, nor would such a narrative be interesting to our readers. It will be sufficient to observe that the numbers and discipline of the force now landed, joined to the skill of its leaders, overpowered all open resistance in the field, so that the blacks, after several obstinate conflicts, and after burning some of the principal towns, were finally compelled to retire into the inaccessible mountains of the interior, whence they carried on, under their undaunted leader, Toussaint, a desultory war against detached parties of their enemies. Elated by this success, Leclerc now threw off the mask, and rashly issued an edict proclaiming the former slavery of the blacks. Toussaint was not slow to profit by this error. Having effected a junction with Christophe, who had still 300 troops under him, and being joined by the cultivators in great numbers, who were no longer deaf to his call, he poured with this collected host like a torrent over the plain; and having everywhere forced the French posts, and driven before him their detached corps, he surrounded the town, to relieve which the French general was compelled to hasten to the spot by forced marches with all the troops he could collect. Here he had recourse to his former arts, and he was but too successful in cajoling the negro chiefs, wearied of war, into a suspension of arms. Having watched his opportunity, he privately seized Toussaint with his family, and embarked him on board of a frigate for France, where, being thrown into prison, he expired in April 1803.

This act of cruel treachery spread universal alarm among the black chiefs; and Dessalines, Christophe, and Clerveaux soon appeared at the head of considerable bodies of black troops. This last contest for the possession of San Domingo was distinguished by a degree of barbarity which surpasses belief. The whites and the blacks seemed to vie with each other in deeds of cruelty and revenge. Retaliation was the plea still used to sanction every enormity, under which an amount of vengeance was at length accumulated on both sides, which nothing short of the utter extermination of one of the parties could thoroughly satisfy. The French, however, it was clear, were now gradually losing ground. About the year 1803 they were confined within their fortifications by the vigorous movements of the black armies; and though reinforcements were received from France, the French general was forced to enter into a capitulation with Dessalines, by which he agreed in 1803 to evacuate the whole island. On the 30th November of that year, the standard of the blacks was hoisted in Cape François; and the French troops, amounting to 8000, surrendered themselves prisoners of war to the British squadron, by which they were closely watched. In 1804 a formal declaration of independence was issued, to which were attached all the names of the generals and chiefs. The ancient aboriginal name of Hayti was revived; while Dessalines, whose military talents were in great esteem, was elected governor-general for life; and in October 1804 he was crowned emperor with great pomp. In this situation he began to display all the cruelties of a tyrant, massacring without mercy the white inhabitants, and committing the most barbarous depredations. A conspiracy was in consequence formed against him; and as he was advancing against the insurgents at the head of a few troops, he fell into an ambuscade where he was expecting his own advanced guard, and fell pierced with balls. His power was disputed by various chiefs, of whom those best known and most successful were Petion and Christophe, the former ruling over the north of the island, the latter over the southern districts. Each having a powerful body of adherents, a civil war was the immediate consequence of their rival claims. In this war, which continued for several years, many battles were fought and many lives were lost; but the issue of the struggle was still doubtful, when in the year 1810 a suspension of hostilities took place, though no formal treaty was signed. From this period civil war ceased in the island of San Domingo. Christophe was declared king of Hayti under the title of Henry I.; and, in imitation of other monarchs, he created various orders of nobility, together with numerous officers of state. He assumed to himself absolute power, and committed the greatest cruelties, according to the mere caprice of his own arbitrary will. His tyranny produced general discontent, and at last an insurrection against him. Being deserted by his troops, he anticipated his fate by committing suicide on the 20th of October 1820. Petion died in March 1818, after having presided over the republic upwards of eleven years. He was succeeded by General Boyer, who ruled over the northern division of the island until the year 1820; when taking advantage of the death of Christophe, and the confusion occasioned by that event, he pressed forward with a considerable force, and took possession of every strong place in the kingdom; and in this manner the whole French division of San Domingo was united under one ruler.

The Spanish division of the island had been ceded to France in 1795 by the treaty of Basle, but it was restored to Spain by the peace of 1814. The feeble government of the mother country, however, was no longer able to control the revolutionary spirit which prevailed in the colony; and in November 1821 the Spanish governor was arrested by the insurgent party, headed by a lawyer of the name of Nunez, and a declaration of independence immediately issued. A strong party afterwards appeared in favour of a union of the whole island under one chief. On the 21st of January 1822 the Haytian flag was first displayed in the city of San Domingo; and on the 9th the keys of the city, and with them the dominion of the whole island, were surrendered to President Boyer. The independence of the new state was recognised by France in 1825, on condition that its ports should be open to the ships of all nations; that French vessels should pay only half duties; and that 150,000,000 francs, or L.6,000,000, should be paid as an indemnity, in five equal payments, the first on the 31st December 1825. Thus, after a series of struggles, beyond all example bloody and ferocious, the whole island of Hispaniola, with its adjacent islets, became subject to one government, under the title of the Republic of Hayti.

Boyer continued to reign over the entire island till 1843, when he was overthrown and driven from the island by a revolution headed by Rivière, who succeeded him as president. After about four months the Spanish part of the island revolted, and Rivière marched with an army to reduce it to submission; but while on this expedition the other parts of the island revolted against him, and he was compelled to escape to Jamaica. A succession of presidents of short duration followed; and on March 1, 1846, Soulouque, the present emperor, was elected president.

Previous to his election as president, Soulouque (the present Emperor Faustin) was unknown to fame. Born a slave, he subsequently obtained his liberty, and became boots' cleaner to one of the illustrious black generals. He gradually rose by energy and undaunted courage, soon obtaining the rank of captain, and subsequently that of general. His ambition was thoroughly aroused by his rapid promotion, and he secretly resolved to emulate the achievements of Napoleon I., whose career he studied as a model, brooding over his plans for three years. In 1849 he carried them into execution by a stratagem. In April an alleged plot to assassinate the president was made the pretext for arresting all those persons he deemed likely to oppose his views. Of these he beheaded a great number, and many fled. In Port-au-Prince, his capital, a petition was got up on the 20th of August, requesting him to accept the imperial crown. No one knew where this petition originated, but it was signed by 354 citizens. This, with two other petitions, one signed by forty-nine generals, and the other by all the colonels, was presented to the Chambers on the 24th; and though it took them by surprise, they adopted the petitions unanimously. Next morning it was referred to the senate. Meanwhile a crown and imperial insignia had been procured and placed on the table in the Senate House. Soulouque modestly accepted the dignity thus "thrust upon him," and received the salutation of Emperor Faustin I.

The first act of the new emperor was to create a nobility; and dukes, marquises, counts, and barons, were created in great numbers. Bobo, an escaped galley-slave, was created prince of the empire; and all the nobles aimed at superseding Soulouque. Moreover, they all acted as spies upon one another, thus keeping the emperor well informed of what was going on. As might have been anticipated, Prince Bobo was the most violent, and was summoned to court; but knowing that death was certain whether he obeyed or refused, he fled.

Soulouque now resolved upon a solemn coronation in imitation of Napoleon I. Accordingly, on April 4, 1851, new uniforms were distributed to the troops, and on the following Sunday the ceremony of blessing and distributing eagles took place. On the 17th of April at sunset 101 guns announced the commencement of festivities in honour of the coronation. These continued during seven nights and seven days. On the morning of the 18th Soulouque, imitating his great model, took with his own hands the crown from the altar, crowned himself and then his wife Adelina.

The empire is divided into six departments, and these are subdivided into arrondissements and communes. The laws are based on the *code civil* of France. The force of the Haytian army is stated at 28,000 or 30,000 men, but of these about one-half only are considered effective.

All the European powers have consuls or consular agents accredited to Faustin I. He has no male issue, and his death will be the signal for another revolution.

Hayti.

The revenue of Hayti arises chiefly from customs and port-dues, territorial imposts, sale of lands, &c. In 1850 the customs' receipts amounted to L.170,000; and in the same year the expenditure amounted to L.216,856. The established religion is Roman Catholic; but other forms of worship are not prohibited. Church affairs are superintended by a vicar-general. In 1854 there were in the state 62 schools and 4 colleges, having in all about 9000 or 10,000 pupils.

The foreign commerce of Hayti is wholly in the hands of foreign merchants, who are permitted to reside only at certain ports, under irksome and injurious restrictions. The foreign commerce does not now exceed L.1,000,000 of annual value. The exports are chiefly mahogany and other timber, dyewoods, coffee, tobacco, and cotton. The imports are British cotton and woollen goods, hardware, cutlery, fire-arms, gunpowder, glass, earthenware, &c. From France are imported brandy, wines, silk, and fancy goods. The population of Hayti is estimated at about 740,000.

The emperor has constituted Cap-Haytian, formerly Cap-Français, the capital and seat of government of the empire. It stands on the N. coast, in N. Lat. 19. 46., and W. Long. 72. 10., and contains about 14,000 inhabitants. The population of Port-au-Prince, the former capital, is 30,000.

On the fall of Boyer, the Spaniards asserted their independence, and on the 27th February 1844 proclaimed the Dominican Republic. Hérard Rivière, who succeeded Boyer, marched with an army of 20,000 men upon San Domingo, but was defeated at Azua by General Pedro Santaña, who compelled the Haytians to retreat within their own territory. The provincial junta of the new republic now formed a constitution, and elected Santaña president. He was followed by General Jimenes in 1848. Soulouque, then president of Hayti, attempted in 1849 to reconquer the territory with an army of 5000 men, but was signally defeated at Las Carreras, on the River Ocoa, 21st April 1849, by Santaña, who had only 400 men under his command. For this victory Santaña received the title of "Libertador de la Patria." General Jimenes, the president, not being fitted for his task, and the invading army having been driven out of the country, Santaña was called upon to restore order within the republic, and to force the president to resign. This effected, Santaña directed the affairs of state until a new election had taken place, by which, upon his recommendation, Buenaventura Baez was named president. During his administration treaties of recognition and commerce with Great Britain, France, and Denmark were concluded. On the 3d July 1853 Baez was banished, and Santaña himself raised to the presidency. It may be stated that Spain has not relinquished her claims upon her former colony.

The Dominican Republic claims for its territory the whole of the Spanish portion of the island. It is divided into five provinces, and has an area of about 17,500 square miles.

The Dominicans are almost entirely an agricultural people. The staples of the S. provinces consist chiefly of the products of the forests. In Seybo, however, the raising of cattle is the chief occupation. But by far the most industrious part is the N., generally called the Cibao, where the staple article is an excellent quality of tobacco. The articles of export are mahogany, satin-wood, fustic, lignum-vitæ and brazil-wood; tobacco, hides, &c. The imports are chiefly flour and provisions from the United States, and general merchandise from Europe.

The constitution of the republic is based on that of Venezuela. The Congress, which assembles annually, consists of fifteen deputies, three from each province, who form the Tribunado or Lower Chamber, and five senators, one from each province, constituting the Consejo Conservador or Upper Chamber. The executive power is vested in a president, who is elected for four years, and who must be a Dominican by birth, and at least thirty-five years of age. The judiciary is exercised by a supreme court and various inferior and local courts, and the French code has been adopted in legal proceedings. In 1852 the revenue amounted to L.76,853, and the ordinary expenditures amount annually to about L.51,300. No foreign debt is owing; but there exists a large home debt, on which the currency is based, and which is of low and fluctuating value. The army amounts to 12,000 men, and may be raised to 16,000. The navy consists of three corvettes and five schooners equipped as war vessels, and mounted with forty-four guns. The prevailing religion is Roman Catholic, but other denominations are tolerated. Pop. about 136,500.

Hayward || Hazlitt.

The chief seats of commerce are San Domingo city and Samana, a small town on a peninsula of the same name. The city of San Domingo is situated at the mouth of the Ozama, on the southern coast, in N. Lat. 18½, and W. Long. 70°, and is the oldest European settlement in the New World, having been built by Columbus in 1504. The population is about 14,000, and the town is defended by substantial fortifications. The cathedral is more than three centuries old. The harbour is capacious, but owing to a bar at its mouth, vessels drawing above 13 feet of water are obliged to anchor in the open roadstead.

HAYWARD, the person who keeps the common herd or cattle of a town, and guards hedges and fences.

HAZARD, a game at dice, without tables. It is played with only two dice; and as many may play at it as can stand round the largest round table.

Two things are chiefly to be observed, main and chance; the latter belonging to the caster, and the former, or main, to the other gamesters. There can be no main throw above nine, nor under five; so that five, six, seven, eight, and nine are the only mains thrown at hazard. Chances and nicks are from four to ten. Thus four is a chance to nine, five to eight, six to seven, seven to six, eight to five, and nine and ten a chance to five, six, seven, and eight; in short, four, five, six, seven, eight, nine, and ten are chances to any main, if any of these nick it not. Nicks are either when the chance is the same with the main, as five and five, or six and twelve, seven and eleven, eight and twelve. Observe, however, that twelve is out to nine, seven, and five; eleven is out to nine, eight, six, and five; and ames-ace, and deuce-ace, are out to all mains whatever.

HAZAREEBAGH, a town of Hindustan, and the principal place of the district of Ramghur, one of the lower provinces of Bengal. Upon the subjugation of Sinde by the British the town of Hazareebagh was selected as the place of residence for the ex-ameers of that country; but under subsequent arrangements some of the brothers have been permitted to remove to Lahore and other localities. Lat. 24., Long. 85. 24.

HAZEBROUCK, a town of France, capital of a cognominal arrondissement in the department of Nord on the Beurre, 24 miles W.N.W. of Lille. It possesses several handsome public buildings, among which are the parish church with a lofty and elegant spire; the town-house; the sub-prefecture; and the old Augustine convent, now used as college lecture-rooms; normal school, hospital, corn market, and tobacco warehouse. Hazebrouck is the seat of a court of primary instance, and has a society of agriculture, a public library, and two theatres. The principal manufactures are linen cloth and thread, soap, leather, beer, salt, oil, and lime. A large weekly market is held here on Saturday. Pop. (1851) 7539.

HAZEL. See BOTANY; nat. ord. *Corylaceæ.*

HAZLITT, WILLIAM, a distinguished critic and miscellaneous writer, was born at Maidstone, April 10, 1778. His father was a Unitarian minister, who, after holding various livings in England and America, was finally settled at Wein in Shropshire, where the young Hazlitt was first sent to school. In due time he was sent to complete his studies at the Unitarian College at Hackney. He ought to have devoted himself to theology, as it was intended that he should adopt his father's profession; but finding political and moral philosophy more to his taste, he neglected the studies proper to the place, and ended by deciding on the choice of a new profession. He determined to become a painter; and about the beginning of the century visited Paris, where he studied with great diligence and some success at the Louvre. On his return home he began a tour of the provinces, and painted a large number of portraits. Finding, however, that he was not likely ever to reach the high standard of art which he had set for himself, he abandoned art, as he had abandoned the church, and began life once more as a litterateur. In 1805 he published his first important work,—the only one, as he himself said, on which he ever prided himself. It was an anonymous essay on the *Principles of Human Action*, and certainly displayed great ingenuity and acuteness, along with some of those crudities of composition that generally mark a first attempt. More notice was taken of his *Free Thoughts on Public Affairs*, published in the following year. In 1808 he married his first wife, the sister of Dr, afterwards Sir John Stoddart, and retiring with her into Wiltshire, supported himself there for several years by miscellaneous literary labour. By this lady he had several children, all of whom, with the exception of one son, died in early childhood. The marriage, however, was in some respects an unhappy one, and in 1823 the contracting parties were divorced. In the following year, Hazlitt married the widow of a Lieut.-Col. Bridgewater who brought him a considerable fortune.

In 1811 Hazlitt removed to London, where he rented the house at Westminster that had once been tenanted by Milton. This circumstance he commemorated on a small tablet which he erected in the yard at the back of the house, in his veneration for the poet and patriot. Mr Bentham was his landlord, and on one occasion nearly drove him mad by proposing to cut down two beautiful trees that shaded this tablet, and to convert the little garden from an ornamental into a merely useful object. In 1813 Hazlitt delivered before the Russell Institution a series of lectures on the history and progress of English philosophy, some of which were published after his death among his *Literary Remains*. About this time also he became connected with the press, contributing political and theatrical criticisms to the leading journals, such as the *Times*, *Examiner*, *Morning Chronicle*, and others. His political articles were collected and republished in 1819 by Mr Hone, who had been encouraged to take this step by the success that had attended the reprint of Hazlitt's theatrical criticisms, published by Stoddart in 1818, under the title of a *View of the English Stage*. One service Hazlitt did to the stage which should never be forgotten. He was the first to discover and proclaim the wonderful powers of Edmund Kean, which were at length, though not till after a severe struggle, recognized by the world. In 1818 he delivered a series of lectures at the Surrey Institution on the Comic Writers, the Poets of England, and the Dramatic Literature of the age of Elizabeth. These three courses have been published in separate volumes, and are well known to all students of English literature. His next acknowledged work was his *Characters of Shakspeare's Plays*, which displays a refined and philosophic taste, and abounds in occasional passages of rare eloquence. From this time to his death he continued to contribute very largely to the periodical press, from the *Edinburgh Review* downwards. Though his literary gains were considerable (averaging about L.600 a year), yet his imprudence in money matters prevented him from making any provision against old age or infirmity. In 1830 his health gave way under the unabated pressure of literary toil, and after suffering for some weeks under a severe dysentery, he died on the 18th September.

Hazlitt was the author of many works besides those already mentioned. Of these the most important were his *Spirit of the Age*, in which he passes in review the leading notabilities of his day, and in his judgments of some of them at least, anticipated the verdict of posterity; his *Plain Speaker*, 1826; his *Table Talk;* the *Round Table* (some of the essays in which are from the pen of Leigh Hunt); the art. *Fine Arts* in the *Encyclopædia Britannica;* and the *Life of Napoleon*, which was published in 1830, shortly before his death. This last, though by no means the most popular of his works, is that on which he put out most of his mind. Napoleon was his great idol among men, and he strove by this *History* to raise a suitable monument to the glory of his hero. As a historian, indeed, Hazlitt has but small chance of being acknowledged by posterity. His political prejudices were too fierce and active; and his style, so well adapted for general literary composition, was on that account unsuited for history. His real title to remembrance is in his criticisms on art, literature, and literary men. As a writer, Hazlitt is forcible, terse, and lively. All his writings abound in passages of vehement eloquence, alternating with brief utterances, pregnant with thought, and striking from their simplicity and truth. Though, strictly speaking, the true sphere of his mind was criticism, it had yet some of the qualities of the poetic temperament. He had a fancy so fertile that he sometimes wearies with the wealth of his imagery and the copiousness of his illustration. He luxuriates in his command of style so as sometimes to make the reader wish that his power was less, or his self-control greater. The perusal of his works convinces his readers that he is a brilliant, sometimes even a splendid writer, but it would seem as if he strained himself too incessantly to produce effect, so that while he always dazzles, he does not always satisfy. As a man he was as much admired as liked. His temper, naturally irritable, had been soured by various causes, among others, by over-indulgence in wine. As soon as he came to know, however, the danger of too social habits he eschewed drinking altogether, and for the last sixteen years of his life used no stimulant but tea. His irritability often involved him in serious misunderstandings with his best friends, yet none was ever readier than he to hold out the hand when the storm had passed. He was a perfectly honest and brave man, and though a recantation of his political creed might have carried him on to wealth and station, he remained to the last as staunch a friend of the people and the people's interests as he had been in the heat of youth.

HEADBOROUGH. See Borseholder, and Tithing.

HEALFANG, or Halsfang (Sax. *halp*, neck, *pangen*, to contain), in our ancient customs, the punishment of the pillory. Also a pecuniary mulct in commutation of the punishment of the pillory, to be paid either to the king or the chief lord. *Qui falsum testimonium dedit, reddat regi vel terræ domino* healfang.

HEALTH, Board of, a commission appointed by the English government in 1848 with the view of promoting the public health in England and Wales, which, in that and the preceding year had suffered seriously from the invasion of cholera. As first constituted, the Board of Health comprised the First Commissioner of Woods and Forests as president, and two other persons nominated by the Crown. The board continued on its original footing for only five years. Under the supervision of this general board, local boards, appointed on different conditions, in various places, were empowered to enforce the Public Health Act. In 1854 the constitution of the board was remodelled. Its duration was made annual, and along with the president (who was appointed by the Crown with a salary of L.2000) were associated the principal secretaries of state, and the president and vice-president of the Board of Trade. The president, however, has power to act alone, and is in fact a minister responsible for the department under his charge.

HEARING. See Acoustics; and Anatomy, § Ear.

HEAT.

Definition ‖ Nature of Heat.

THE term HEAT, in common language, is applied both to the sensation excited in us by the approximation of a warm body, and to the cause of that sensation. To obviate this ambiguity, chemists and other cultivators of physical science have employed the word *caloric* to designate the cause of heat; but as there are few disquisitions in which this distinction is material to perspicuity, in this article we shall use either term to signify the cause of the sensation.

SECT. I.—NATURE OF HEAT.

One of the first inquiries that suggests itself is, what is *caloric?* Two opinions on this subject have divided philosophers. The most generally received opinion is, that heat, or caloric, is a material agent of a peculiar nature, highly attenuated, and, from its affinity or attraction for all other matter, universally distributed amongst the particles of bodies, in quantities proportional to their mutual attractions, or, as it has been termed, the *capacities* of different substances for heat; whilst its tendency to diffuse itself amongst contiguous bodies has been explained on the supposition of its own particles being repellent of each other. The other opinion, which has been maintained by Bacon, Boyle, and several other philosophers, considers heat as a mere quality of matter, and ascribes it to a vibratory movement among the intimate particles of bodies; an idea which was adopted by Rumford, to explain his curious experiments on the excitation and communication of heat by friction. This opinion, however, seems vague and unsatisfactory. If we say that heat is motion amongst the particles of matter, still we have no explanation of the manner in which this motion is produced; for we cannot conceive any movement without an impulse, nor an impulse without a material agent. Heat pervades all sorts of matter: it remains in some circumstances dormant, or, as it is termed, *latent*, and may be again elicited from bodies by various means. Did it consist in vibrations or motions of the particles of other matter, it should pervade elastic bodies with the greatest celerity; which we know not to be the fact. It will, for instance, pervade a rod of lead, or of the softest copper, far more readily than an equal length of glass or of marble. If we mingle together equal quantities of water at different temperatures, the resulting temperature will be an exact mean between the extremes. But if heat consisted in such vibrations, there ought to have been a loss of heat, as in all other communicated motions. If we mix together equal quantities of different substances at different temperatures, the resultant temperature is not a mean: one body has lost more heat than the other has appeared to gain, or a part of the heat of the one has become latent in the other, and that in a constant ratio to the power of each substance of absorbing heat, as tried by comparing each with a third body in the same manner. It is very difficult to conceive this species of interchange, if heat merely consisted in vibrations amongst the particles of matter. Still more difficult is it to conceive how a permanent temperature could subsist among a great system of bodies, as the planets, if heat were nothing more than a vibration of the particles of bodies; for the original impulse ought to diminish with each communication.

It is possible, however, to modify this theory, by supposing that heat is produced not merely by the motions of the particles of the heated substance, but by the vibrations or undulations of a very subtile matter existing in all bodies. This will approximate the vibratory theory to that which has been generally considered as its antagonist, will accord well with some recently discovered facts, and will assimilate the vibratory hypothesis of heat to the undulations now so generally received as explanatory of the phenomena of light, to which heat has so intimate a relation.

Nature of Heat.

Caloric, like light, has been proved to be capable of radiation, of reflection, and refraction, whilst later investigations have distinctly proved that refracted heat is susceptible of polarisation. But it is transmitted, reflected, refracted, and polarised by different substances in a different manner and degree from light; and hence some have inferred that light and heat are not the same agent, but are produced by different kinds of matter. Other philosophers have regarded them as modifications of the same matter, depending on the greater celerity or velocity of the undulations that produce them. Such speculations, however, are not yet susceptible of any direct proof; and, in the present state of our knowledge, it is safer to consider light and heat as produced by different but intimately connected agents.

These views lead us to the conclusion that the phenomena of caloric are owing to the movements of a subtile matter, universally diffused throughout other bodies, the particles of which are strongly repellent of each other, and have an affinity for those of all other bodies, differing in force according to each kind of matter. We may further conceive, that heat or caloric is the cause why the particles of the most solid bodies are not in absolute contact. If we diminish the temperature of a bar of iron, for instance, it shrinks in all its dimensions, *i. e.* its particles approximate; and the more we reduce the temperature, the nearer they approach. Each particle of matter would seem to be surrounded with an atmosphere of heat, which remains *latent* or quiescent, until disturbed by the approach of bodies of a different temperature, when the vibrations or undulations of the subtile matter of heat are induced, by the tendency of this matter to produce an equilibrium of temperature; and then we become sensible of the existence of heat.

The subtilty of the matter of heat is such, that we cannot ascertain its accumulation in any body by the nicest balance; its fluidity may be considered as proved by the ease with which it insinuates itself amongst the particles of matter; its affinity for other matter is shown by its being universally contained in all bodies, in proportions differing in each kind of substance; its repulsion amongst its own particles is proved by its tendency to exist in a state of equilibrium in contiguous bodies.

Our knowledge of the laws which regulate the distribution of caloric was very imperfect when we possessed no other measure of heat than our sensations. The susceptibility of the sense of touch varies in different individuals, and in the same individual at different times. We can even make the same object feel warm and cold to the same person, by previously cooling one hand, whilst the other is immersed in a warm fluid. Hence sensation could never afford any tolerable measure of varying degrees of heat; and we are indebted for more accurate notions on the subject to the invention of *thermometers*. The principle of these instruments depends on the expansion of solids, fluids, or gaseous bodies by heat, and their subsequent contraction on cooling. The construction of these useful instruments will be described under the article THERMOMETER. It will be here sufficient to state, that though the thermometer affords us indications of the changes in the sensible heat of bodies, it does not give us any information respecting their latent caloric, nor the absolute quantity of heat

Diffusion of Heat.

they may contain. This must be sought for by other modes, which we shall shortly explain, after we have considered the modes in which caloric is diffused amongst bodies, and its general effects on different kinds of matter.

SECT. II.—DIFFUSION OF HEAT.

The tendency of heat to diffuse itself equally amongst bodies is so great, that we are unable permanently to accumulate it in any substance. All that can be effected in this way by the most skilful contrivances, is to produce some retardation of this dissipation. The mode in which it is diffused through solids, liquids, and gases, is different, and demands a separate consideration.

I. *Diffusion of Heat by Communication.*

1. *Diffusion in Solids.*—When we place a heated solid in contact with a colder body, the superabundant caloric of the first immediately begins to flow into the latter. The nearest particles are first heated, and they communicate a portion of their caloric to the second series, and these last to a third, until both bodies acquire a common temperature; and this equilibrium will be established amongst all contiguous bodies. If a bar of iron twenty inches long be heated at one end, it will require four minutes for the smallest sensible increase of temperature to be perceived at the other. Biot has endeavoured to ascertain the rate of this transmission. He employed a bar of iron several feet in length, and bent into a right angle, at one end of which a steady heat of 216° Fahrenheit was applied. Thermometers were placed in holes drilled for the purpose, at intervals of four inches along the top of the bar. In four hours all the thermometers became stationary, the difference between the first and second = 21°·50; between the second and third, = 11°·25; between the third and fourth, = 7°·25; between the fourth and fifth, = 5°; between the fifth and sixth, = 4°; between the sixth and seventh (beyond which no sensible effect was perceptible), = 1°·75; which, allowing for the unavoidable errors in such investigations, would show, that, taking the distances in arithmetical progression, the decrease of temperature follows a geometrical ratio in penetrating solids. In such cases, the heat seems to be communicated from particle to particle, and is said to be *conducted* through the body.

All bodies do not *conduct* heat with equal celerity. If we place equal thermometers on equal cubes of metal, ivory, marble, and glass, heated by the same source, we shall find that the thermometer placed on the metal will rise soonest; next, that placed on the marble, then those on the ivory and the glass. The most dense bodies conduct heat, in general, more readily than rarer bodies; but experiment shows that their conducting power is not always in the ratio of their density, but probably depends also on their affinity for caloric. Spongy and light bodies are found to be extremely bad conductors of caloric. Silk, cotton, and wool, are especially so; and hence their utility in preserving our animal heat in cold climates. Count Rumford made a series of experiments on the conducting power of different substances of this nature, and found that raw silk, fur, and eider-down, were remarkably bad conductors of heat. They give to us the sensation of warmth, not by communicating heat to our surface, but because their bad conducting power prevents the waste of our animal heat by the ambient air. Their stopping the transmission of heat seems partly to depend on the air they entangle; for, by twisting them, *i. e.* by expelling a portion of the air contained in such bodies, their conducting power is increased.

The facility with which bodies conduct heat is not exactly in proportion to any of their sensible qualities, but is more nearly in the direct ratio of their density than any other quality. This may be ascribed to the greater intensity of the repulsive energy of the atmospheres of caloric surrounding each particle of dense bodies (by reason of their greater proximity) conveying each fresh addition of temperature with greater celerity through such substances. But if we conceive "heat to be a material agent," this quickness of conducting power may also be modified by the different degrees of affinity between caloric and each kind of matter. However this may be, scarcely any two substances conduct heat with equal facility. Solids conduct much more readily than liquids. Of the former, the best conductors are the metals; and amongst these, the very best are gold, silver, platinum, and copper, whilst iron and lead are among the worst. The rapidity with which silver conducts away heat is well illustrated by wrapping a piece of muslin smoothly round a spoon of that metal, when the muslin may be held in the flame of a candle or a lamp, so as to boil water in the spoon, without burning the muslin.

The following table of the conducting power of different metals and other bodies is given by Despretz (*Ann. de Chim. et Phys.* xxxvi.):—

Gold	1000	Tin	303·9
Platinum	981	Lead	179·6
Silver	973	Marble	23·6
Copper	898·2	Porcelain	12·2
Iron	374·3	Clay	11·4
Zinc	363		

2. *Diffusion in Liquids.*—The extreme slowness with which liquids conduct heat is shown by a beautiful experiment of Count Rumford. Freeze a little water in the bottom of a tube, and then pour water over the ice: by inclining the tube, the flame of a lamp may be applied to the surface of the liquid, so as to cause it to boil; and by slowly moving the flame towards the ice, we may raise the water to ebullition in successive portions; yet this ebullition will almost reach the ice before it shows any signs of melting. The same fact is exhibited by fixing an air thermometer in a vessel filled with water to one or two tenths of an inch above the ball of the thermometer, and pouring a little æther on the surface of the water. On kindling the æther, it will burn with a copious flame, without affecting in the slightest degree the submersed thermometer. This extreme slowness of liquids in conducting heat induced Count Rumford to suppose that they were absolute non-conductors of caloric; but this inference is not warranted by his own experiments, and was fully refuted by the investigations of Hope, Murray, and Traill, which proved, that though liquids conduct heat slowly *downwards*, they are not absolute *non-conductors* of caloric.

If, however, we apply heat to the lower part of a vessel containing any liquid, it rapidly acquires a higher temperature. This, however, is in a different manner from *conduction.* The liquid is heated by the *transportation* of its particles in quick succession. In this case the particles nearest the heating cause become specifically lighter by receiving heat; they therefore ascend through the fluid, to which they impart part of their caloric, while their place is supplied by another series of particles, which become heated, and ascend in their turn; and this succession continues until, by these rapid changes, the whole body of the fluid attains its boiling point, if the heat be sufficient for that purpose. These motions may be rendered visible by throwing into the vessel a few particles of matter a little heavier than water, such as powdered amber.

It is by this transportation of their particles that liquids are principally heated; and the rapidity with which a piece of ice melts when it floats in a jar containing hot water, compared to the extreme slowness of the melting of a similar mass of ice fixed in the bottom of a jar, and defended from the immediate contact of the hot water by a thin film of ice-cold water, exhibits, in a striking manner, the difference between the heating of fluids by *transportation* and by *conduction*.

3. *Diffusion in Gases.*—The conducting power of gases is not so easily ascertained, because it is difficult to separate their conducting power from the effect of radiation of heat through them. The experiments of Professor Sir John Leslie and of Dr Dalton, however, decidedly show a difference in the conducting power of gases, which is also more nearly in the direct ratio of their specific gravity than of their other properties; hydrogen having the lowest conducting power, atmospheric air one considerably higher, and carbonic acid the greatest of all the gases subjected to this examination.

The difference of bodies in conducting heat is a most important subject, as on it depends not only many of our contrivances to concentrate artificial heat, and apply it to numerous purposes in the useful arts, as the obtaining of metals from their ores; but on it also depend the methods of defending our bodies against external cold. The living system has within itself the power of supporting a nearly equable temperature, notwithstanding the perpetual tendency of contiguous bodies to a common temperature; but if the naked surface be exposed to the elements in our climate, the heat of the body would soon be reduced below what is consistent with health or comfort. To preserve the animal heat, we surround our bodies with bad conductors of caloric, such as woollen, silk, or cotton; and the more imperfectly these defences conduct heat, the less will our temperature be reduced. Hence the worst conducting substances are the most suitable garments for a cold climate; and, in hot latitudes, the comfort of man requires that the coverings of his body should be of the kind that would most rapidly abstract his redundant animal heat.

Nature has beautifully adapted the covering of the lower animals to the climates they inhabit. The thick fur of the Greenland bear, the musk ox, and the arctic hare, adapts them to the rigours of their native climate; whilst the short and sleek hair of the antelope, the giraffe, the leopard, and the lion, proclaims them denizens of the warmer regions of the earth. Even in the same species inhabiting a changeable climate, nature adapts their covering to the season. The glossy sleekness of the horse, and of our domestic cattle, diminishes toward the close of autumn. The bear, the fox, and the weasels of northern regions, assume a longer and more shaggy coat on the approach of winter; and the sheep, which in Europe is covered with a thick fine wool, an extremely bad conductor of heat, in the burning plains of Africa is clothed only by a short and coarse hair, that presents comparatively a small obstacle to the evolution of animal heat.

In the vegetable kingdom a similar care is bestowed to defend plants from excessive cold. Plants of cold climates, which are perennial, are protected by a considerable thickness of bark; a substance which experiment proves to be a bad conductor of heat. In high latitudes they are further defended against the excessive cold of the climate by a spongy covering of snow, which, until it begin to melt, is found to be a very bad conductor of heat; and therefore tends to preserve the juices of plants from being frozen. Thus trees are more seldom killed by the freezing of their sap, when a fall of snow has preceded an intense frost; an accident not uncommon, even in the temperate climates of the earth, in a long continuance of what is termed a *black frost*. Recent voyages of discovery have also shown that the Esquimaux find the excessive rigour of their inhospitable climate very endurable in houses built of frozen snow.

II. *Diffusion of Heat by Radiation.*

The diffusion of heat by the means already noticed is a comparatively slow process, and is limited to bodies in contact with each other. But heat is capable of being diffused among bodies not in contact. A heated body suspended *in vacuo* emits its excess of heat in all directions; and in air, though much of its caloric apparently passes off with the ascending currents which it produces in the ambient air, the emanations of heat also pass off in directions contrary to these aerial currents. Thus a person standing before a fire perceives its warmth, though a light body like a feather will show that there is a current of air perpetually flowing toward the fire. This emission of heat is termed *radiation*, and is analogous to the emanations of light from a luminous object; each point of the heated surface emitting divergent rays, which are subject to the same modifications as those of light, by reflection from polished surfaces, and by refraction through transparent media.

When the rays of heat fall on a bright metallic surface, they are *reflected*. As early as 1682, Mariotte showed that "the heat of a fire is reflected from a burning mirror, so as to be sensible in its focus; but that it is intercepted by a plate of glass interposed between the mirror and the fire." The next important step was made by Lambert, who discovered that the heat might be so increased, by employing two concave mirrors and a charcoal fire placed in the focus of the one, that a combustible might be kindled in the focus of the other. But the most successful cultivator of this branch of science during the last century was Scheele of Sweden, who proved that metallic surfaces are the most powerful reflectors of radiant caloric; that glass is far inferior in this respect; that if we cover the surface of the metallic mirror with a film of lamp-black, it does not reflect heat, but actually absorbs it; that radiant heat is separated from light by interposing screens of glass; and that it passes through air, without suffering any obstruction from the direction of the aerial currents through which it radiates.

Saussure and Pictet repeated the experiments of Lambert. They showed the instantaneous transmission of heat by radiation; that it was in such experiments material to place the heated body and the thermometer in the focus of each mirror; and that, a very little beyond the focus, the effect was trifling, although the thermometer was nearer the heated body. When the heated body was a red-hot cannon bullet, combustibles were speedily kindled in the focus of the other mirror at the distance of several feet. These researches were greatly extended by Pictet, who showed that a flask of hot water radiated heat which could be concentrated in the focus of a metallic mirror, and thus rendered sensible by a thermometer, showing that the invisible rays of heat might be reflected, as well as those emanated from a hot luminous body.

The experiments on radiant heat may be exhibited by means of a pair of concave mirrors of well-polished tinned iron, hammered into segments of spheres of about one foot in diameter; but still better with mirrors of thick brass plate, hammered, on Sir John Leslie's plan, into a parabolic form. The writer of this possesses a pair twenty-two inches in diameter, hammered into a parabolic curve with surprising accuracy, by Mr Alexander Kilpatrick of Edinburgh, with which he has repeatedly melted lead by collecting the sun's rays in one of them. This form of mirror is the best; because the rays which fall on the mirror parallel to its axis are reflected, not divergingly, but so as to meet in the focus of the parabola.

Pictet found the sensibility of the thermometer much increased by painting its ball black; and he showed that glass screens intercepted the rays of caloric from burning bodies or a heated bullet; but it was found that the radiant heat in the sun's rays was not intercepted by a plate of glass, or even by a sheet of tin, which completely intercepts heat derived from other luminous bodies.

Such was the state of our knowledge of radiant heat, when our veteran astronomer, Sir William Herschel, discovered, toward the close of the last century, that rays of heat exist, independently of those of light, in the solar spectrum. When he received the solar rays through a prism of flint-glass, he found that a row of delicate thermometers placed in the coloured spectrum were differently affected at its two extremities. In the violet ray it only rose 2°, in the red ray it rose 7°; but his most interesting discovery was, that half an inch beyond the red ray it was still hotter. These very important results were fully confirmed by Sir Henry Englefield. In one of Englefield's experiments, the following results were obtained:—In the blue rays, in 3′ the thermometer rose 2°; in the green, in 3′ it = 4°; in the yellow, in 3′ it = 6°; in the middle of the red, in 2′·5 it = 16°; in the outer edge of the red, in 2′·5 it = 17°·5; and beyond the spectrum, in 2′·5 it = 18°. When the bulbs of the thermometers were previously blacked, the full red ray raised the thermometer in three minutes 22°; and just beyond the spectrum it rose 33°. Even half an inch beyond the spectrum altogether, the rise was 6° more than in the red ray.

These experiments show that the refrangibility of the rays of heat and light are different, and that the former are less refrangible than the latter.

The experiments of Berard and of Leslie confirmed the fact, that the point of greatest heat in the solar spectrum is in the red rays; and Leslie states the result of his experiments to have made the difference between the violet and red as one to sixteen; but neither of these philosophers detected any heat altogether beyond the spectrum. The conclusions of Herschel have, however, been confirmed by subsequent investigations; and Seebeck has shown that prisms of different substances produce a different refraction of the rays of heat. With a hollow prism filled with water, the greatest heat is in the full yellow light; with sulphuric acid it is in the orange; with crown glass it is in the dark limit of the red.

We may here state, that not long after Herschel's discovery, Ritter, Wollaston, and Beckmann, simultaneously discovered the existence of other invisible rays in the solar spectrum, which are only known by their chemical effects in decomposing some metallic saline compounds, as the nitrate of silver. These *chemical rays* are the most refrangible of all, and exist in greatest abundance toward the violet end of the spectrum, and even entirely beyond it. Thus the solar spectrum would seem to consist of three species of rays, the luminous, the calorific. and the chemical; all differing in their refrangibility, and in their apparent effects: and if we consider white light as composed of red, yellow, and blue rays, we have five kinds of rays in the solar beam, three of which are visible, and two invisible. In the solar beams these are intimately blended, but may be in some degree separated by refraction through diaphanous prisms. The separation of the luminous and calorific rays may be made by black opake bodies, through which the sun's heat will penetrate without admitting a single ray of light. The sun's rays, however, pass through all transparent media, without a separation of light and heat. Glass and ice intercept the rays of terrestrial heat, the first partially, the latter wholly; yet the sun's rays passing through and collected in the focus of a lens of glass, produce the most intense heat; and Scoresby and others have shown, that a lens of *ice* will concentrate the sun's rays, so as to ignite inflammable substances.

The publication of Sir John Leslie's *Inquiry into the Nature of Heat*, in 1804, forms an important era in the history of the radiation of caloric. This very original and able philosopher, by the simplicity and delicacy of his apparatus, and the ingenuity of his well-devised experiments, did more than has been accomplished by any other individual to develop the laws which regulate the transmission and reception of this mysterious agent; and his work will remain a land-mark in the history of this branch of physical science. In his experiments, a single mirror only was employed; and the source of heat generally used was a cube or square canister of tinned iron placed before the mirror, at the distance of three or four feet, whilst the ball of an air thermometer was placed in the focus of the mirror. The air thermometer employed by him was his own modification of that figured by Sturmius. (*Colleg. Curios.* p. 53, 1676.)

In the instrument of Leslie, termed by him a *differential thermometer*, both limbs of the instrument, as well as both balls, are equal; and instead of being joined with cement, the *recipient ball* is united by the blowpipe to the same piece with the *sentient ball.* These changes give additional delicacy and accuracy to the instrument; in which the coloured fluid is sulphuric acid tinged with carmine.

Leslie's principal object was the relation of different surfaces in emitting and receiving calorific rays. Of his cubical canister, one side was polished, or, as it is termed by workmen, *planished;* the second was covered by a plate of glass; a third with white paper smoothly pasted on; the fourth was painted with lamp-black mixed with *size.* The cubes he used were from four to ten inches, and were filled with boiling water. When the polished side was turned toward the thermometer, placed at four feet from the mirror, the increase of temperature was no more than 12°; when the glass side was presented, the differential thermometer under the same circumstances rose to 90°; when the papered side was the radiating surface, the temperature was 98°, and the painted side indicated 100°; when the polish of the planished side was destroyed, by ploughing it in one direction with a fine-toothed plane, its propelling or radiating power rose to 19°; and when scratched in one direction with a fine file, its effect was as much as 26°. On covering one of the surfaces smoothly with gold and silver leaf, the effect was about equal to the surface of polished tin; a plate of polished iron gave 15°; a surface of fresh lead 19°; but when the same became tarnished, its effect was equal to 45°; and painting it with red oxide of lead raised it to 80°. An amalgam of mercury and tin, when fresh, gave no more than 20°.

Leslie then investigated the relative *receiving power* of different surfaces, by coating the *sentient ball* of the differential thermometer with different substances. When that ball was smoothly coated with tinfoil, the effect of the blackened side of the canister was only 2°·5, or about one fifth of what it produced on the naked ball; and he found, that of either side of the canister the effect was now just one fifth of that observed with the naked ball. On the other hand, when the ball was covered with a coat of china ink, or formed of a black enamel, the effect of either side of the canister was greatly increased.

The power of surfaces in reflecting heat was also investigated. In fact, it was shown by the last series of experiments with the coated ball; but he proved it also by varying the reflecting surface. When a glass concave mirror, two feet in diameter, was substituted for the metal reflector, the effect of the blackened side of the canister on the naked ball was but just perceptible; and if a film of china ink be spread over the surface of the mirror, even this slight effect totally disappears. If, however, the concave surface of the glass mirror be smoothly coated with tinfoil. the effect of the black side of the canister will be ten times more than with the naked glass surface. Removing the silvering from the back of the mirror produced no effect on its reflecting the calorific rays, neither was this affected by roughening the back of the mirror. Hence Leslie infers, that reflection of heat takes place at the surface of the glass mirror, or principally so.

A polished tin reflector had its power diminished one third by being coated as smoothly as possible with tinfoil, evidently by the imperfection of the smoothness of its surface. Scratching its surface with sand-paper diminishes its effect one tenth; and he found that the mirror seemed to have its reflecting power more impaired when the scratches were all in one direction, than when they crossed. A film of tallow on the surface of the mirror reduced the effect of the blackened side from 100° to 8°; but if held before the fire until all that could be thus removed had run off, the effect of that side rose to 37°. When the surface of the mirror was covered with a very thin iridescent film of isinglass. the blackened surface gave an effect of 80°; but when that film was only $\frac{1}{1000}$th of an inch, the effect was reduced to 15°.

The results of his experiments with other reflecting surfaces gave the following proportions:—A reflector of polished brass = 100°, of the same coated with tinfoil = 85°, of steel = 70°, of fresh lead = 60°, of glass = 10°.

The inference from these investigations is, that the reflecting power of various surfaces bears some inverse proportion to their propelling and absorbing powers. The numerical results of Leslie's experiments would give the ratio between metallic surfaces and glass, in reflecting power as ten to one; in propelling power as one to eight; in absorbing power as one to five. It was, however, supposed that some minute circumstances, of which it is difficult to estimate the effect, interfered in the two last processes, and that the propelling and absorbing powers are equal in all bodies: we shall find this to be incorrect.

One of the most interesting parts of Leslie's investigations was the effect of screens of different kinds, interposed between the sources of heat and the thermometer. When he interposed a screen of tinfoil, the effect of the blackened side of the canister was 0°; a thin sheet of crown-glass was = 20°; a sheet of common writing paper, placed about two inches from the cube, was = 23°. If the screen of any material was placed one foot from the cube, the effect was only one thirtieth of what it was at the distance of two inches. From this he inferred, that the screen prevents all transmission of radiant heat until it becomes itself heated; and then it radiates from its other surface toward the thermometer. This was confirmed by substituting a plate of ice (a substance the temperature of which cannot rise above 32° F.) for the screen, when the effect was 0°. This view he considered as confirmed by his beautiful contrivance of the *double* or compound screen. He coated one side of two plates of glass with tinfoil; when the coated sides were outermost, the thermometer did not rise; when the glass surfaces were outwards, the thermometer rose to 18°. He blackened one surface of two plates of tinned iron; when the blackened surfaces were outwards, the effect was 23°; but if the plates were separated from each other, the thermometer fell back to its former station. When the tinned surfaces were outermost, the thermometer was not at all affected.

Leslie included his whole apparatus in a trough of water, in such a way as to be able to fill the canister with hot water after the whole was adjusted; but there was no radiation of caloric.

The inference which this philosopher drew from his investigations is, that heat is an elastic substance, extremely fluid and active; and he advanced strong arguments against the theory which ascribes all the phenomena of heat to vibrations in the particles of matter. (See *Inquiry*, p. 139 to 150.) Yet he is disposed to consider the phenomena of radiation as depending on certain undulations, produced by radiating surfaces in the ambient air. This view has been ably combated by the late Dr Murray, with the sagacity which distinguished that philosopher. But the limits of the present article will not allow us to enter into this part of the subject, for which we must refer the reader to Leslie's *Inquiry*, and Murray's *Chemistry.*

The more usually-received theory of radiation is, that from heated bodies emanate rays of caloric in all directions, which proceed through gaseous bodies with little or no sensible interruption, and with amazing velocity; that these rays are absorbed by dark and rough surfaces, and are reflected by polished bright surfaces.

There is, however, one curious experiment, which is rather difficult of explanation, namely, the seeming *radiation of cold.* The Florentine philosophers of the *Academia del Cimento* found, that when a mass of snow was placed in the focus of one mirror, the thermometer placed in the focus of the other sunk, or indicated cold. This subject has been investigated by Pictet and by Leslie. The latter observed that his canister, filled with snow, produced the greatest effect when its blackened side was towards the thermometer and the mirror, and the least when its polished side was in that direction. The effect of screens, in retarding the influence of the cold body, he found analogous to their effect on the radiation from the hot water.

These facts were considered by Leslie as proving the existence of what he denominated cold pulses from the snow towards the mirror, "on the wings of the ambient air;" but the explanation of Pictet appears to account for it well, without the necessity of inferring the existence of frigorific particles, which is a highly improbable supposition. On this view, radiation is considered as only taking place amongst bodies unequally heated. He conceived that bodies at the same temperature do not radiate heat to each other, because in this state caloric exists in them all in an equality of tension; but when a cool body is introduced, all radiate heat towards it, and consequently their temperature falls. Hence radiation is nothing more than the tendency of caloric to establish an equilibrium of temperature. The rays of heat enter into the snow from the surrounding matter, and, amongst others, from the thermometer, which is now a radiating body; and these collected in the mirror pass in right lines to the snow, with a celerity in proportion to their absorption by the cold body. Hence the caloric of the thermometer will more rapidly leave it when the blackened side of the cold canister, that is, its most absorbent side, is turned to the thermometer.

Leslie explains this phenomenon by his theory of aerial pulsations. He considers the cold surface as abstracting part of the caloric of the contiguous stratum of air, which induces a momentary contraction of that portion; and this contraction produces pulsations, accompanied by a discharge of heat, in a continued chain from the thermometer and the mirror to the snow.

The effect of surface on the refrigeration of bodies, an important part of the consequences of radiation, has been ably examined both by Sir John Leslie and Count Rumford. The experiments of both show, that to preserve the heat of any liquid, a bright metallic vessel is the best; and Rumford has pointed out many important economical purposes to which these principles may be applied. Thus, where it is of consequence to preserve the heat of liquids, of steam, or of hot air, they should be conveyed in vessels and tubes of polished metal. On the other hand, if we wish to have the greatest radiant heat from a stove or grate, its surface next the room should be dark and rough, as these are the most favourable for radiating heat into the apartment. The same principles show why a silver

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tea-pot makes better tea, and keeps it longer warm, than a china one.

One of the most beautiful applications of the principle of the radiation of heat, is Dr Wells' explanation of the phenomena of dew and hoar-frost. Dr Wilson of Glasgow had observed, that bodies upon which dew and hoar-frost formed, were always *colder* than the surrounding air. This cold he ascribed to these depositions; but an attentive examination of facts led Dr Wells to draw an opposite conclusion, and to infer that the coldness of the bodies was the *cause* of the deposition of dew and hoar-frost. This he successfully established, by proving that, before any dew formed, the surface on which it condensed was uniformly cooler than the ambient air. And it was reserved for this accomplished man to offer a theory of those meteors, complete in almost all its parts, and perfectly satisfactory. He ascribed it to the radiation of heat, without any return from the air to the surface of the earth. He observed, that it was chiefly in serene, clear nights, that dew was formed; that exposure to the open clear sky favoured the formation of dew; and that cloudy skies were unfavourable to its formation. These phenomena he beautifully explained on the theory of radiation. The upper regions of the atmosphere are well known to be the abodes of perpetual congelation, as is seen whenever mountains reach a certain altitude, differing, it is true, in different climates, but yet invariable over the earth. When we have a clear atmosphere at night, the surface of the earth rapidly parts with the heat it had acquired during the day, by radiation to the superior regions, whence it can receive no heat in return. In this case, the empyrean regions act the part of the snow in the Florentine experiment; and the earth's surface may represent the thermometer. But if fleecy clouds intervene, they act the part of screens, intercepting the passage of radiant caloric from the earth, and consequently retarding the nocturnal cooling of its surface. Air at an increased temperature contains more water than cool air, and on the reduction of its temperature deposits its surplus water. Now, as the radiation from the earth's surface cools it more rapidly than the air during serene nights, its temperature rapidly falls, as the thermometer shows; and the consequence is the cooling of the stratum of air in immediate contact with the ground, and the deposition of its superabundant moisture, in the form of dew or hoar-frost, according to the celerity and intensity of the refrigeration.

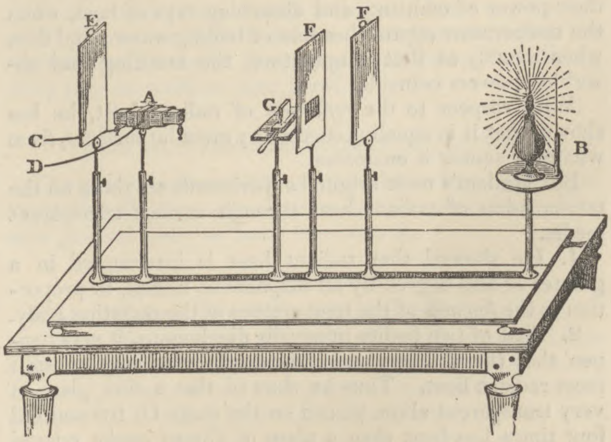
This theory is experimentally proved by placing substances absorbent of moisture, along with thermometers, below and above screens, and then noting the temperature and the increase of weight. If, for instance, a light table, about three feet high, be placed in a garden on a clear night, and a few grains of wool, previously weighed, be laid under the table, and as much on its upper surface, with a thermometer by each parcel of wool, it will be found that the upper thermometer will indicate the greatest degree of cold, and the wool on the table will have imbibed much more moisture than that below. The table, in such experiments, acts the part of clouds in intercepting the discharge of radiant heat, and preventing the cooling of the earth's surface. The theory agrees with the fact, that dew is heaviest in our climate in serene nights, after a hot day; and that the dews of hot climates are far heavier than with us, so as, in clear weather, in the south of Europe, to drench the clothes of persons exposed to the air about sunset. The slight anomalies which sometimes occur in such experiments are easily explicable by the different *conducting power* of substances in regard to heat, by which the influence of radiation may be in some degree modified; but undoubtedly the principal effect is due to *radiation*.

The influence of a clear sky in reducing the temperature of the earth's surface, and the effect of clouds in preventing this change, are beautifully illustrated by Leslie's elegant invention, the *Æthrioscope*. (See, for the description of the æthrioscope, the article CLIMATE.) This instrument is so delicate, that it instantly indicates cold on presenting its uncovered ball to the clear sky; but if a passing cloud cross the zenith, even momentarily, the movement of the fluid in its stem immediately shows an increase of temperature. If one walk in a clear night, with this instrument in one hand and a parasol in the other, it may be kept in a perpetual state of fluctuation, by alternately projecting it beyond and drawing it under the parasol.

Diffusion of Heat.

The radiant heat afforded by the sun's rays is the most important phenomenon of this class. Light and heat are in these rays so united, that experiment would seem to prove the one to be always in proportion to the other. This is by no means the case with the light and heat of common combustibles, or what we may term *terrestrial*, in contradistinction to *solar* emanations of light. Phosphorus gives an intense light during combustion, but a feeble heat; whilst hydrogen, which has a very feeble light, excites a high temperature by its combustion. Solar light and heat, on the other hand, are uniformly proportional. There are more marked differences between solar and terrestrial radiant heat. Screens of glass greatly interrupt the passage of the latter, but do not sensibly intercept that of the sun. A plate of the most diaphanous ice totally intercepts terrestrial radiant caloric, but does not impede the sun's heating rays. This has, with considerable reason, been supposed to depend on the different velocities of the two species of calorific emanations. Sir John Leslie considered "that the phenomena of solar radiation proved *heat to be only light in a state of combination*." (*Essay*, 162.)

For thirty years after the publication of Leslie's *Experimental Inquiry*, little appears to have been attempted on this subject, until within a recent period, when the experimental researches of Melloni and of Nobili, particularly of the former, opened a beautiful field of investigation, which has already been cultivated with success by Professor James Forbes of Edinburgh. Melloni has, by means of a thermo-magnetic combination, invented a very delicate test of minute degrees of heat, wholly inappreciable by any thermometer, and has successfully applied it to investigate the laws of radiant heat. By uniting fifty small bars of antimony and bismuth into one bundle, about three fourths of an inch square, and about 1·17 inch in length, and connecting this with a galvanometer, he obtained an apparatus so sensible to heat, that the warmth radiating from the human hand, at the distance of several inches from the end of the bars, is indicated by the deviation of the needle of the galvanometer.



Melloni's instrument is represented in the adjoining figure, where a firm sole of wood is seen, provided with a groove, in which the different parts of the apparatus slide to adjust their relative distances. A is the bundle of metallic bars, enclosed in a square case of brass; B is the source of the heat; C, D are the wires proceeding from the bars, to convey their thermo-magnetism to the nearly neutralized needle or galvanometer, which is not here represented; G is the stage for occasionally supporting various substances, the effect of which on the calorific rays it is intended to ascertain; FF are screens of brass, moveable on joints, for cutting off at pleasure the radiant heat, or for obviating the influence of extraneous sources of heat. In F is a hole through which the heat radiates to A when the screen is removed.

This apparatus has been employed by Melloni to investigate the laws of radiant heat; and he has not only confirmed the general results of Leslie, but extended greatly our knowledge of this mysterious agent.

Melloni found, that the radiant and absorbent power of surfaces were not always proportional, as the following tables show.

The radiant power of surfaces of

Lamp black............= 100
Carbonate of lead......= 100
China ink...............= 85
Isinglass.................= 91
Lac.........................= 72
A metallic surface.....= 12

The absorbent power of surfaces of

Lamp black............= 100
Carbonate of lead......= 53
China ink...............= 96
Isinglass.................= 52
Lac.........................= 52
A metallic surface.....= 14

Melloni also found, that the absorbent powers of the surfaces varied considerably, according to the *source* of the radiation, and the *temperature* of that body. Thus, radiation from incandescent platinum wire, from copper at 400° and copper at 100° centigrade, gave the following results.

	Incand. Platinum.	Copper 400°	Copper 100°.
Lamp black....=	100	100	100
Carb. of lead...=	56	89	100
China ink......=	95	87	85
Isinglass........=	54	64	91
Lac...............=	47	70	72
Metal. surface =	13·5	13	13

This experiment proves,

1. That bodies do not always agree in their emitting and absorbent powers, though generally nearly so.
2. That their absorbent power varies very remarkably with the origin and intensity of the calorific rays.
3. That they approach each other more and more in their power of emitting and absorbing rays of heat, when the temperature approaches that of boiling water; and that, when exactly at that temperature, the emitting and absorbing powers coincide.

With respect to the *reflection* of radiant heat, he has shown, that it is equally reflected by metallic surfaces, from whatever source it emanates.

But Melloni's most original experiments are those on the transmission of radiant heat through various transparent media.

1. He showed that radiant heat is intercepted in a greater or less degree by all diaphanous bodies, in proportion to the *lowness* of the temperature of the radiating body.
2. That of two bodies unequally diaphanous, it may happen that the thickest and least diaphanous may transmit most radiant heat. Thus he showed that a thin plate of very transparent alum, placed on the stage G, transmitted four times less heat than a plate of almost opake quartz, about 100 times as thick; but he found that in the *same* substance the transmission of radiant heat is diminished by the thickness of the plate interposed, and this diminution is proportional to the lowness of the temperature of the radiant body.
3. That there are combinations of two media, which allow a notable quantity of light to pass, but totally intercept radiant heat; whilst others transmit heat, but wholly intercept light.
4. That in traversing a transparent plate, radiant heat undergoes certain modifications, variable with the nature of the plate; a change which renders it more or less susceptible ultimately of being transmitted through other diaphanous substances. Melloni instances this last property in glass, in crystallized citric acid, and in alum.

Delaroche had inferred, from his experiments, that it was a general law of radiant heat, that the permeability of plates to this agent depended upon the intensity of the source of the caloric; and in this way he explained the instant permeability of glass and ice to the calorific rays of the sun, whilst they retarded those from terrestrial sources of heat; but Melloni has discovered one substance which he found to be equally pervious to heat, from whatever terrestrial source, whether proceeding from the brightest flame, or from water far below the boiling point.

The power of penetrating glass and other media increasing in proportion as the radiating heat approaches the state of light, had been used by Delaroche as an argument for their identity; but the anomaly of rock-salt destroys the universality of the supposed law on which the argument is founded. Yet Mrs Somerville has ingeniously employed the unlooked-for analogy between light and heat, in the equal transmission of the latter, however eliminated, through rock-salt, as an argument for their being modifications of the same principle. The condition of visibility or invisibility, she contends, may depend on the construction of our eyes, not on the nature of the agent producing the sensations of vision and of heat.

"The sense of seeing, like that of hearing, may be confined within certain limits; the chemical rays beyond the violent end of the spectrum may be too rapid, or not sufficiently excursive in their vibrations to be visible to the human eye; and the calorific rays beyond the other end of the spectrum may not be sufficiently rapid, or too extensive, in their undulations, to affect our optic nerves, though both may be visible to certain animals or insects."

She has traced the analogies between light and heat in their reflection by polished surfaces, their refraction through transparent media, with their concentration by concave and dispersion by convex mirrors; and since the publication of her beautiful essay on the connection of the physical sciences, Professor J. D. Forbes has drawn the analogy closer, as we shall presently see.

But to return to Melloni. This able philosopher has shown that radiant caloric is susceptible of refraction; and when it arrives at the second surface of the refracting angle, with a certain obliquity, it is, like light, reflected toward the interior of the prism, and issues at the opposite face.

By interposing the same plate of glass, he ascertained the influence of transmission on the absolute power of different radiating surfaces thus:

	Before the interposition of the plate of glass.	After ditto.
Lamp-black.....................=	100	100
Carbonate of lead............=	53	24
China ink.......................=	96	100
Isinglass........................=	52	45
Lac...............................=	43	30
A metallic surface...........=	14	17

Melloni, however, failed to detect the polarisation of radiant heat: indeed, he states that the direction in

Diffusion of Heat.

which we slice crystallized bodies does not exert any influence upon the quantity of radiant heat immediately transmitted by them; and adds, that radiant heat is *not polarised* by transmission through tourmaline. In this, however, Melloni was deceived; and it was reserved for our countryman Professor Forbes of Edinburgh to complete the analogy between light and heat, by demonstrating the polarisation of the latter.

Since the characteristic phenomenon which marks the polarisation of light is its variable susceptibility as to reflection or transmission, under circumstances in which common light would be reflected or transmitted, it will appear that the correlative fact in the case of heat would be indicated by a diminished effect on the thermometer, where the intensity of light, under similar circumstances, would be a *minimum*, and *vice versa.* The importance of establishing this effect with regard to heat is far greater than the mere addition of such facts to our knowledge; for, as the corresponding facts in the instance of light have been completely brought into the domain of *analysis* by Fresnel, the polarisation of heat must be considered as almost decisive of its nature.

Mr Forbes employed Melloni's apparatus; and by interposing two plates of tourmaline, cut parallel to the axis of the crystal, and mounted on two slips of thin glass, he made a series of successive observations under the two conditions of the axes parallel and perpendicular to each other. Two measures of intensity in the position in which least light is transmitted were noted, and in the following table this position is indicated by *dark;* their mean is given, which is then compared with the intervening observation, in the position of greatest illumination, which is marked *light.*

The source of heat was a small oil lamp placed on the stage, six inches from the centre of the pile of Melloni's apparatus; the numbers indicate the degrees of the galvanometer.

Dark.	Mean.	Light.	Ratio.
4¼			
	4·5	5·2	86 : 100
4¾			
	5·0	6·0	83 : 100
5¼			
	5·2	6·0	86 : 100
5			
	5·4	6·5	83 : 100
5¾			

He afterwards obtained the polarisation of heat from various luminous and non-luminous sources, such as brass heated by a spirit lamp to 390° centigrade. The quantity of heat from different sources, polarised by the tourmalines, was as follows:—

With Argand lamp..............= 16 per cent.
...... Oil lamp....................= 11 do.
...... Incandescent platinum..= 12 do.
...... Brass at 390° cent.......= 3 do.

The most convenient way of polarising heat is by transmitting it through a bundle of extremely thin laminæ of mica, inclined to the incident ray at the polarising angle; mica having the property of transmitting heat very readily. The amount of polarisation is indicated by the relative quantities of heat reaching the pile, or thermo-magnetic combination of the instrument, through a second bundle of thin plates of mica, placed alternately in a parallel or perpendicular position to the first. With such an apparatus Mr Forbes demonstrated, in the most decisive manner, the polarisation of heat; and obtained this effect, even with water below 200° F. as the source of heat. The quantity polarised, however, always bears a proportion to the temperature of the source of the radiant heat, as is seen by the following tabular results.

General Effects of Caloric.

Sources of Heat.	Rays out of 100 polarised by the mica plates.
Argand lamp with a glass chimney	29
Oil lamp with a square wick	24
Alcohol lamp	36
Incandescent platinum	40
Brass heated to about 700° F.	22
Mercury in a crucible at about 500° F.	17
Water under 200° F.	6

Mr Forbes next proceeded to attempt the polarisation by *reflection;* and in this also he succeeded by the use of reflecting surfaces of mica, as in the corresponding case of light.

The success of these investigations, and the analogy of light, led him to the more delicate problem of the *depolarisation* of heat by plates of mica. By interposing a film of mica between the two bundles of mica plates already mentioned, having their planes of incidence at right angles to each other, and marking the difference of the heat transmitted to the galvanometer, when the principal section of the film of mica was parallel to the plane of primitive polarisation, or inclined to it at an angle of 45°, he succeeded in demonstrating the polarisation of the rays of heat, even when heat without light was employed. In these experiments, when the principal section coincided with the plane of polarisation, the depolarising effect was *nil;* but when it was inclined at the angle of 45°, he obtained the following proportions in one series of experiments.

100 : 118 — 100 : 120 — 100 : 120 — 100 : 113.

The depolarisation is still more marked with incandescent platinum; as the results were

100 : 126 — 100 : 138 — 100 : 138.

One of the most striking proofs of the depolarising power of mica is obtained, when the two bundles of mica plates are crossed, so as to intercept most heat, and we interpose a very thin plate or film of mica as above mentioned; then the galvanometer moves towards zero, or the thin plate evidently stops more heat than it depolarises; but if we substitute a much thicker plate of mica for the film, the instrument will indicate a higher temperature than when no mica at all is interposed, or the thick plate depolarises more heat than it intercepts.

These experiments were varied in a great variety of ways, so as to establish the fact of the depolarisation of heat; and if we admit that it depends on a similar cause to the analogous phenomena of light, it follows that the rays of caloric are susceptible also of *double refraction;* that the two pencils are polarised in opposite planes, and that they become capable of *interference* by the action of the analysing plate.

These curious facts would indicate at least a great similarity between light and heat; and the concluding observations of Professor Forbes's paper (*Edin. Phil. Trans.* xiii.) tend to confirm their identity.

SECT. III.—GENERAL EFFECTS OF CALORIC.

The general effects of heat applied to other matter are, expansion, fluidity, vaporization, and incandescence. The *most* general effect of heat, however, is,

1. *Expansion.*

When a body is heated, it expands in all its dimensions; but when the heat is withdrawn, the body returns to its original size. This is well shown by having a turned rod of metal, loosely fitted to a gage, to ascertain its length, and provided with a hole which first allows it, when cold, to pass through. This expansion is small in solids, but has been most accurately measured by philosophers, for

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the important purposes of ascertaining with precision the true length of the pendulum vibrating seconds in any latitude, and for obtaining a perfect standard of length. This difficult subject engaged the attention of Ellicot, Smeaton, Roy, Troughton, Lavoisier, and Laplace. The later experiments were made by the two last-mentioned philosophers, and were first published by Biot in the following table, which shows the expansion which different solids sustain, in passing from the freezing to the boiling point of water, in fractions of their own lengths.

Steel, not tempered	0·00107915	= $\frac{1}{927}$
Steel, tempered and annealed	0·00123956	= $\frac{1}{807}$
Silver, cupelled	0·00190974	= $\frac{1}{524}$
Silver of Parisian standard	0·00190868	= $\frac{1}{524}$
Copper	0·00171733	= $\frac{1}{582}$
Brass	0·00187821	= $\frac{1}{532}$
Tin of Malacca	0·00193765	= $\frac{1}{516}$
Tin of Cornwall	0·001217298	= $\frac{1}{462}$
Iron, forged	0·00122045	= $\frac{1}{819}$
Iron, wire-drawn	0.00123504	= $\frac{1}{812}$
Gold, pure	0·00146606	= $\frac{1}{682}$
Gold, standard, annealed	0·00151361	= $\frac{1}{661}$
Gold, standard, unannealed	0·00155155	= $\frac{1}{645}$
Platina	0·00085655	= $\frac{1}{1167}$
Lead	0·000284836	= $\frac{1}{351}$
Mercury, in volume	0·01847746	= $\frac{1}{54}$
Flint-glass, English	0·00081166	= $\frac{1}{1248}$
Glass, French, with lead	0·00087199	= $\frac{1}{1147}$
Glass tube, without lead	0·00089694	= $\frac{1}{1115}$
Plate glass	0·00089089	= $\frac{1}{1122}$

A very elaborate and interesting set of experiments on the expansion of building materials by heat, with a view to determine how far the changes produced by temperature may affect the stability of edifices into which these different materials enter, were since laid before the Royal Society, by Alexander J. Adie, Esq. civil engineer. He exposed square rods of these substances, twenty-three inches in length, and either half an inch or an inch in diameter, in a pyrometer of his own invention, to a heat of 212°. The increments in length were accurately determined by a microscope-micrometer, attached to the instrument; and the following table gives the increase of the whole length produced by 180° of heat, in decimals of an inch:—

	Decimals of an Inch.
Sandstone of Craigleith Quarry, Edinburgh	·0011743
Greenstone of Ratho, Edinburgh	·0008089
Arbroath paving flag	·0008985
Caithness paving flag	·0008947
Penrhyn slate	·0010376
Aberdeen gray granite	·00078943
Peterhead red granite	·0009583
Galway black marble	·00044519
Carrara white marble	·0011928
Best stock brick	·0005502
Cast iron, half inch square	·00114676

The expansion of solids at different temperatures appears to be nearly equable, as far as we can ascertain. The ratio of their expansion really *increases* with their temperature; but their whole expansion is so inconsiderable, that the increasing rate is inapplicable, except in the nicest investigations.

The expansion of liquids is much more considerable. In passing from the freezing to the boiling point of water, the expansion of several is as follows:

Mercury	0·00200	= $\frac{1}{50}$
Water	0·00456	= $\frac{1}{215}$
A saturated solution of common salt	0·00500	= $\frac{1}{20}$
Sulphuric acid	0·00600	= $\frac{1}{17}$
Muriatic acid	0·00600	= $\frac{1}{17}$
Oil of turpentine	0·00700	= $\frac{1}{14}$
Æther	0·00700	= $\frac{1}{14}$
Olive oil	0·00800	= $\frac{1}{12\cdot5}$
Nitric acid	0·1100	= $\frac{1}{9}$
Alcohol	0·1100	= $\frac{1}{9}$

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The inequality of the expansion of fluids by heat has long been known to form an obstacle to the accuracy of thermometers. Deluc found, that of all fluids mercury was the most equable in its expansions, which is probably owing to the great distance between its freezing and boiling points; for it is found that those liquids which have a low boiling point are the most irregular in their expansion at ordinary temperatures; and hence alcohol is not a suitable fluid for thermometers.

The expansibility of liquids is not in proportion to their density; but it is more nearly in the inverse ratio of their density than of any other known property.

The expansion of gases by heat is much more considerable than that of the other two forms of matter.

The higher increasing ratio in the expansibility of liquids with their augmenting temperature, than in solids, led philosophers at first to infer, that the inequalities of the gaseous bodies, in this respect, would be still more considerable; but the elaborate researches of General Roy have disproved this idea; and some experiments of the late Dr Murray of Edinburgh, and of Dr Dalton, would rather indicate a *decrease* in the ratio with the increased temperature. This, however, may probably be owing to the imperfection of our best thermometers, and to the difficulty of estimating the expansions of the glass containing the air examined.

Dr Dalton has ascertained that all gases expand equally by equal increments of heat; a conclusion which has been confirmed by Gay-Lussac. They have shown that, between the freezing and boiling point of water, 100 cubic inches of atmospheric air expand to 137·50, that with hydrogen the result was 137·52, with oxygen gas 137·48, and with nitrogen 137·49; differences so slight as to be within the probable limits of experimental error.

The force opposed to expansion would appear to be cohesion. Expansion is least in solids where the cohesion is strongest; it is more considerable in liquids where the cohesion is greatly weakened; and it is greatest in gases, in which cohesion is wholly overcome.

The expansion of bodies by heat, and their contraction on the reduction of the temperature, would show that the atoms of bodies are not in absolute contact. In fact, we may suppose them surrounded by *atmospheres of heat*, which prevent, by the repulsive energy of caloric, their absolute contact; whilst the force of cohesion limits the diffusive influence of the contained caloric. In some, the superior force of cohesion gives rise to solidity. When more heat is introduced, the cohesion is weakened, and the body becomes a liquid; and a further addition of caloric destroys cohesion altogether, separates the atoms, and the body becomes a gas.

The expansion of bodies by heat proves the mutual repulsion of their particles; but this limits the repulsive energy of heat to insensible distances. In 1824, Libri endeavoured to prove, from the movements of globules of water along fine wires, that the repulsive power of heat was exerted also at sensible distances. But his experiments are not conclusive; for the motions may have arisen from the formation of vapour at one end of the globule. Fresnel attempted to prove this point by bringing discs of foil or of mica, on the end of a delicately suspended magnet, into contact with fixed discs *in vacuo*, and marking the effect of heat collected from the sun's rays. The moveable discs sensibly receded; but this may have arisen from some change produced by the heat in the form of the discs. Professor Forbes has happily applied the repulsive energy of heat acting at *sensible distances*, to explain the curious vibrations of the metal bars in Trevelyan's experiments. Still more lately Professor Powell of Cambridge has demonstrated the repulsion of heat at sensible distances (*Phil. Trans.* for 1834), by the changes produced, on the approximation of a heated body, in the Newtonian coloured rings of plates of glass which are pressed together. When, for instance, a flat plate is laid on a slightly convex surface of glass, the rings appear. On bringing a heated body near the upper surface of the plates, the rings instantly contract, and again enlarge on withdrawing the heated body. On repeating the experiment with the colours formed under the base of a prism placed on a lens of small convexity, he found the repulsion of heat acting at distances, which Sir J. Herschel has calculated at $\frac{1}{1100}$th of an inch.

Expansion is so general an effect of heat, that there are only two known exceptions, viz. in clay, and in water at a certain limited range of temperature. It is well known that porcelain clay contracts in baking, and ever afterwards retains its contracted dimensions. It was this quality which induced Wedgwood to employ its contractions as a pyrometer. (See THERMOMETER and PYROMETER.) This property, however, seemingly depends on heat producing in the heterogeneous substance clay, a more intimate union of its parts, or a partial conversion of this mechanical mixture into a chemical compound.

The exception of water between 42° and 32° Fahrenheit, is, however, real. When water is cooled down from the ordinary temperature, say 60°, it regularly contracts by the cooling, until it has attained 42°; but whilst passing from that point down to its freezing point, it continues to expand gradually, until converted into ice.

The important purposes which this constitution of water serves in the economy of nature, the immense quantity of heat which is by this contrivance saved to our lakes and other collections of water, are strikingly pointed out by Count Rumford in his Essays; and this peculiarity in water has been confirmed by the well-devised experiments of Professor Hope and Dr Murray.

Many liquids at the moment of congelation *expand*, from the crystalline arrangement of their parts. This is familiarly known in the floating of ice in water, in the bursting of water pipes by frost, and in the splitting of masses of rock by the congelation of the water which has insinuated itself into their fissures. This force is well known to be enormous, as was shown by the experiments of the Florentine academicians, of Huygens, and of Major Williams at Quebec (see *Edin. Phil. Trans.*). The same cause produces the expansion of cast iron at the moment of becoming solid; and it is to this property that we are indebted for the sharpness of the casts obtained from this metal. In these instances we do not find an exception to the law of contraction by diminished heat. It is wholly owing to a crystalline arrangement of the particles, by which interstices are left between them, and consequently the solid occupies more space than if solidification took place without crystallization. Hence lead expands not in cooling, though cast iron does.

Many operations in the arts depend on the contraction of metals as they cool. It is in this way that the tyers of coach wheels are fitted tightly to the fellies. The expansion of metals by heat seemed at one time to form an insurmountable bar to the perfection of the going of a pendulum clock; but the ingenuity of an English artist showed how, by a combination of bars of metals of unequal expansibility, this property might be applied to keep the pendulum, at all temperatures, of precisely the same length. This first produced the gridiron pendulum; and more lately the compensation pendulum, with a mercurial cistern at the end of a metallic rod. Similar principles have been successfully applied to the balance-wheels of pocket chronometers.

2. *Liquefaction, or Fluidity.*

When solids are heated, they first expand, and then melt. This is a very general effect of caloric, the exceptions to which are disappearing, as we discover new sources of intense temperature. The oxyhydrogen blowpipe has fused almost all the more refractory substances; and the sun's rays collected by immense lenses, or metallic mirrors, have melted, or even dissipated in vapour, many bodies, which were long regarded as incapable of fusion. We are therefore entitled to regard solidity as the natural state of all matter, and its two other modifications as resulting from its union with caloric.

Those bodies always fused at the ordinary temperatures are no exception to this law, since, by artificial cold, we have reduced most of them to a solid state. Thus mercury, at about — 40° of Fahrenheit, becomes a solid metal with the lustre of silver; and alcohol, which has not yet been frozen, may be considered as having its melting point lower than any yet discovered artificial cold. The point at which bodies become fluid differs widely in different substances, but remains uniformly the same in the same fluid under similar circumstances. Thus ice always melts at 32°.

It was long believed, that when solids began to melt, they were converted into liquids by a small increase of heat; and that they might again return to the solid state by a small diminution of their temperature. An attentive consideration of the process of liquefaction convinced the celebrated Dr Joseph Black of the insufficiency of the commonly-received opinion; and he promulgated in 1757 more philosophic views of this subject, which he illustrated by a beautifully simple experiment.

He introduced equal quantities of water into two thin glass flasks of the same form and weight. One of them he froze, by placing it in a freezing mixture; the other he reduced by similar means to the temperature of 32°, or its freezing point, but without allowing it to become solid. When removed from the freezing mixture, the flask of ice soon acquired the same temperature as the ice-cold water, and both were suspended in a room at 47°. In half an hour the thermometer in the ice-cold water had risen to 40°, but it required twenty-one half-hours to raise the temperature of the flask which had been frozen to the same point. As both were exposed to the same medium, equal quantities of heat must have been imparted to each in equal times; but it required twenty-one times as long to raise the frozen flask 8°, as sufficed to impart 8° to the ice-cold water. Dr Black inquired what had become of this quantity of caloric, which was not indicated by any rise in the thermometer? He inferred that it had entered into the ice during its liquefaction; and as the quantity so absorbed was not indicated by the thermometer, he denominated it

Latent Heat.—In repeating the experiment with much care, he found that a pound of ice required twenty times as long to rise through 7°, as did as much ice-cold water; and therefore inferred, that during the conversion of that ice into water, as much heat disappears, or is absorbed, as would have elevated a pound of ice-cold water 140°. This absorption of heat during liquefaction is easily shown. If we add a pound of boiling water to a pound of ice, the temperature of the mixture will still remain at 32°; but if to a pound of water at 32°, we add a pound of boiling water at 212°, the temperature of the mixture will be found about 122°, or a mean between the extremes of temperature.

Similar absorptions of heat take place during the melting of tallow, bees-wax, and of the metals.

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When liquid bodies congeal, or become solid, their latent heat is again given out.

It is possible, by nice management, to cool down water considerably below its freezing point. The principal circumstance necessary for this experiment is to leave it at perfect rest, in an atmosphere from 10° to 15° below 32° (Dalton succeeded in this way in cooling water as low as 5° without freezing); but on slightly agitating it, the water suddenly freezes; and if a thermometer has been suspended in it, the instrument suddenly rises to 32°, owing to the conversion of latent into sensible heat.

Another experiment shows this fact in a striking point of view. Into a glass flask introduce a mixture of sulphate of soda and water, in such proportions that it will form a saturated solution about the point of ebullition. When this is heated to that point, pour a little oil on its surface, introduce a thermometer, and remove it from the fire. When quite cold, drop into it a small crystal of sulphate of soda, and the solution will speedily crystallize into a solid mass, during the formation of which the thermometer will be seen to rise, indicating the evolution of sensible heat, during the conversion of the liquid into a solid.

The absorption of sensible caloric on the liquefaction of bodies forms the basis of most of the processes by which we obtain artificial cold. When to some salts, such as sulphate of soda, we add nitrous acid diluted with an equal part of water, the salt rapidly melts, and the temperature is reduced to the beginning of Fahrenheit's scale. Diluted acid added to snow rapidly melts it, and the temperature is greatly reduced. A mixture of common salt and snow, which is the mixture generally employed to procure ice-cream, will sink the temperature to the beginning of Fahrenheit's scale. Dry muriate of lime added to dry snow will reduce the temperature, during their liquefaction, so low as to freeze mercury. In all these instances it is the absorption of heat caused by the liquefaction, or the conversion of sensible into latent caloric, that produces the cold.

Dr Black applied his theory of latent heat to explain many phenomena. The ductility of a body appears to be owing to the presence of latent caloric; for if we hammer a piece of iron smartly, it becomes intensely hot, by parting with its latent caloric, and at the same time has its ductility greatly impaired. This ductility is only restored by again heating the metal in the fire, by which it re-acquires latent heat, that may again be forced out by a repetition of the hammering.

The absorption of heat by bodies whilst melting is an important law in the economy of nature. Had it merely been necessary, for the immediate conversion of ice or snow into water, to raise the atmospheric temperature a few degrees, the sudden formation of water would have deluged the earth on every occurrence of a thaw. On the other hand, had the slightest lowering of the temperature of the air below 32° been all that was requisite to convert water into ice, the sudden expansion of the congealing juices of vegetables must have burst their sap-vessels, and rent asunder the strongest ornaments of the forest. But the law of the gradual absorption and emanation of caloric during these transitions from the solid to the liquid, and from the liquid to the solid state, produces those changes tranquilly and beneficially. The melting snow gradually augments the sources which fertilize the valleys; whilst the soil, loosened by the expansion produced by the previous frost, when softened by the succeeding thaw, is fitted for the reception of the roots of plants.

The influence of these processes on climate is not inconsiderable. The absorption of heat during the liquefaction of ice on tropical mountains, sends down into the heated valleys copious sources of cool water, which by its immediate contact, and still more by its evaporation, assuages the fervour of a broiling climate; and in high latitudes the caloric, eliminated on the freezing of water, tends to mitigate the rigours of an arctic winter

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3. *Vaporization.*

When liquids are heated, the first effect is expansion; but if the application of heat be continued, they assume the aeriform state, or pass into *vapour;* and when the caloric is abstracted, they again assume the liquid form. When water is heated to 212° Fahrenheit, it boils, and is converted into an invisible aeriform fluid, which remains perfectly transparent and colourless as long as its temperature is not below 212°; but what in common language is called steam, is this elastic fluid partially recondensed into water, by the loss of a portion of its heat. The invisible elastic vapour is capable of occupying space and expelling atmospheric air, as is shown by corking a flask when boiling, and opening it under water; when the flask will be suddenly entirely filled with the water, which condenses the steam.

Liquids, however, pass also into vapour by a more gradual process. If exposed to the air, water, for instance, gradually disappears; and if the process be carried on under a glass vessel, the included air becomes charged with moisture, which may be again abstracted from it by dry quicklime, or other substance having a strong affinity for water. The process by which liquids are thus converted into vapour is termed *Spontaneous Evaporation;* an important operation in nature, as on it depends the charging of the atmosphere with water, for the formation of clouds, mist, rain, and dew; all elastic fluids, however, are not capable of being condensed into liquids by any decrease of temperature we can command. Thus, no artificial cold has hitherto been discovered capable of converting atmospheric air into a liquid.

The common property of all aeriform fluids is *elasticity,* or the tendency, when forcibly compressed, to resume their former bulk. Thus, if we throw air, by means of a forcing pump, into an air-tight cistern, provided with a small orifice commanded by a stop-cock; on opening the latter, the air will issue out with great force, until the air has regained its former volume.

But vapours, or those aeriform bodies which are not permanently elastic, may, by strong pressure, even whilst their temperature is above their vaporific point, be condensed into liquids.

The elasticity of all aeriform bodies is increased by augmentation of temperature. In atmospheric air this increase has been found equal to $\frac{1}{480}$th of its volume for every 1° Fahrenheit; and the elasticity of steam, or the vapour of water, is nearly doubled by 30° of increased temperature above 212.

We are indebted to the celebrated Dr Dalton for accurate ideas as to the elasticity of aeriform bodies at different temperatures. He showed that the vapour of water, under a barometrical pressure of thirty inches at the boiling point, is just equal to the elasticity of atmospheric air under the same pressure; that the ratio of increase is rather less than a geometrical series, when the temperature is taken in an arithmetical progression; and, what was less obvious, that the elasticity of all vapours is precisely the same with the elasticity of the vapour of water, at the same number of degrees above the boiling point of each liquid. Thus water, under a mean barometrical pressure, boils at 212°; and the elasticity of its steam at 220°, or 8° above its boiling point, was found by Dalton to be = 34·99 inches: alcohol boils at 175°, and the elasticity of its vapour at 183°, or 8° above its boiling point, is just = 34·99.

The bulk of a body is very much increased by its conversion into vapour. Dr Black and Mr Watt made experiments to ascertain this increase. They boiled water in a flask, and, as the last drop was converted into steam, accurately closed the flask, which was then carefully weighed; on opening the flask below the surface of water, the quantity of water which rushed in was easily ascertained by a second weighing of the flask. The mean of several experiments showed that water, in the state of vapour, occupied 1800 times the space it filled as water. When heat is applied to solids, its first effect is expansion, next liquefaction, and, lastly, conversion into vapour. A few solids pass at once into the state of vapour, as carbonate of ammonia.

Different liquids acquire different degrees of heat for their vaporization. Thus æther becomes vapour at 104°, alcohol at 175°, water at 212°, and mercury requires a temperature about 692°. The vaporific point, however, remains constantly the same, in the same liquid, under the same barometric pressure. If, however, we diminish the pressure, the liquid will boil at a lower temperature. This is easily shown by the air-pump, in the exhausted receiver of which æther will boil at a temperature considerably below the freezing point of water. It is also strikingly exhibited by the following experiment: If a portion of water, say two ounces, be boiled in a flask capable of holding eight or ten, and if it be corked whilst briskly boiling, a vacuum will be formed on its surface, by the condensation of its vapour, on removing it from the lamp. As the steam condenses, the liquid in the flask will begin to boil more briskly as the flask cools; and if we pour *cold* water on this flask, the more will the pressure of the vapour in the flask be removed, and the more violently will the contained water boil. If now we pour *boiling* water on the flask, more steam will be formed, and the boiling will cease, but will be again renewed on a second application of the *cold* water. This may be alternated for several times if the flask be well corked.

As the boiling point of liquids varies exactly in the ratio of the barometrical pressure, it is obvious that the height of mountains may be ascertained by noting the thermometrical degree at which liquids boil on them. A portable instrument, constructed for this purpose, was devised by the Reverend F. Wollaston.

We cannot heat any liquid beyond its boiling point in an open vessel. Water placed on the fire soon rises to 212°, but a thermometer plunged in it remains at this point, however long it boils; but if the vessel be provided with a steam-tight cover, the temperature of the liquid may be much increased, according to the strength of the vessel. The elasticity of the steam in such cases is enormous; and experiments with steam under high pressure are hazardous, unless the vessel be of great thickness. The Marquis of Worcester seems to have burst a cannon by this means; and the frequent explosions of steam-engine boilers is a familiar instance of the same. Dr Black and Mr Watt heated water in a strong copper vessel to 400°; and in some of Perkins' experiments lead was melted, it is said, in water subjected to strong pressure; yet in an open vessel we cannot heat water to more than 212°.

Dr Black sagaciously and happily applied his doctrine of *latent heat* to explain the conversion of liquids into vapour. He remarked, that when a kettle was placed on the fire it soon rose to 212°; but though the same heat continued to be applied, it rose no higher. In one of his beautifully simple and conclusive experiments, a vessel containing some water, at temperature 50°, was placed on a red-hot iron plate; in four minutes it began to boil, but it required twenty minutes to convert the whole into vapour. In the first four minutes it had acquired an increase of 162° of temperature; and as the heat was uniform during the whole time of the experiment, it must have received an equal quantity of heat during the whole interval; or, during the other sixteen minutes, 810° must have flowed into it, yet during the whole time a thermometer in it rose no higher than 212°. Black naturally inferred that this large quantity of heat, which disappeared, had entered into the vapour in a *latent form.*

A series of experiments were undertaken by him, and by his friend Mr Watt, from which they inferred, that when water is converted into steam, it unites with 940° of heat, which the thermometer does not indicate; or, in Black's phraseology, that quantity becomes *latent* in the steam. This determination nearly coincides with the experiments of Lavoisier, who estimated the quantity which thus disappears at 1000° Fahr.

The absorption of heat during the formation of vapour is easily demonstrated. A piece of muslin moistened with any liquid, laid on the bulb of a thermometer, sinks the temperature; and if that liquid be very evaporable, the temperature thus produced will be low in proportion. The evaporation of æther will freeze water under the receiver of the air-pump; and the evaporation of the fluid called sulphuret of carbon is so rapid, that, in a well-exhausted receiver, it will freeze the mercury in the bulb of the thermometer.

A liquid may even, by particular management, be frozen by its own evaporation. This is the principle of Wollaston's philosophic toy, called the *cryophorus;* and it was ingeniously applied to an important practical purpose by the late Sir John Leslie, viz. the production of ice at a cheap rate in all climates. The apparatus employed by this philosopher is a powerful air-pump, which can at once exhaust from three to six flat receivers about twelve inches in diameter. These are fitted to different plates, each connected with the pump, and each provided with its own stop-cock. A shallow glass dish, nearly the width of the receiver, intended to hold a thin stratum of sulphuric acid, is introduced under each receiver, and a cup of porous earthenware, supported on a glass tripod about an inch above the surface of the acid, is under each receiver. Water is to be poured into this cup, which is to be placed on its tripod, and the whole covered by the receiver. By working the air-pump, each receiver may be exhausted in succession. The withdrawing of the atmospheric pressure causes the rapid evaporation of the water, the vapour of which is immediately absorbed by the sulphuric acid; and thus the vacuum is sustained. The latent heat necessary for the conversion of the water into steam or vapour is derived from the water itself; its temperature therefore falls; and the absorption of the vapour by the acid, as quickly as it is formed, keeps up the vacuum, and speedily reduces the whole water to the freezing point, when it soon forms a cake of ice. By a full-sized machine of this kind, about a quarter of an hour's labour will set the process in full operation; and within the period of an hour afterwards six pounds of solid ice may be obtained. During this process, the water loses only about one fiftieth of its bulk; and the acid will be sufficiently strong for repeated operations of the same kind.

Leslie showed, that any substance which is powerfully absorbent of watery vapour, may be substituted for the acid; and he found that highly toasted *oat meal,* or well-dried powder of *greenstone,* had very considerable power to produce ice, when employed instead of sulphuric acid. He even showed, that by enclosing a globule of mercury in a small pyriform mass of ice, suspended over the acid in a good vacuum, the mercury might easily be frozen.

The latent heat of steam may be shown by the large quantity of water which may be rapidly heated by a small

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quantity of steam. The elegant distillatory apparatus figured (No. 46) in Henry's Chemistry readily proves this. In an experiment with a similar apparatus, the condensation of one ounce of steam heated eight ounces of water from 60° to 180°; that is, the whole water gained 120° of temperature; consequently that ounce of steam had lost as much caloric as would have elevated an ounce of any fluid, capable of being so heated, to 960°.

The same phenomena attend the condensation of all other vapours; and we are to regard the discovery of Black, *that during the conversion of solids into liquids, or of liquids into vapours, heat is absorbed, which is again given out on their recondensation*, as a general law, and one of the highest importance, both in its practical application, and in explaining the phenomena of nature.

With regard to those aeriform bodies which we cannot condense, or, as they are called in chemical language, permanently elastic fluids or *gases*, we have every reason to consider them but as vapours, of which the point of generation is so low, that we have not yet found any means of exhibiting them in their unelastic state. This view is supported by analogy, and by recent discoveries. Some of the gases which a few years ago were reckoned permanently elastic, have been, by a great pressure, reduced to the state of liquids. This has been shown in the case of chlorine, muriatic acid, ammonia, and carbonic acid. It can also be shown that gases contain latent caloric. Thus, if we suddenly compress atmospheric air in a small tube fitted with a piston, so much heat is given out as to ignite touchwood. The sudden expansion of air, too, is always attended with the absorption of heat. Thus, on discharging an air-gun, the sudden expansion of the air produces a sensible degree of coolness in the condenser.

The same facts are shown when chemical action of the gases with each other produces condensation, or when they are evolved from their combinations.

The qualities of vapour are applied to many important purposes in the useful arts; and, on account of its economical fitness, the vapour of water, or *steam*, is that almost always employed.

The application of steam to domestic purposes is familiar to all; and it is frequently employed to communicate an equable heat, when a temperature above 212° would be injurious or dangerous. Thus steam, confined in metallic tubes, is used to dry some delicate articles of manufacture; and in some instances, where there is risk of explosion from even a moderate increase of temperature, the same contrivance is adopted. Steam has also been employed to warm apartments. It is employed to heat the dye-vats in calico-printing, and other species of dyeing, and has likewise been used for heating warm baths. For these last purposes, the steam is usually allowed to escape into the fluid to be heated by numerous small apertures in pipes coiled in the bottom of the vessel; which may thus be made of less costly materials than if it were necessary to subject it to the fire.

The most important application of steam, however, is as a moving power in the most stupendous of human inventions the *steam-engine*, the perfecting of which has conferred an enviable immortality on the name of WATT. The application of this noble discovery to the moving of machinery of every sort, from the ponderous hammers of the *forge* to the slender needles of the *tambouring frame*, to the drawing out and twisting the gossamer filaments of the cotton factory, to the weaving of cloth with a celerity that gives the process the air of enchantment, the winged velocity of the locomotive engine on the railway, and the stately mechanism which renders navigation independent of the winds, belongs to different branches of practical mechanics.

The conversion of liquids into vapour is the foundation of the important arts of *evaporation* and *distillation*. By the first we obtain salts from their solutions; by the latter, the spirituous or more volatile particles of compounds. See EVAPORATION and DISTILLATION.

Quantity of Heat in Bodies.

4. *Incandescence.*

When the temperature of a body is raised to a certain pitch, it begins to emit light as well as heat; and this is termed *incandescence*, or glowing heat; a designation preferable to *ignition*, which may be confounded with *combustion*; a process totally different from that treated of in this section, inasmuch as it is accompanied by important chemical changes in the body acted on; whereas incandescence may be repeated innumerable times with the same body, merely by raising its temperature. The point at which this takes place would seem to be the same in all bodies, and has been approximated by Newton; but as the determination depends on the acuteness of the eye, and the degree of obscurity in the apartment where the experiment is made, it is not easily fixed. According to his calculations, a good eye can perceive a body faintly luminous about 635° Fahrenheit; it shines with a full red in the dark about 752°, it is luminous in twilight at 884°, and glows in broad day-light when its temperature has reached 1000°. The experiments of Irvine, who found that mercury, which boils at 660°, is not in the slightest degree luminous at that point, prove that Newton fixed the point of incandescence too low. On the other hand, the determination of Wedgwood appears too high. In general the point of incandescence may be stated at about 800° Fahr. Its lowest pitch is at first a dull red, which becomes a full red with an increased temperature, or the least refrangible rays first meet the eye; if the heat be increased, these rays become mingled with the yellow; and, when the temperature is raised to the utmost, all the other rays of the spectrum are evolved in the proportions which constitute *white light*.

All solids which are not volatilized by heat may be rendered incandescent; and all liquids may be heated to redness, provided we can repress their volatility. But it has been doubted whether gases be capable of incandescence. Dr Fordyce had remarked that the extremity of the flame of a blowpipe, which was itself invisible, heated a thin rod of glass to a white heat; and some experiments of Mr T. Wedgwood prove that air, heated in a bent tube passing through a crucible filled with red-hot sand, was not luminous, although a gold wire suspended in the heated air became red. The speculations of Sir Humphry Davy on flame show that his opinion inclined to consider flame as luminous gases; but in all such cases there is reason to consider the light as derived from the combustible. Incandescence can be excited by the mere percussion of hard bodies against each other. Thus, two pieces of quartz struck together will produce light; the same will take place with two fragments of porcelain; and the light produced by the collision of flint and steel is partly incandescence, partly a species of combustion of the steel.

It has been supposed that incandescence affords a probable evidence of the identity or convertibility of heat into light. But this is not a legitimate deduction; for we may conceive that light and heat, though two distinct fluids, may have an intimate affinity for each other, or a tendency to unite, that both may exist united in all matter, that heat is most easily separated by percussion and friction, but that, when the percussion is violent, both are given out.

SECT. IV.—QUANTITY OF HEAT IN BODIES.

Equal weights of the same body, at the same temperature, contain equal quantities of heat; and when their tem-

Quantity of Heat in Bodies.

peratures are unequal, their heat is in proportion to their temperature. But it is very different with dissimilar bodies, which can be shown to contain unequal quantities of heat at the same temperature. The following is the method of proving these positions. If we mix a pound of water at 40° with a pound of water at 112°, the resultant is 76°, the mean between the extremes of temperature.

But if we mingle a pound of water at temperature 112° with a pound of mercury at 40°, the resultant temperature will not be 76°, the mean, but 109°. Here the temperature of the water has only been diminished 3°, yet that of the mercury has risen 69°. If we reverse the experiment, and take water at 40° and mercury at 112°, the product will be 43°; the mercury losing 69°, whilst the water only acquires 3°; or the same quantity of heat which can elevate the temperature of mercury 23° will only augment that of water 1°. If a similar experiment be made with spermaceti oil, Dr Thomson has shown (*System of Chemistry*) that the quantity of caloric which will elevate the temperature of the oil 2° can only raise that of water 1°.

Dr Black was undoubtedly the first who promulgated the idea of the absorption of heat during liquefaction and the formation of vapour; and this doctrine was publicly taught in his lectures in Glasgow university from 1757 to 1764. His pupil, Dr Irvine, continued these experiments at his suggestion, and ascribed the absorption to a change in the *capacity for heat*. These experiments were made between 1765 and 1770; and in 1779 Dr Adair Crawford published his treatise on *Animal Heat*, in which the capacities of numerous substances are given, which were corrected in his edition of 1788, from the results of most elaborate experiments. Professor Wilcke of Stockholm published some valuable experiments on the same subject, in the Stockholm Transactions for 1781. This philosopher introduced the term *specific heat* for what Irvine named *capacity for heat*. Various experiments on the same subject were made by Lavoisier and Laplace, with the instrument called a *calorimeter*, in which the specific caloric was estimated by the quantity of snow melted by different substances heated to the same pitch. The subject of experiment in their investigations was introduced into a wire cage suspended within a vessel of tinned iron. This vessel was filled with snow or ice; and to secure that snow from being melted by the external air, the vessel containing it was placed within another exterior case, and the space between them also filled with snow; and the whole covered by a lid, likewise covered with snow. Thus, if water in passing from 212° to 32° melted one pound of ice, and the same weight of oil melted a half pound; if the specific caloric of water be termed 1·0, that of oil will be 0·5.

A considerable series of experiments on this curious subject were made by Dr Dalton (*New System of Chemical Philosophy*). In these investigations Dalton pursued a method, also employed by Leslie, namely, to observe the comparative rates of cooling, as was proposed by Meyer. This would be preferable to the other modes of ascertaining the specific caloric, were we sure that the cooling of bodies is not influenced by other circumstances than their capacity; but in this method it is difficult to obviate the effects of radiation and conducting power on refrigeration. In all these determinations there are to be found discrepancies inseparable from the difficulties attending such delicate investigations; but they have sufficient accordance when we attempt to estimate the capacities of solids and of liquids. It is a far more difficult and delicate problem to determine the specific caloric of gaseous bodies, from the minute quantities of matter to be operated on in such experiments, and the difficulty of obviating the chance of accidental error where the changes of temperature are necessarily very minute. Crawford found the difference in the specific heat of the gases rarely to exceed $\frac{1}{10}$th of a degree of Fahrenheit. He employed two equal hollow spheres of brass, united by a bar of the same metal, and furnished with stop-cocks, and an adapting piece, to be screwed to an air-pump. One of these was filled with the gas to be tried, and the other was exhausted of air. Each ball had cemented into it a very delicate thermometer; both were heated to the same pitch by exposure to the same source of heat, conveyed by cylinders surrounded with warm water. They were then simultaneously plunged into separate vessels containing each equal quantities of cold water, and the elevation of temperature of the water in both vessels ascertained by delicate thermometers, indicating as small a change as $\frac{1}{30}$th of a degree of Fahrenheit. The temperature communicated by the vacuum being subtracted from that given out by the other ball, the difference exhibited the heat communicated by the included air alone; and the accuracy of the method was afterwards tested by again comparing them when the exhausted vessel was filled with atmospheric air.

The specific caloric of gases has been again investigated by Berard and Delaroche in 1813. They passed a current of each gas, at a given temperature, through a spiral tube, fixed in a cylinder of thin copper filled with water and then closed. The temperature communicated, by the passage of the gases from a gasometer through the spiral, to the surrounding medium in a given time, being proportional to the excess of temperature each gas acquires from the source of heat above that of the medium in the cylinder, the comparative specific heat of each gas may be ascertained.

For the success of such experiments the current of gas must be uniform, and the temperature of the gas, when entering and escaping from the cylinder, must be accurately ascertained, as well as that of the water in the copper vessel.

The conclusions of these philosophers are directly at variance with those of Crawford, and, indeed, would tend to overturn some of the most important points of the philosophy of heat now generally received. But these experiments, though highly ingenious, are not more satisfactory than those of Crawford. The only objection to his conclusions is derived from the smallness of the quantities operated upon in his experiments; but the simplicity of his apparatus, the delicacy of his instruments, and the apparent care of his manipulations, more than fully counterbalance that objection; whilst the complexity of the apparatus of Berard and Delaroche, the acknowledged difficulty of keeping up an equable current through the spiral tube, the impossibility of obviating in such investigations the influence of changes in the medium during the experiments, and the nicety requisite to ascertain the temperature of the entering and escaping currents, present sources of error of which it is almost impossible to estimate the amount. On these grounds we may consider the conclusions of Crawford as not yet overturned.

The deductions of these gentlemen would lead to the conclusion that all the gases, with the exception of hydrogen, have an inferior specific heat to water; and they even make steam *inferior* in capacity to water in the ratio of 847 to 1000. If this last were true, instead of an absorption of heat when steam is generated, we should have an extrication of caloric from it; and water in the *worm-tub* of a still, or in the *condensing-back* of a steam-engine, ought not to increase in temperature. It may be added, that more recently the conclusions of Berard and Delaroche have been controverted by Delarive; and his experiments, as well as those of Clement, support the opinions of Crawford.

Mr Haycraft (in a paper in *Trans. Royal Soc. Edin.* x.)

has endeavoured to show that all gases at the same temperature, when perfectly freed from moisture, have the same specific heat; and that when they are saturated with water, their specific caloric is a certain ascending arithmetical ratio, in proportion to the quantity of moisture they contain. These views are rendered not improbable by the well-ascertained fact, that the elasticities of all the gases are the same at the same temperature.

The capacities of bodies are more nearly in the inverse ratio of their density, than of any other sensible property. Thus solids in general have less capacity for caloric than liquids, and liquids less than vapours or gaseous bodies. In the same body a change of capacity accompanies a change of volume. Thus gases compressed have their capacity diminished, and heat is extricated; and when they expand, their capacity is increased, which is the cause of the coldness felt on a sudden expansion of the air. Crawford endeavoured to show that this was also the case with liquids; but his experiments are scarcely to be relied on as establishing that point. The contraction of Wedgwood's pyrometrical pieces would seem to diminish sensibly their capacity for heat. The capacity of bodies is not, however, exactly in the inverse ratio of their density, which probably arises from the effect of density on capacity for heat being modified by a difference in the force of affinity between caloric and various substances. There seems also to be some relation between capacity and power for conducting heat, as the former is nearly in the inverse ratio of the latter. If these views be correct, we may assume that the capacity of all bodies for caloric is directly as their volume and their affinity for heat, and inversely as their conducting power and their density.

When a body changes its form of existence, its capacity for heat is also changed. When a solid is melted, its capacity is increased, and the specific heat of the same substance is still further increased when it is converted into vapour. Thus, according to the best experiments, the capacity of ice is 0·9000, that of water being 1·000, and that of steam 1·500.

This important law was applied by Dr Irvine to explain the liquefaction of solids. Dr Black regarded the liquefaction as owing to the absorption of heat; Dr Irvine ascribed this absorption to a change in the capacity of the body. The first ascribed the melting of the solid to the absorption of the heat, whilst the other attributed the absorption to the change of form. As the change of form and the absorption or extrication of caloric are in such cases simultaneous, it is obvious that the question cannot be decided by direct experiment. It has been objected to Irvine's theory that it assigns no cause for the change of form, whilst Black's ascribes the change to the ingress of caloric. On the other hand, Black's theory does not explain why the heat is absorbed. When we heat a solid, the first effect is expansion, and this expansion keeping pace with the increasing temperature, a point will be attained when the expansion has so far overcome the cohesion of the solid that its particles move freely among each other, that is, when the body will become liquid. Thus far the change may be attributed to sensible heat; but the capacity of the body for heat has all the time been increasing, and, to satisfy this increased capacity, sensible heat has become latent. This appears the simplest view of the subject, ascribing the change of capacity to the expansion by the sensible heat; and the difference between the solid and fluid states may be conceived to depend on the prevalence of one of two opposing forms, the cohesive attraction of the particles of matter for each other, and the repulsive energy of caloric.

Dr Black has supposed that latent heat is retained in bodies by an affinity superior to that between sensible caloric and the particles of matter, and liquefaction is ascribed to this more intimate union. This opinion is scarcely perhaps reconcilable with the immediate effect of mixing ice cooled to 20° and water a little above the freezing point, when the water parts with its latent heat to raise the temperature of the ice; or with the effect of mechanical pressure in causing gases to part with their latent caloric.

Absolute Quantity of Heat in Bodies.

It will be sufficiently obvious, that neither by the thermometer nor by the capacity of bodies do we determine the whole heat which they contain at any temperature. The first is evidently nothing more than an indication of changes in a scale, of which the two extremes are unknown; the last mode affords us but the relative quantity of caloric required to elevate the temperature of other bodies compared to water, but it does not point out how many degrees any given temperature is above that point at which a body is deprived of all its heat. Irvine appears to have first conceived the idea of ascertaining by calculation the absolute zero, or deprivation of all heat, on the supposition that the whole heat in any body is proportional to its capacity. If this be granted, the whole caloric it contains at a given temperature may be found by ascertaining the quantity of heat it absorbs when passing from the solid to the liquid state. Thus ice has the capacity of 9 to water as 10, and, when both are at temperature 32°, water will contain one tenth more heat than the same weight of ice; but this excess is given out when water freezes, and as much is again absorbed when it melts. According to Black's experiment, ice absorbs as much caloric, whilst passing into water, as would elevate an equal quantity of ice-cold water 140° Fahrenheit. Therefore 10 × 140 = 1400°, will give the *natural zero*, or the point of the absolute deprivation of heat. Almost the same result is obtained by comparing the capacity of steam and water, viz. 1·0 and 1·5. Water, in passing into steam, absorbs 940° of sensible heat, and 940 × 1·5 = 1410.

The following general formula, as applicable to this investigation, is given by Professor Robison in his notes on Black's Lectures. Let the capacity of water be 1. Let the quantity of water be W, and its temperature be *w*. Let the quantity of the body whose capacity is tried be B, and its temperature be *b*, and the temperature after mixture be *m*. Then the

capacity of B $= \frac{W \times \overline{m - w}}{B \times \overline{m - b}}$. Or if the water be the hottest of the two bodies mixed, the formula is

$$B = \frac{W \times \overline{w - m}}{B \times \overline{m - b}}.$$

The accuracy of this conclusion, however, depends on three points: first, the perfect determination of the specific heat of water, and of its two other forms of existence, to which it is probably impossible to obtain any more than an approximation; secondly, on the assumption that the whole heat of bodies is retained in them by their capacity; and, lastly, on the supposition that while the body retains its form of existence, its capacity remains unchanged. Until these points be established, the theory is but an amusing speculation, in which the estimates of other philosophers do not materially differ from those of Irvine. Rumford, from experiments on the heat extricated by the combination of hydrogen and oxygen, placed the natural zero at 1552° Fahrenheit below the freezing point; Gadolin, from the cold produced by dissolving muriate of soda in water, inferred it to be at — 1432°.

Variations of Temperature.

SECT. V.—VARIATIONS OF TEMPERATURE.

1. *Artificial Means of Increasing Temperature.*

Caloric may be excited by the sun's rays collected by a lens or by a concave mirror, by friction and percussion, and by chemical action.

1. When we collect the sun's rays by a lens, it is well known that combustibles may thus be fired; and if the lens be large, it produces the most intense temperature we can command. In the focus of the powerful lens made in London for Mr Parker (which measured three feet in diameter, three inches thick at the centre, and weighed 212 lbs.), the most infusible metals were instantly melted and dissipated in vapour, and most stony substances were vitrified. Another, constructed at Paris, is described in the *Memoires* of the French academy. Lenses of great power have been also made of two curved plates of glass joined together, and filled with spirit of wine. A remarkable lens of this sort, formed by bending two plates of glass on a parabolic mold, and filling the cavity between them with ninety quarts of spirit, was constructed by Rossini of Gratz, in Styria. The diameter of the plates was 3 feet 3 inches, and they were united by a strong ring of metal. The whole was mounted on a heliostat, which, with the lens complete, weighed 550 lbs. This fine instrument cost about L.1000, but became, a few years ago, the property of the French government for L.338. In its focus a diamond was instantly kindled and dissipated; and a piece of platinum, twenty-nine grains in weight, was melted and thrown into violent ebullition.

Concave metallic mirrors are capable also of concentrating the sun's rays, so as to produce a powerful heat. Mirrors of hammered brass, or tinned iron, are used for experiments on the radiation of heat. It was by some combination of mirrors that Archimedes is said to have fired the Roman fleet at the siege of Syracuse; and Kircher, having found a description in Tzetzes, of the device of Archimedes, from which it would seem that the mirrors were placed on *hinges*, in order to adjust them to a focus, constructed a compound burning mirror of this kind possessing considerable power; but Buffon, by combining as many as 168 plane glass mirrors, six inches broad, showed that silver might be fused at the distance of sixty feet by such an instrument.

2. The capability of friction between two solids to excite heat is well known. In Rumford's experiments water was made to boil by the friction in boring a cannon; and the simple experiment of rubbing a smooth metallic button on a board, by which much heat is produced, is familiar to every school-boy. The firing of carriage-wheels, and of different kinds of machinery, whose parts, moving against each other, are not well oiled, is well known. This extrication of heat takes place *in vacuo* as well as in the air, and appears to be owing to the compression employed forcing the particles of the solid more closely together, and extricating their latent caloric. Berthollet showed that this extrication of caloric is not unlimited, as Rumford erroneously supposed; but that, if we repeatedly compress any body, the quantity of heat extricated rapidly diminishes by each application of the compressing force.

Percussion acts in precisely the same manner. A piece of iron, by smart hammering on an anvil, may become so hot as to fire combustibles. This process evidently diminishes the capacity of the iron for heat, its specific gravity becomes greater, and the loss of its latent heat renders it stiff and brittle. A similar change takes place in *wire-drawing* metals; so that, to restore pliability and ductility, we must subject them to the fire, which restores their latent heat, and renders them again ductile.

3. Chemical action is a fruitful source of increase of temperature. If we mingle together equal parts of sulphuric acid and water, or of alcohol and of water, the bulk of the mixture diminishes, and heat is given out. The temperature produced by chemical action will often ignite inflammables. Thus a drop of sulphuric acid on a mixture of chlorate of potassa and sugar will set the mixture on fire. Indeed, the process of combustion, the great source of artificial heat, is nothing more than the chemical union of the oxygen of the air with the combustible body. The source of the temperature is the liberation of the latent heat of the oxygen, on its entering into union with the carbonaceous matter of the fuel; and the increase of the temperature is in proportion to the air consumed in a given time. If we wish a higher temperature, we increase the quantity of air that passes through the fuel; hence the utility of bellows, and of the blowpipe, in exciting a higher temperature than the spontaneous combustion of the burning body would afford. See FURNACE.

Variations of Temperature.

2. *Artificial Means of Diminishing Temperature.*

There are three methods by which we can cool bodies; by placing them in contact with colder substances, by the evaporation of liquids, and by the liquefaction of solids.

1. The first method is very familiar, and depends on the tendency of caloric to an *equilibrium* in contiguous bodies.

2. The conversion of a body into vapour causes, by the increase of its capacity for heat, an absorption of caloric. Thus the evaporation of water from the ball of a thermometer causes the mercury to fall. If we apply a still more evaporable fluid, ether, the fall of the thermometer will be still lower; and, if we accelerate this process by an air-pump, the cold produced will be intense; the degree of the absorption of heat, or, in other words, the production of cold, being in proportion to the quickness of the evaporation.

3. The most powerful means of reducing temperature is by what are termed *freezing mixtures*. All these depend on the rapid melting of solids by the addition of various substances. Many experiments have been made on this subject by Lowitz of Petersburg, and by Mr Walker of Cambridge. Salts are the solids most commonly used, and they are in general either mixed with snow or with acids. Thus, if we mix common salt and snow together, the temperature falls to 0° of Fahrenheit. If we pour two ounces of nitric acid diluted with an equal quantity of water on three ounces of sulphate of soda, the temperature sinks below the beginning of Fahrenheit's scale. Equal parts of strong muriatic acid and of snow will produce a cold of -30° Fahrenheit; and the same proportions of diluted sulphuric acid and snow, if previously cooled down to 20°, will cause the freezing of mercury, reducing the temperature to -60°. Dry muriate of lime and dry powdery snow, in the proportions of two of the former to one of the latter, if previously cooled by immersion in salt and snow, will sink the temperature to -66°; and three parts of muriate of lime and two of snow, similarly treated, will reduce the temperature to -73°.

In all these experiments, it is the sudden conversion of sensible into latent heat that lowers the temperature of the mixtures; the substances assume the liquid form, their capacity for heat is increased, and the disappearance of the sensible heat is manifested by the sinking of the thermometer.

For the natural variations of temperature and their causes, see CLIMATE, and PHYSICAL GEOGRAPHY.

For various important facts and observations on heat, see Black's *Lectures on Chemistry*, vol. i.; Murray's *System of Chemistry*, vol. i.; Dalton's *Chemistry*; Leslie *on Heat*; Pictet *Sur le Feu*; Rumford's *Essays*; Deluc *Sur les Modifications de l'Atmosphère*; Saussure *Sur l'Hygrométrie*; Young's *Lectures on Philosophy*; Biot, *Traité de Physique*, i.; Martine *on Heat*; Crawford *on Heat*; Irvine's *Essays*; J. and G. Murray's *Popular View of Chemistry*; Mrs Somerville's *Connection of the Physical Sciences*; *Phil. Trans.*, 1754, 1777, 1783, 1788, 1792, 1795, 1799, 1800, and 1801; *Edin. Phil. Trans.*, vi., ix., x., xii., xiii.; *Ann. de Chim.*, 3, 14, 22, 29, 71, and 75; Nicholson's *Journal*, 4, 9, 11, and 12, 8vo series; *Journ. de Physique*, 61; *Ann. of Phil.*, 2, &c.; *Manchester Memoirs*; *Mémoires de l'Académie de Genève*, &c.

The theory of heat which ascribes this agent to motion among the particles of matter, and which has been distinguished by the name of *The Mechanical* or *Dynamic Theory of Heat*, was adopted by Count Rumford in 1778, and by Sir Humphrey Davy in 1799. Since that period it has been very ingeniously maintained by Mayer, in Liebig's and Wöhler's *Annalen* for 1842; by Mr Joule, before the British Association in 1843; by Mr John Macquorn Rankine; and by Professor William Thomson of Glasgow, in the *Edinburgh Philosophical Transactions.*

The principal fact on which Rumford founded his views is the high temperature exerted by friction in the boring of cannon; Davy adduced his experiment of the melting of two cakes of ice when rubbed together *in vacuo;* Mayer adduces the rise of 1° of the thermometer by the agitation of water in support of his views; Joule draws his conclusion from the heat produced by the friction of water running through a pipe, which he estimates at 1° for every pound of water moving with a force equal to raise a weight of 770 lbs. one foot.

Other arguments have been drawn from the still obscurely understood heating effects of magnetic electricity, and the analogies between radiant heat and light; to which last the undulatory hypothesis has been ingeniously applied. The views are specious, and by some are considered as satisfactory; so as to have converted the celebrated Melloni to the undulatory theory, which considers light and radiant heat as differing only in the length of their undulations. (T. S. T.)

HEATH. See BOTANY; nat. ord. *Ericaceæ.*

HEATHFIELD, LORD. See ELLIOT.

HEBE, in *Grecian Mythology*, the goddess of youth, and cup-bearer of the gods. She was the daughter of Jupiter and Juno, and is sometimes depicted assisting her mother in yoking her horses to her chariot. In her function of pouring out the nectar at the feasts of the gods, she was superseded by Ganymede; but she always retained her power of restoring the aged to the bloom and vigour of youth. In Rome she was worshipped under the name of Juventas, and a temple in her honour existed on the Capitoline Hill as early as the time of Servius Tullius.

HEBER, REGINALD, bishop of Calcutta, was born April 21, 1783, at Malpas in Cheshire. He was sent to the grammar-school of Whitchurch at the age of eight, and entered Brazen-nose College, Oxford, at the age of seventeen. In his first year there (anno 1800) his *Carmen Seculare* gained the prize for Latin verse, as did his *Palestine* in 1803 for English verse. In 1804—the year of his father's death—he was elected fellow of All Souls' College. In the following year he began his travels in Europe, visiting Sweden, Norway, Russia, and the Crimea. After an absence of more than a twelvemonth, he returned through Austria and Germany to England. Soon after he took the degree of M.A. he married Amelia, daughter of William Shipley, dean of St Asaph, and settled on the living of Hodnet in Shropshire. In 1812 he began a Dictionary of the Bible, and published a volume of poems. In 1815 he was appointed to deliver the Bampton lecture on "The Personality and Office of the Christian Comforter." In 1822 he was elected preacher at Lincoln's Inn. On the 16th June 1823, after having been made D.D. of Oxford by diploma, he sailed with his family for India, having been appointed to succeed Bishop Middleton at Calcutta. He landed at Calcutta on the 10th of October, and shortly afterwards consecrated the church of St Stephen at Dumdum. His first visitation in the cathedral at Calcutta was held on Ascension Day 1824. In May 1825 he held a visitation at Bombay. At Trichinopoly, on the 3d April 1826, he was found dead in his bath before breakfast, having been suddenly cut off by an apoplectic fit at the age of forty-three.

Bishop Heber gave early indication of that love for the classics, in the study of which he afterwards gained such high honours at college; for at the age of seven he had translated *Phædrus* into English verse. With a natural thirst for knowledge, a strong memory to retain what he once learned, and a glowing fancy, he possessed also the application necessary to develop these faculties into important results. Not possessing originality in the same degree, the classics became his model. For the exact sciences he had not the same relish. Logic, at least as unfolded by Aldrich, he even disliked. He had a taste for drawing and natural history. During his European travels he kept a copious journal of what he saw and read. Hence his voluminous correspondence with his friends contains the results of his close observations of the manners, customs, and superstitions of the people through whose countries he passed. He wrote a history of the Cossacks, contributed to the *Quarterly Review*, and published a complete edition of Jeremy Taylor's works, with a life and criticism. As an author he is most popularly known for his hymns and sacred pieces. These breathe a strain of the most exalted piety and Christian fervour; and in this accurately reflect himself.

But it is as the Christian pastor of Hodnet, and the apostolic Bishop of Calcutta, that Heber is specially entitled to our regard. From a very early age his mind was imbued with feelings of the deepest reverence for God. Prayer and reading of the Scriptures were attended to by him with exemplary regularity during the absorbing period of college life. When he returned from his travels in Europe, after his unusually brilliant career at Oxford, the path to literary fame was open to him, yet he preferred devoting himself to the humbler duties which devolve on the pastor of a parish. When disease was spreading through the district, Heber was still to be found at his post, visiting the sick, comforting the afflicted, relieving the distressed, and making known to all the way of salvation through Jesus Christ. An amiable temper, conciliatory manner, a benevolent heart, and a sound head, accompanied by such faithful discharge of duty, endeared him to all his parishioners.

Modest as he was, it is not remarkable that when he was offered the vacant bishopric of Calcutta his diffidence led him twice to refuse such a responsible charge. When, however, he did enter upon its duties, his whole energies were directed to the great work of evangelizing India. He travelled extensively, planting churches and encouraging the missionaries. Of his route through the upper provinces, between Calcutta and Bombay, a narrative was published in 2 vols. 4to. He also visited the Deccan, Ceylon, and Madras, carrying out with characteristic zeal the great object of his mission.

HEBERDEN, WILLIAM, a practical physician of great celebrity, was born in London in the year 1710. He was sent at a very early age, near the end of 1724, to St John's College, Cambridge. He took his first degree in 1728, and obtained a fellowship about 1730; he became master of arts in 1732, and took his degree in physic in 1739. He remained at Cambridge about ten years longer as a practitioner of physic, and gave an annual course of lectures on the Materia Medica. In 1746 he became a fellow of the Royal College of Physicians in London; and two years afterwards he left Cambridge, having presented to St John's College the specimens which had been subservient to his lectures. He also added to this donation, a few years afterwards, a collection of astronomical instruments of some value. Having determined to establish himself in London, he was elected a fellow of the Royal Society in 1769; and was employed in a very extensive medical practice for more than thirty years. When he became sensible that his age required some indulgence, he resolved to pass his summers at a house which he had taken at Windsor; but he continued his practice in the winter for some years longer. In January 1760 he married Mary, daughter of W. Wollaston, Esq., by whom he had five sons and three daughters; but he survived them all, except Dr W. Heberden, and Mary, married to the Rev. G. Jenyns. In 1778 he was made an honorary member of the Royal Society of Medicine at Paris.

Dr Heberden's first publication seems to have been a short essay on the incongruous composition of the mithridate and theriac, entitled *Antitheriaca*, 8vo, 1745. 2. He sent to the Royal Society an Account of a very large Human Calculus, weighing more than 2¼ lbs. avoirdupois (*Phil. Trans.* xlvi., 1750, p. 596; *Abr.* xi., p. 1005). 3. Account of the Effect of Lightning at South Weald, in Essex (*Phil. Trans.* liv., 1764, p. 198). Both these essays are erroneously attributed, in Dr Maty's index, to his brother, Dr Thomas Heberden of Madeira, who sent several other papers to the society. Dr Heberden was one of the principal contributors to the first three volumes of the *Medical Transactions*, published in a great measure at his suggestion, by the College of Physicians, in which we find about sixteen of his original communications. 4. Remarks on the Pump Water of London, 1768. 5. Observations on Ascarides. 6. On Night Blindness, or Nyctalopia. 7. On the Chicken-Pox. 8. On the Epidemical Cold of 1767. 9. Queries relating to bark, camphor, cold, the gout, and apoplexy. 10. On Hectic Fever. 11. On the Pulse. 12. On a Disorder of the Breast, the *angina pectoris*. 13. On Diseases of the Liver. 14. On the Nettle Rash. 15. On Noxious Fungi. 16. Queries on sizy blood, on hernia, on damp clothes, on venesection in hemorrhages. 17. On an Angina Pectoris. 18. On the Ginseng. 19. On the Measles. 20. Table of the Mean Heat of the different Months in London (*Phil. Trans.* lxxviii., 1778, p. 86). 21. *Commentarii de Morborum Historia et Curatione*, London, 1802, in 8vo; also in English. He had long been in the habit of making notes in a pocket-book, at the bedsides of his patients; and every month he used to select and copy out, under the proper titles of the diseases, whatever he thought particularly worthy to be recorded. In the year 1782 he employed himself in digesting this register into the form of a volume of *Commentaries* on the history and cure of diseases, religiously observing never to depend on his memory for any material circumstance that he did not find expressly written down in his notes. These Commentaries were intrusted to the care of his son, Dr W. Heberden, to be published after his death. We find in them a greater mass of valuable matter, accurately observed and candidly related, than in almost any other volume which has ever appeared upon a medical subject; yet they are but too likely to chill the ingenuous ardour of many a youthful mind, and even to lead to a total apathy with respect to the diligent study of a profession in which so respectable a veteran was so often disposed to exclaim that "all is vanity." There are, indeed, many instances in which he does not seem to have been perfectly master of all the instruments of his art: thus, he appears to have been but partially acquainted with the virtues and various uses of antimony and ipecacuan, and to have reasoned very inaccurately on the operation for a strangulated hernia. But it has been remarked, that the more experience a physician acquires in his profession, the more he is in general inclined to approach the opinions of Dr Heberden, and to esteem his writings.

Notwithstanding that he has been accused of having occasionally been liable to personal and professional prejudices, it may safely be asserted that he possessed a singular combination of modesty and dignity of character. He was not only a well-informed and accomplished scholar, but a man of the purest integrity of conduct, of mild and courteous manners, distinguished by genuine piety, and by unaffected benevolence of heart. It is related by one of his biographers, that he bought a sceptical work, left in manuscript by Dr Conyers Middleton, of his widow, for L.50, in order to burn it. He was at the expense of publishing another work of the same author on the Servile Condition of Physicians amongst the Ancients, as well as an edition of some of the plays of Euripides by Markland. He had an opportunity of rendering an essential service to Dr Letherland, a man of the deepest and most extensive learning and science that adorned the last century, but of retired habits, and very little known even in his own profession, though he contributed by his literary information to the popularity of more than one of his colleagues. Dr Heberden's extensive practice made it inconvenient for him to accept the appointment of physician to the queen; and the king, who had always shown him the greatest esteem and regard, readily adopted his disinterested recommendation of Dr Letherland as his substitute in the situation. He died on the 17th of May 1801, at the age of above ninety years, having exhibited at the close of his life the same serenity of mind which he had enjoyed throughout its course. (*Life* prefixed to his *Commentaries;* Chalmers' *Biographical Dictionary.*) (T. Y.)

HEBREW LANGUAGE. See PHILOLOGY, § *Hebrew Language;* ALPHABET, &c.

HEBREWS, EPISTLE TO THE. The authorship of this epistle has been greatly disputed. It has been ascribed to *Luke* by Origen, Jerome, and Philastrius; but, 1st, the similarity of style between this epistle and Luke's admitted writings is too general to support a claim of authorship. 2nd, Admitting Paul to have been the author of the epistle, such similarity of style as occurs between the epistle and Luke's writings could be easily accounted for by the fact that Paul and Luke were much associated together. 3d, The same resemblance between Luke and this epistle can be extended to the epistles which Paul is admitted to have written. Also Stuart and Eichhorn point out the preponderance of Jewish feelings, and familiarity with the Jewish schools, in the epistle over what is found in Luke's writings. Hence Luke is not the probable author of the epistle. Barnabas has been claimed by some as the author This view is supported somewhat inconclusively by Ullmann and Wieseler, the latter of whom has appended a long dissertation on the subject to his *Chronology of the Apostolic Age.*

An Alexandrian origin has been claimed by Eichhorn, Schulz, Bleek, and others, chiefly on account of the close resemblance between this epistle and the writings of Philo, an Alexandrian Jew. Stuart, however, has shown that there is nothing in the epistle which could not have been written by a person who had never quitted Palestine. It is alleged by Bleek that the author of the epistle makes a mistake about the furniture of the tabernacle (ix. 3, 4) which a Jew in Palestine would not have made; but Deyling has shown that there the mistake belongs only to those who have discovered it. The claims of Apollos to the authorship of the epistle fall to the ground with those for an Alexandrian origin. Apollos was first suggested by Luther, and in this the Reformer has been followed by Heumann, Bertholett, De Wette, Bleek, and Tholuck. Clement, Silas, and others, have also been proposed as the authors of the epistle.

The claims of the apostle Paul are founded—1st, upon the doctrinal correspondence between this epistle and his other writings. To him peculiarly belongs the doctrine, that Judaism was typical and temporary; while Christianity was typified and permanent. The glory of the Mediator, both in his humiliation and exaltation, is described in the Epistle to the Hebrews in the same manner as in Paul's admitted epistles. The word *Mediator* occurs only in the Epistle to the Hebrews and in Paul's epistles; so also the expression *the God of Peace*. So obvious are these resemblances in

Hebrews to what occurs in Paul's epistles, that even those who deny his claim admit that the author must have been one of his companions. But, 2d, many of the *figures* used in the Epistle to the Hebrews are Pauline: the Christian life is a *struggle*, a *race;* through Christ we have *access* with *confidence* to God; the *Word of God* is a *sword;* some Christians are only *children*, and to be fed with *milk;* others are *men*, to be fed with *strong meat.* 3d, Peculiarities of style favour the Pauline authorship. Paul is given to the use of *unusual words* in his admitted epistles; unusual words occur in Hebrews; so of paronomasia, and the tendency "to go off at a word" into a long parenthesis; also the manner of reference to Old Testament illustrations; and the multiplication of these references favours the Pauline origin. 5th, The concluding personal references of the writer of Hebrews accord with the supposition of the Pauline origin of the epistle.

The objections to the Pauline authorship are—1st, the difficulty of assigning a reason for the suppression of the name of Paul, were he the author. But the difficulty is just as great whether Luke, or Apollos, or Barnabas, or any other be supposed to have written the epistle. 2d, Eichhorn urges that the Epistle to the Hebrews is more logically reasoned than accords with the Pauline authorship. It is answered that the reasoning of the Epistle to the Romans is as closely logical as that in Hebrews. Tholuck urges that Paul nowhere calls Christ priest, shepherd, apostle, &c.; it is replied that Paul applies figurative appellations to Christ according to the peculiarities of the parties addressed. To speak of priests to Gentiles could not be done without explanation. It was quite otherwise in addressing Jews, who had a priesthood of divine appointment; so of other names.

As to external evidence, the Pauline authorship was universally received from the first by the Eastern Church. In the Western Church, however, it was not so universally adopted till the fifth century. The general result is—1st, no better claims can be urged than those of Paul; 2d, there is no decided obstacle in the way of his claims; and, 3d, both internally and externally the evidence preponderates in his favour.

The object of the epistle was to convince Jewish Christians of the superiority of Christianity over Judaism. It was written before the destruction of the temple.

HEBRIDES, The, or Western Islands of Scotland, consist of about 200 islands or islets, lying between N. Lat. 55. and 58. 51., and W. Long. 5. and 7. 52. Their ancient name was *Hebudæ* or *Ebudæ*, and the alteration was simply the result of a printer's error in an early edition of the works of the venerable Bede, published in Paris. From the census returns it appears that in 1851 the number of inhabited islands in the Hebrides was 79, having a population of 116,367; from 20 to 30 more are partially inhabited during the summer and grazing season. The most southern of the group are situated on the Firth of Clyde—as Bute, Arran, the Cumbrays, Lamlash, and Inchmarnoch. The geological formation of these islands includes granite, gneiss, slate, trap, sandstone, and limestone. Arran is peculiarly rich in attractions both to the geologist and botanist, and possesses highly picturesque scenery. The other islands are usually divided into the *Outer Hebrides*, or Long Island, and the *Inner Hebrides.* The former consists of the Lewis, Harris, North and South Uist, Benbecula, Barra, and a number of smaller islands—the whole length from Barra-Head to the Butt of Lewis being about 130 miles. The Inner Hebrides include Islay, Skye, Mull, Jura, Coll, Colonsay, Rum, Tiree, Ulva, Lismore, &c. The outer range consists almost exclusively of gneiss rocks, with poor soil and large proportions of moss and moor. The inner range is composed chiefly of trap and slate—"a basis," as is said by a recent authority, "for the most part of secondary sandstones and limestone, out of which have arisen from the fiery nucleus of the earth, enormous overlying, and, in some cases, overflowing masses and mountains of trap rocks, chiefly greenstone, sienite, basalt, hyperstene, and an endless variety of pitchstone, claystone, and felspar porphyries, with their associated crystals and minerals." The magnificent basalt columns and caves of Staffa are well known. The islands are not rich in minerals. Iron has been found in several of them, but the want of coal in sufficient abundance renders it of but nominal value. Lead exists, and was sometime wrought in Islay. In Skye and Tiree are marble quarries, which also were worked for a short time, but are now abandoned. There are excellent slate quarries at Easdale, Luing, Seil, Shuna, Lunga, &c.—a small and intricate group of islands annexed to Argyllshire, which, from the number of workmen employed, the workmen's houses, and vessels shipping cargo, present a busy and animated scene. The Outer Hebrides are almost wholly destitute of wood. For miles the eye ranges over tracts of dreary moss, though efforts have been made in Lewis to redeem the sterility of the soil. At one time the manufacture of kelp from the seaware afforded employment to the people of Barra, Harris, Lewis, Skye, &c., but the reduction of the duty on salt and barilla has nearly extinguished this branch of Hebridean trade. When Dr Johnson visited Skye in 1773, agriculture was neglected, and there was scarcely a vegetable grown on the island. Now arable farms, cultivated with care and skill, and gardens producing all the fruits and flowers grown in Scotland, are found. The mild and humid climate of the islands is peculiarly favourable to vegetation, and vast improvement has been effected. Arable cultivation, however, is in most districts considered subordinate to grazing and sheep-farming. The greater part of the surface consists of mountains incapable of cultivation. The valleys by which these mountains are intersected are narrow, and frequently covered with peat-moss, and the sides of the valleys are often too steep and rocky to be fit for tillage. But the most formidable obstacle to the profitable pursuit of corn-farming is the excessive humidity of the climate, which no industry can overcome, and no skill obviate. The drenching rains and cloudy skies for which the Hebrides are so notorious, frustrate the efforts of the cultivator in every stage of his operations. In winter the finer particles and every soluble and fertilizing ingredient in the soil are washed away; in spring the land cannot be brought to the requisite condition for receiving the seed; in summer the corn is etiolated and does not fill, and in harvest the process of ripening is retarded, and the crop is often little better than straw. In truth, the islands are essentially pastoral. Drainage and artificial manures have done much, and there are farms in Skye and Islay which may vie with any on the mainland, but the general characteristics of the islands are such as we have described. Rearing of cattle (which is carried on to a considerable extent) and sheep-farming seem to be the only sure and profitable occupations. Much of the land has been converted into sheep-walks, on which large flocks of Cheviot sheep are now reared, and sold at the Inverness or Falkirk trysts. The Crinan and Caledonian canals offer facilities for export and intercommunication; steamboats from Glasgow now visit most of the islands; and excellent roads, under the charge of a parliamentary commission, traverse the principal districts. The impulse which all these combined have given to trade and production need not be described. The moors and desolate tracts are often let at high prices to English sportsmen. Every year the passion for field sports, especially deer-stalking, seems to increase, and many Highland lairds derive a larger revenue from their moors than their grandfathers did from their whole estates. One great and permanent interest in the Hebrides is that of the fisheries. This has never been prosecuted with sufficient spirit or perseverance. The Lewis islanders are perhaps the most active;—of old, Barra was celebrated for its bold seamen and fishermen, but their descendants are sunk in apathy and poverty. To Lowland adventurers is left the chief harvest of these distant seas.

The scenery of the Hebrides may be generally described as partaking of the wild and sublime. Large masses of mountains, of all forms, tower up in the interior; and the coasts, indented by arms of the sea, are rugged and varied in outline. Skye is now a favourite resort of tourists. The Bay of Scavaig, Loch Coruisk, Glen Sligachan, and the Cuchullin Hills, are scenes of almost unexampled grandeur and picturesque desolation. The Spar Cave, with its lofty chamber and white translucent stalactite, and the mighty ocean-temple of Staffa, have no parallels. Spots of great beauty—green pastoral glens, sheltered bays and lakes, are interposed amidst the wildest scenes. Even among the rough rocks of Harris and Barra, enchanting marine views burst on the spectator. In winter they are terrible; but "what can be more delightful," asks a native of that solitary coast—the late Professor Macgillivray—"than a midnight walk by moonlight along the lone sea-beach of some secluded isle, the glassy sea sending from its surface a long stream of dancing and dazzling light, no sound to be heard save the small ripple of the idle wavelet, or the scream of a sea-bird watching the fry that swarms along the shores? In the short nights of summer, the melancholy song of the throstle has scarcely ceased on the hill-side, when the merry carol of the lark commences, and the plover and snipe sound their shrill pipe. Again, how glorious is the scene which presents itself from the summit of one of the loftier hills, when the great ocean is seen glowing with the last splendour of the setting sun, and the lofty isles of St Kilda rear their giant heads amid the purple blaze on the extreme verge of the horizon!" We may add that a sail on a summer day down the Sound of Mull, amidst the archipelago of islands, gigantic mountain-ranges in the distance, and by the shores, perched on projecting rocks and promontories, the ruins of Dunolly, Dunstaffnage, Duart, Ardtornish, Mingarry, &c.,—"chiefless castles breathing stern farewells,"—is an event never to be forgotten or remembered without emotion.

The original inhabitants of the Hebrides seem to have been of the same Celtic race as those settled on the mainland—the Scoto-Irish, whom Columba, about the middle of the sixth century, converted to Christianity. Scandinavian hordes then poured in, with their northern idolatry and lust of plunder, but in time they adopted the language and faith of the islanders, and were recognised as Earls of Orkney and Kings of the Hebrides and Isle of Man. The chief seat of their sovereignty was at Islay. About the year 1076 or 1096 died in Islay, Godred Crovan, King of Dublin, of Man, and of the Hebrides. He was succeeded by Olaus or Olave, and the daughter of Olaus was married to Somerled, or Sorlet (in Gaelic *Somhairle*, and corrupted by chroniclers into Sorli Marlady, &c.), who became the founder of the dynasty known as Lords of the Isles.[1] From the year 1156 to 1164, Somerled was styled Prince of Argyll *(Regulus Eregeithel)* and Lord of Kintyre. After a rebellion of twelve years against the Scottish monarch, Malcolm IV., he was slain in 1164, and was succeeded by his son Reginald, who styled himself Lord of Inchgall (the Western Isles), and also King of the Isles and Lord of Argyll and Kintyre. This Reginald, his son, and grandson, were monks of Paisley, and liberal benefactors to the monastery there. Angus Oig, the fifth of the race of Somerled, in 1306, after the defeat of Robert Bruce by John of Lorn, entertained the king for three days at his castle of Dunaverty, in South Kintyre. Previous to this many efforts had been made by the Scottish monarchs to displace the Norwegians. Alexander II. led a fleet and army to the shores of Argyleshire in 1249, but he died in the island of Kerrera. On the other hand the Norwegian sovereign was no less indignant at the independence assumed by the Jarls, or governors of the islands, and at the indignities offered to his subjects. King Haco or Hacon sailed with a great fleet and army to assert his rights. The exact date of his expedition is ascertained by a fact illustrative of the light thrown by science on history. The Norwegian chronicler remarked, that when the king lay with his fleet in Orkney, "a great darkness grew over the sun, so that only a little ring was bright round his orb." The eclipse was calculated, and found to have taken place on the 5th of August 1263. Haco's fleet was shattered by tempests in the Firth of Clyde, and the portion of his army which landed was defeated at Largs. The discomfited monarch retreated, passing the narrow strait between Skye and the mainland (which still bears the name of Kyle-Hacon, or Kyleakin), and reaching Orkney, died there on the 12th of December. Magnus, son of Haco, concluded a peace with the Scots (1266), renouncing all claim to the Hebrides and other islands, excepting Orkney and Shetland, and King Alexander agreed to give him a sum of 4000 merks in four yearly payments. It was also stipulated that Margaret, daughter of Alexander (then only four years of age), should be betrothed to Eric, the son of Magnus—a connection long remembered and lamented in Scottish song and story.

The race of Somerled continued to rule the islands, and from a younger son of the same potentate sprung the Lords of Lorn, who took the patronymic of Macdougall. John of Isle or Islay, between the years 1346 and 1354, first adopted the title of "Lord of the Isles." He was one of the most potent of the island princes, and was married to a daughter of the Earl of Strathern, Steward of Scotland. His son, Donald of the Isles, was memorable for his rebellion in support of his claim to the earldom of Ross. The chiefs of Mackintosh and Maclean joined his standard, but Donald was defeated or weakened at the battle of Harlaw, fought in July 1411, and was ultimately compelled to make submission, and abandon his claim to the earldom. His son Alexander resumed the hereditary warfare against the Scottish crown. The sceptre, however, was now in the firm and unrelenting hand of James I.; and the Lord of the Isles, after undergoing, with his mother, the Countess of Ross, imprisonment for a year, was fain to make abject submission, delivering up his sword on his knees. The son of Alexander, John of the Isles, soon however appears in an attitude of sovereignty, treating as an independent prince with Edward IV. of England. In 1462 was concluded, between John of Isle, Earl of Ross and Lord of the Isles, and King Edward IV., the treaty of Ardtornish, by which John, his son Donald Balloch, and his grandson John of Isle, became bound to assist King Edward and James Earl of Douglas in subduing the kingdom of Scotland. The reward promised for this high service was not great. They were to receive respectively, in time of war, L.200, L.40, and L.20 yearly; and in time of peace 100 merks, L.20 and L.10 sterling. The alliance seems to have led to no active operations, and the island king was adjudged to be a traitor to his liege sovereign of Scotland, and deprived of his earldom of Ross, which was annexed to the crown. In the reign of James V. another John of Isla resumed the title of "Lord of the Isles," but was compelled to surrender the dignity. He afterwards laid siege to the Castle of Ellandonan in Ross-shire, and was slain with an arrow. The glory of the lordship of the Isles—the insular sovereignty—had departed. From the time of Bruce, the Campbells had been gaining the ascendancy in Argyll. The Macleans, Macnaughtons, Maclachlans, Lamonts, and other ancient races had sunk before this favoured family. The lordship of Lorn was wrested from the Macdougalls by Bruce, and their extensive possessions, with Dunstaffnage Castle, bestowed on the king's relative, Stewart and his descendants, afterwards Lords of Lorn. The Macdougalls, at a subsequent period, regained possession of their ancient residence, Dunolly Castle, but this branch of the house of Somerled was never reinstated in its former importance. The Macdonalds of Sleat, the direct representatives of Somerled, though driven from Islay and deprived of supreme power by James V., still kept a sort of insular state in Skye. There were also the Macdonalds of Clanranald and Glengarry (descendants of Somerled), with the powerful houses of Macleod of Dunvegan (*Siol Tormod)*, and Macleod of Harris *(Siol Torquil)*, M'Neill of Barra, and Maclean of Mull.[1] Fierce sanguinary feuds continued throughout the 16th and 17th centuries among these rival clans and their dependent tribes, and the turbulent spirit was not subdued till a comparatively recent period. James VI. made an abortive attempt at the colonization of Lewis. William III. and Queen Anne attempted to subsidize the chiefs in order to preserve tranquillity, but the wars of Montrose and Dundee, and the Jacobite insurrections of 1715 and 1745 showed how futile were all such efforts. It was not till 1748, when a decisive blow was struck at the power of the chiefs by the abolition of heritable jurisdictions and the appointment of sheriffs in the different districts, that the arts of peace and social improvement made way in these remote regions.

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[1] Worsaae's *Danes*. *Origines Parochiales Scotiæ*, Bannatyne Club, 1854.

The change was great, and at first not unmixed with evil. It was no longer the interest of the chief to surround himself with a host of dependents. His strength lay in money, not in arms. A new system of management and high rents were imposed, in consequence of which numbers of the tacksmen, or large tenants, emigrated to America. In twenty years, from 1772 to 1792, about 6400 persons left the country, carrying with them, in specie, at least L. 38,400. The exodus continued for many years. Sheep-farming, on a large scale, was next introduced, and the crofters were thrust into villages or barren corners of the land. The consequence was, that despite the numbers who entered the army, or emigrated to Canada, the standard of civilization sunk lower, and the population multiplied in all the islands. The people came to subsist almost entirely on potatoes and herrings; and in 1846, when the potatoe blight commenced its ravages, a scene of nearly universal destitution ensued. The population of Skye, which Johnson, in 1773, considered too great for the means of subsistence, had swelled from 15,000 to 24,000; and of these, 8000 (one-third) demanded and received relief from the Destitution Fund nobly provided by the British nation. In Tiree there were 1400 people who paid no rent and had exhausted the fuel on the island. Over the islands, generally, the proportion of destitution was in the ratio of 70 per cent. of the population. Temporary relief was administered in the shape of employment on roads and other works; and an emigration fund being raised, from 4000 to 5000 of the people, in the most crowded districts, were removed to Australia, where labour, and the reward of labour, awaited them. The condition of the islanders at home is still deplorable. To elevate them must be the work of many years; and a still more extensive family emigration seems necessary as a preliminary step. Education in the English language is also required, to which should be added the prosecution of the fisheries on a better basis, and the colonization in the Hebrides of east coast fishermen (descendants of the industrious and hardy Shetlanders and Scandinavians) in eligible fishing stations.

Hebrides, *New*, a group of islands in the Pacific Ocean. See Australasia (vol. iv., p. 265).

HEBRON, a very ancient city of Palestine, in the tribe of Judah, 18 miles S. of Jerusalem. Its most ancient name was Kirjath-arba, *i. e,* "the city of Arba," so called from Arba, the father of Anak and of the Anakim, who dwelt in and around Hebron. The patriarchs Abraham, Isaac, and Jacob resided much at Hebron, and are there entombed. The ancient city lay in a valley; and the two remaining pools, one of which at least existed in the time of David, serve with other circumstances to identify the modern with the ancient site. David on becoming king of Judah, made Hebron his royal residence, and reigned here seven and a half years. Its modern name is *El Khulib*, "the friend" of God, the title by which the Moslems designate Abraham. In modern history Hebron is chiefly noted for the part taken by its inhabitants in the rebellion of 1834, and the heavy retribution which it brought down upon them. They gave battle to Ibrahim Pasha near Solomon's pools, but were defeated, and retired within the city, which was taken by storm, and given over to sack and pillage. The town of Hebron lies low down on the sloping sides of a narrow valley. The houses are all of stone, high and well-built, with windows, and flat roofs, on which are small domes, sometimes two or three to each house. The streets are narrow, seldom more than two or three yards in width. The bazaars and shops are well supplied with commodities. It has nine mosques, the principal of which is the massive structure built over the tombs of the patriarchs. This is esteemed by the Moslems one of their holiest places, from which Christians are rigorously excluded. Hebron has long been noted for the produce of its glass-works, consisting chiefly of glass lamps, many of which are exported to Egypt. Pop. variously estimated from 5000 to 10,000.

HEBRUS, now the Maritza, the largest river in Thrace, rises in the high ground between Mounts Scomius and Rhodope. It flows in a S.E. direction from its source to Hadrianople; from that city to the sea its course is almost due S. It falls into the Ægæan nearly opposite the island of Samothrace, and forming at its mouth the Palus Stentoris. Unlike most of the rivers in Greece the Hebrus is navigable for about two-thirds of its course. Small craft sail up as far as Philippopolis. Its principal tributaries are the Artiscus (Bujuk-déré), the Agrianes (Ergene), Contadesdus (Saradjala), and Tearus (Tekedéré). It was at the source of the Hebrus that Darius erected a pillar with an inscription to the effect that its waters were the purest and best, just as he himself was the fairest of men.

HECATÆUS, one of the earliest of the Greek historians. He was sprung from a noble family of Miletus; his father's name was Hegesander. The dates of his birth and death are not ascertained; but he is known to have taken part in the counsels of the Ionians when they were deliberating to throw off the Persian yoke. He tried to dissuade his countrymen from this attempt; and as he was well acquainted with the strength and resources of the Persian empire, he dwelt on the hopelessness of a contest with so powerful an antagonist. His advice was neglected, and the consequence followed which he had predicted. This fixes his *floruit* about 500 B.C. Like Herodotus, Hecatæus seems to have visited foreign countries, and to have described, from personal observation, their physical characteristics, and the manners and customs of their inhabitants. His works were of three kinds, historical, genealogical, and geographical, and were held in some esteem by the ancients. Herodotus sometimes refers to him as an authority. The numerous fragments of his works which have come down to us have been collected by Creuzer in his *Historicorum Antiquissimorum Fragmenta.* (See *Mémoires de l'Académie des Inscript.*, tom. vi., p. 475; Vossius *de Hist. Græc.*, p. 440; and Ulrici, *Charakteristik der antiken Historiographie*, Berlin, 1833.)

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[1] The M'Neills were originally of Irish origin. It is related that when the chief dined, a horn was sounded from the battlements of the castle tower in Barra, and a herald proclaimed, "Hear, O ye people, and listen, O ye nations! The great M'Neill of Barra, having finished his meal, the princes of the earth may dine!" The charters granted by the Macdonalds ran in a similar mock-heroic strain:—"I, Macdonald, give you a right to your farm from this day till to-morrow, and every day thereafter, so long as you have food for the great Macdonald of the Isles."

HECATE, in *Grecian Mythology*, the name of a mysterious goddess, who, in many of her attributes, bore a strong resemblance to Diana. Her power was at one time so extensive that she was identified with several other deities, such as Proserpine, Ceres, Cybele, and especially Diana or Artemis. Her statues were set up in cross-roads and in front of houses. She was worshipped with peculiar honours at Athens and Ægina, where she was regarded as the patron goddess of the domestic hearth. The sacrifices offered to her consisted chiefly of black lambs, dogs, and honey. (See Diana.)

HECATOMB, in *Grecian Antiquity*, signifies, according to its etymon, an offering of a hundred oxen. Even before Homer's time, however, the word had lost its strict etymological meaning, and was employed to denote generally a great public sacrifice. Homer himself (*Il.* vi., 93) talks of a hecatomb of twelve oxen; and again (*Il.* i., 315), hecatombs of oxen and rams; and even (*Il.* xxiii., 146) a hecatomb of fifty rams. Later writers used sometimes to reckon even the votive gifts under the hecatomb. (See Sacrifice.)

HECATOMBÆON, in *Grecian Antiquity*, the first month in the Attic year, answering to the last half of our July and the first of August. It took its name from the great festival of the Hecatombæ, at which hecatombs were offered.

HECHINGEN, a city of Germany on the Starzel, 31 miles S.S.W. of Stuttgart. It was capital of the sovereign principality of Hohenzollern-Hechingen, which was ceded to Prussia in 1849. Pop. about 3400.

HECLA, a volcano of Iceland. See Iceland.

HECTARE. See France, § *Weights and Measures.*

HECTOGRAMME. See France, § *Weights and Measures.*

HECTOLITRE. See France, § *Weights and Measures.*

HECTOMETRE. See France, § *Weights and Measures.*

HECTOR, in *Grecian Story*, the most valiant foe that the Greeks had to encounter in the siege of Troy. He was the eldest son of Priam and Hecuba, and of all the Trojan chiefs was the wisest in counsel and the bravest in the field. During the whole continuance of the siege he was the bulwark of his country, devotedly meeting all risks, and bravely encountering all odds. He slew some of the most distinguished leaders of the Grecian host, and fought on equal terms with Menelaus, Ajax, Diomede, and others. His last exploit was his conquest of Patroclus, the friend of Achilles, whom he slew and stript of his armour. The death of Patroclus roused Achilles from the lethargic indifference which he had maintained since he had been insulted by Agamemnon. He sought out the slayer of his friend, and Hector fell in the encounter. His victorious foe dragged his corpse three times round the walls of Troy; but the body was preserved from injury by the gods. Some of the scenes in which Hector takes part are among the finest in the Iliad. Such are his interview with his brother Paris, and afterwards with his wife Andromache and his son Scamandrius at the Scæan gate (book vi.); his final combat with Achilles; and after his death, the interview of his aged father with that chief concerning the ransom of the slain hero's body. The *Iliad* closes with the description of the funeral rites and games in his honour.

HECUBA, the daughter of Dymas (Hom. *Il.* ii., 718), or of Cisseus (Eurip.), or of the River Sangarius and Metope (Apollodor. iii., 12, 5), was the second wife of Priam, and had by him nineteen sons and a great number of daughters. Of the sons, the most celebrated were Hector, Paris, Deiphobus, Helenus, Polydorus, Troilus; and of the daughters, Polyxena, Cassandra, Creüsa, and Laodice. When Hecuba was pregnant of Paris, she dreamed that she had brought into the world a burning torch, which reduced her husband's palace and all Troy to ashes. This dream was interpreted to mean that the son she should bring into the world would prove the destruction of his country. To avoid this, she exposed Paris as soon as he was born; but he was saved by shepherds, and afterwards acknowledged by his parents. During the Trojan War she witnessed the death of nearly all her children, and at last saw her husband murdered before her eyes. (Virg. *Æn.* ii.) When Troy was taken, Hecuba fell to the lot of Ulysses. They set sail and landed in the Thracian Chersonnesus, where Hecuba learned that her son Polydorus had been murdered by Polymnestor, the ancient friend of the Trojans, to whom Priam had sent him. She proceeded with some Trojan women to the house of Polymnestor, put to death two of his sons, and tore out his own eyes. Polymnestor foretold to her that she would be changed into a she-dog, and would leap into the sea at Cynosema. The tradition further says, that under this form she ran for a time howling through Thrace, till she was at length stoned to death by the inhabitants.

HEDGEHOG. See index to Mammalia.

HEDJAZ, El, a district of Arabia. See Arabia.

HEDWIG, Johann, a distinguished German botanist, was born in 1730 at Cronstadt, in Transylvania. He early lost his father, and was obliged to fight his way as he best might through his medical course. This he did manfully and honourably. After graduating at Leipzig he returned home, only to find that it was not lawful for him to practise with a foreign diploma in the Austrian dominions. He then removed to Chemnitz in Saxony; and thence, in 1781, to Leipzig, where he published his great work on the mosses under the title of *Fundamentum Historiæ Naturalis Muscorum.* This work secured him the chair of botany at the university, when it fell vacant in 1789. He held it till his death in 1799. Hedwig was an excellent observer; one of the best, indeed, of last century. In microscopic researches his skill was pre-eminent. Two valuable qualities in an observer he combined in a very unusual degree—memory and keenness of eye-sight. Besides his *Fundamentum*, he wrote many other scientific works and papers, nearly all bearing on his favourite study, but none of them approaching in value the important work with which his fame is now identified.

HEGEL, George Wilhelm Friedrich, was born at Stuttgart, on the 27th of August 1770. At the age of eighteen he entered the University of Tübingen. During his philosophical and theological curriculum he was the chosen friend of Schelling, who, though his junior, at this time far outshone his destined rival. He took his degree in 1793; and for the following eight years was engaged as a private tutor, partly in Berne, and partly in Frankfurt-on-the-Maine. During this period he entered deeply into those theological, historical, and political studies, the results of which in after-life gave so much lustre to his peculiar system. But his mind was already becoming more and more exclusively bent towards philosophy. The death of his father in 1799 having left him in possession of some property, he gave up private teaching, and in 1801 went to the University of Jena with the view of qualifying as an academical lecturer. At this time his earliest publications were issued (Jena, 1801), viz., his *Habilitations-Schrift, De Orbitis Planetarum;* and an essay—*Ueber die Differenz des Fichte'schen und Schelling'schen Systems.* Soon after he embarked, along with Schelling, in the publication of the *Critische Journal der Philosophie.* During the six following years he was engaged in the preparation of the earliest of his larger works, the *Phænomenologie des Geistes* (Bamb. 1807). In 1806 he was made professor of philosophy at Jena. But the disastrous campaign of that year drove him to Bamberg, where for two years he was editor of a political journal. In 1808 he became rector of the Academy of Nüremberg. During the last four years of his residence there he issued the second of his great works—*Wissenschaft der Logik* (Nürem. 1812–16). In 1816 he was removed to a chair of philosophy at Heidelberg. Here he published his *Encyclopædie der Philosophischen Wissenschaften* (Heidel. 1817). In 1818 he at last reached a position where his genius found full scope and appreciation. He was called to Berlin, to fill the chair of Fichte; and here he remained till his death, the acknowledged chief of the German philosophers. Men of all ranks and professions, even from foreign countries, flocked to his lectures. A school of zealous disciples formed around him. In 1827 a review (*Jahrbücher für Wissenschaftliche Critik*) was established as the organ and advocate of his doctrines; and through the influence of the minister Von Altenstein, his scholars came to occupy many of the professorial chairs in the Prussian universities. Thus honoured and rewarded, Hegel survived till 1831, when he was cut off by cholera (14th November), in the sixty-first year of his age. During this period he had published his *Grundlinien der Philosophie des Rechts* (Berlin, 1821). Soon after his death a complete edition of his works was commenced by a number of his scholars. Besides those published in his lifetime, this issue included his lectures on the *Philosophy of Religion*, on *Æsthetics*, on the *Philosophy of History*, and on the *History of Philosophy;* and also a copious *Life* of Hegel by Rosenkranz, forming the last volume of the series. It was completed in 1844, in 18 vols. octavo.

Hegel did not stand alone; he stood at the culminating point of German philosophy, towards which there had been a continuous progress ever since the days of Kant. That great thinker, in opposition to the reigning sensationalism of his time, had chiefly devoted himself to the investigation and vindication of our *a priori* principles of knowledge;—of those principles, regulative and constitutive, *analytic* and *synthetic*, which depend upon experience only (as the spark in the flintstone depends upon the steel) as the occasion of eliciting them into conscious recognition, and which, moreover, being prior to experience in the order of thought and of nature, though posterior to it in the order of time, are necessary in order to the possibility of experience itself. But while vindicating, with a hitherto unequalled power and success, the independence of our *a priori* knowledge to experience, Kant left experience itself and its *a posteriori* products on a very unsatisfactory footing. He held that the *data* of the *sensory*, of perception internal and external, must be recognized as valid for practical purposes; but he refused to recognize their truth and validity within the sphere of speculation. As he was thus confessedly unable to bridge over the gulf between the internal and the external, the ideal and the real, his system was one of virtual idealism. The Gordian knot which Kant thus failed to untie was boldly cut by the subjective idealism of Fichte. Beginning with the admitted impossibility of establishing the existence of an external world, Fichte carried it out to this conclusion, that for man there *is* no external world; that as no other thing *is known* to him, so in fact no other thing *exists for* him, but his own mind; that self, or the "*ego*," is the universe. The objective idealism of Schelling was an attempt to deliver the human spirit from the prison-house of the *ego* in which it had been thus pent up by Fichte. The question was, how to find a way out of it to the knowledge of something beyond. The good old way of common sense, external perception, was not to be thought of. Accordingly, Schelling hit upon the old Platonic figment of *intellectual intuition—Anschauung*—a state of cognition in which the soul transcends the ordinary conditions of thought and limitations of being, and gazes directly upon the unconditioned, the self-existent, the *absolute.* This absolute, the object of intuition, has a real existence beyond the knowing subject. At the same time subject and object, ideal and real, though diverse, are identical; they are but opposite poles of the same universal subject, of the one, true, indivisible, absolute object—the living soul of the universe. Thus the solid footing which Kant had failed to find for metaphysics was sought by Fichte and Schelling in the knowledge of the absolute. Fichte assumed this transcendent reality as existing in man himself; Schelling, as—phenomenally, at least—manifesting itself *ab extra.*

Only one step further remained to be taken; that step was taken by Hegel. He, too, seeks to solve the same problem by an assumed knowledge of the absolute. But this absolute with him is not a universal *substance*, as with Spinoza; or *self*, as with Fichte; or a universal *mind* or *subject*, as with Schelling. Hegel's absolute is neither matter nor mind, neither a substance nor a subject, external nor internal; but *a process*, even the process of thought itself. The constitutive principle of his system is the identity of thought and existence. And it is not merely that the ideal and the real *are* identical, as in the system of Schelling; it is this *relation* of identity that is the sole reality—the absolute itself. And again, it is not merely that the absolute may be recognized, as by Schelling's *Anschauung*, as uniting in itself the subject and object; it is this *recognition* that *constitutes* the absolute, because it is only in this conscious recognition that the unity is realized or brought into being. Thus, the process of apprehending, and the object apprehended, the absolute thought and the absolute existence, are one; all being is represented by the term absolute idea; this process, thought, or idea, is the ground of all existence, embracing in its bosom, as its possible developments, God, the universe, and man.

Having thus indicated the marvellous results, let us now revert to the method by which they have been reached. This is the more necessary in the present case, because it is its method, or dialectic, which forms the distinctive peculiarity of the Hegelian system. In fact, Hegel's aim at first was, not so much to establish a new system, as to give scientific form and method to the somewhat loose materials thrown out by Schelling. Hegel's genius was severely systematic; and the *Anschauung* which his illustrious friend had invented as an organ of constructive thinking, was to him only a stumbling-block. It grieved him to see the absolute arrived at in this arbitrary way—"shot," as he himself expressed it, "out of a pistol." So, in place of this intuition, he resolved to substitute a rigidly dialectic method. With this view, he first of all (in his *Phaenomenologie*) instituted an inquiry into the process by which, in point of fact, man does arrive at the knowledge of the absolute. This process, both in the individual mind and in that of the race, he found to embrace three distinct epochs—three successive, progressive, and mutually connected stages of intelligence. The *first* is that of pure and simple sensational intuition; in which the subject is barely conscious, being aware of no object, but merely of a "here" and a "now." The *second* is that of perception or understanding; in which the subject and object appear as diverse and contrasted; in which they are regarded only as opposites or contraries; in which the thinker regards the objects of his thought as having an independent existence, and forming a world distinct from the thought itself. The *third*, last, and highest, is that of *absolute thought.* Here the point of view is reached from which man attains to the knowledge of the absolute The multiplicity of the second epoch or stage now disappears, by being brought back into a unity—*a unity which consists in the recognized identity of the seemingly contrasted opposites.* But this recognition is now no longer, as in the first epoch, a mere undeveloped sensation; it is an act of thought, carrying along with it a distinct consciousness of the seeming or phenomenal diversity of the things thus brought into one.

But we have not merely thus reached the point of view from which the absolute is descried, or, in other words, that absolute thought in which the absolute consists. In so doing we have also discovered the *regulative principle*—that of the *identity of contraries*—which has presided over its genetic development. This principle or law is the immanent fate or inborn necessity of thought. By the force of this law the subject in its first stage is eternally constrained to project itself into an object; and the contrast thus produced gives birth to the second stage. But by the same law the thinker or thought is made to seek for the recognition of the unity of these apparent contraries; and in seeking and finding their unity the last and highest stage of thought is reached. Further, in thus discovering the development of thought, we have also found the law of the history of *being*. For thought and existence are identical. And therefore the principle of the identity of contraries, in being the law of thought, is also the law of things; and thus we have the materials, not only of a logic, but also of a metaphysic; the faithful application of this one law will enable us to deduce, from the bare idea of being, a true history of actual things, a complete system of the universe.

This, in fact, is what Hegel professes to have accomplished. His only postulates are, the identity of thought and existence as a *constitutive*, and the identity of contraries as a *regulative* principle. This regulative principle guides him through all the departments of human knowledge, in all their details and ramifications. Everywhere he finds the same rhythm endlessly repeated, the one unvaried trilogy of, first, the idea simply; then, the idea of opposites as contrasted; and then, the contraries returning into a recognized unity. In thus following out his principle to its results he has shown wonderful dialectic skill, and at the same time lighted incidentally upon many views of real value to true philosophy. Let us illustrate his principle by its application. By his self-imposed limitation, he feels compelled to begin with the barren, empty idea of being, eviscerated of all contents, and in fact equal to nothing; and from this *Seyn=nichts* to develop the universe in the following manner:—1st, We have pre-supposed the bare idea, being, or thought (for they are identical), as yet undeveloped, and recognizing nothing beyond itself. 2d, The immanent necessity of its own law causes thought to project itself into externality or objectivity; and thus gives to us *nature*, and the philosophy of nature. 3d, Under the impulse of the same necessity, the thought, or idea, or being, is carried to its completed evolution, by a regression to the primitive unity, but now a unity that is consciously recognized; and this self-consciousness gives *mind*, and the philosophy of mind. Thus the universe is produced; and by the same method we arrive at all its varied details.

Speculations so shadowy, unsubstantial, and wildly remote from men's living sympathies and interests, might safely be allowed to pass away unrecorded into their native dreamland, if it were not that certain of their practical consequences, or rather of their practical aspects, invest them with a deep, and even a tragic interest. We might perhaps be disposed to recoil from the view which this system gives us even of what we are accustomed to speak of as the material world; for surely to describe nature as being merely one of the manifestations of thought, is not to *explain* nature, but to substitute a shadow in its place. This, however, might be tolerated, side by side with the ingenious speculations of our own Berkeley. It is only when we look upon the great realities of the spirit-world in the light of the Hegelian pantheistic idealism, that its frightful consequences fully unfold themselves to our view. In reviewing Hegel's deduction of the universe from the abstract idea (or being=nothing), we naturally inquire, Where is *God* to find a place in this system? In answer to this, we are told that he is in the universe, as the soul is in the body, "all in the whole, and all in every part." The absolute thought or existence itself is God; who, therefore, reaches self-consciousness and personality only in the person and consciousness of man. This is, in effect, to affirm that there is no God—*i.e.*, that there is no personal, supreme, intelligent being, distinct from and presiding over the universe; that creation and providence are not the actions of a free agent, but the mechanical operation of a *nothing*, obeying the constraining power of the law of the identity of contraries. To say that though God is not a person, yet he is personality realizing itself in man, is only to say that the only vestige of divinity in the universe is an attribute of what we are accustomed to regard as one of God's imperfect creatures. And while man is thus seemingly exalted with one hand into a god, with the other he is reduced to a phantom. For man is thus not a separate, independent person, endowed with a free will, and responsible for his actions; he is but the absolute thought in its highest manifestation, ever moved only by the power of the supreme regulative principle of all existence. Human history is not the progression of the free, but the necessary evolution of thought, according to the same all-pervading law of the identity of opposites. And not only is man thus stripped of his distinctive attribute, that of freedom and responsibility, he is at the same time robbed of his distinctive hope, that of immortality. There is, no doubt, a verbal admission of man's immortality, as there is also of God's personality. For, it is said, as God finds his personality in man (by being degraded into the finite), so man finds his immortality in God, by having his being absorbed in the infinite, by sinking back into unconsciousness. Thus man finds immortality by *ceasing to be*, by losing his personality; even as God, in order to *begin to be*, in order to find personality, has to lose his infinity by becoming identified with evanescent humanity. God is but a shoreless, soulless, thoughtless ocean of being, ever striving to come into personal existence in the consciousness of men. The generations of men, past, present, and future, are but the separate waves, or rather, the froth on the crest of the waves of the endlessly evolving tide, destined, each one in succession, to pass away into oblivion and nonentity, as they sink back and are absorbed in the ocean whose heavings gave them a momentary and phantastic existence. Having thus bereft humanity of its three grand moving powers—a personal God, a free will, and a real immortality—it only remained that Hegelianism should extend its baleful influence into the sphere of revelation. And this has not been left undone. While preserving the terminology of orthodox Christianity, and even while professing to be a devout adherent of the Lutheran Church, Hegel contrived to torture the Bible itself until it became a witness for his absolute idealism. Thus the doctrine of the Trinity is that of absolute thought, developing itself in the three-fold movement prescribed by the law of contraries. The fall of man is simply a departure of the absolute idea into a state of objectivity or externality; redemption is a method of restoring the unity thus lost between the soul and God—*i.e.*, between the phenomenal opposites; and the church and its ordinances are the means by which their reunion is symbolized and realized.

The followers of Hegel have been divided into three parties. The "extreme right" endeavour to harmonize the speculations of the Hegelian philosophy with the doctrines of Christianity, to philosophize with their master, and believe with the orthodox Christian. How this can be effected, or even attempted by a sane mind, it is hard for a British intellect to fathom. The "centre" party, again, hold by the principles of Hegel, and deduce from them their legitimate logical results—among other things, the subversion of the historical truth of Christianity. But even here we find evidence of that strange obliquity of intellectual and moral vision which, in those of the "extreme right" we might regard as a misfortune arising from their false position. One of the "centre" (Strauss), avowedly in application of the Hegelian principles, has made a formal attempt to overthrow the authority of the gospels, and reduce their contents to the rank of mythic fables. Thus far might have been expected. But what we cannot reconcile with the supposition of his possessing the feeblest sense of moral distinction is, that this coryphæus of infidelity *was a doctor in divinity!* A third party, the "extreme left," though not shining among the great lights of philosophy, is yet important because of its extended ramifications in Germany, in France, and even in Britain. But while this party have adopted the negative and destructive results of Hegelianism, they have departed altogether from its real principles, spirit, and method. Hegel himself would be the last to recognize as his legitimate offspring the spurious brood of gross materialistic atheism and red republicanism which has assumed his name.

The fontal error, from which consequences so disastrous have flowed, is found in Kant's refusal to hold as valid for speculation the products of experience, the data of the *sensory*, of perception and reflection. This refusal was grounded upon the fact that these *a posteriori* judgments are not, like the *a priori*, possessed of the qualities of universality and necessity. While the German philosophers, down to Hegel, were unfolding the results of this one-sided system, another, and a wiser, though a humbler philosophy, in Scotland, while vindicating as vigorously as they against sensationalism, the idealistic, or *a priori* portion of our knowledge, was no less firmly contending for the reality and validity of the *a posteriori* or contingent elements given in perception and reflection. It was asserted that the only authority, that of consciousnesss, which we possess for the truth of the *a priori*, speaks no less emphatically for the truth of the *a posteriori;* and that, therefore, if upon that authority we accept the one as true, we must also accept the other; if we reject either, we must reject both.

But while a direct refutation of the Kantian error was thus being prepared in Scotland, an indirect, and perhaps a more effective one, was being prepared in Germany itself. In the hands of its own adherents the principle that would reject our experience, in being carried out to its full legitimate results, found a *reductio ad absurdum.* Their fundamental principle, that nought is to be held as valid for metaphysics which does not possess the *criterion* of necessity and universality, renders metaphysic impossible. For metaphysics is the science of being; and being can be made known to us only as *contingent.* All being, all actual concrete existence—God, the world, man, personality, identity, freedom, responsibility—is made known to us, and can be made known to us, only as logically contingent; as something that is; as a matter of fact or history. Being, therefore, can be revealed to us only *a posteriori* through experience—*i.e.*, through the medium of external and internal perception. And thus, in rejecting experience as a source of knowledge, Kant deprived metaphysics of all its possible *materials.* That which remains, the law of contradiction and the causal judgment, is purely formal. These *a priori* principles may themselves be elaborated into the formal sciences of logic and induction; they may give form to matter obtained through experience; but they can never themselves give to us any knowledge of existing things—of an object or objects to be constructed into a science of the actual. Thus we are shut up to a philosophical *rationalism*, compelled to find in our discursive reason itself, not only the principles, but also the constituent elements of our knowledge. It is vain with Fichte and Schelling, after having dethroned intuitive reason in its normal exercise of perception and reflection, to seek for the lost materials of knowledge by such expedients as the "*Anschauung*"—*i.e., the same intuition*, but now, in an arbitrary acceptation, and a confessedly abnormal exercise—the same mind, but now raised to a preternatural and extranatural elevation, to which, although the ascent were possible, no mortal could *be known* to ascend, nor would be able to bring down the results of his exstatic vision so as to render them intelligible to the world below. Hegel clearly saw that this *Anschauung* was but a makeshift. He carried out the rejection of experience to its legitimate results. In his system alone can rationalism be consistent with itself. It is only where *thought* is *existence*, where *logic* is *metaphysics*, that metaphysics not based on experience can exist. But as soon as it thus exists it ceases to be. For in asserting that thought is not only the *organ*, but also the whole *material* and *substance* of our knowledge of the actual, we are at the same moment admitting that this knowledge has *no* material whatever. And thus the coryphæus of idealism is the nemesis of sensationalism; while carrying a false philosophy to its last extreme Hegel has vindicated the true; he has done modern philosophy the service of furnishing, the most impressive refutation, while presenting the most completely and consistently developed exposition, of the German speculative idealism. (J. M'G.)

HEGIRA (from the Arabic *hajara*, to desert), a Mohammedan epoch, dating from the expulsion of Mohammed from Mecca, July 16, A.D. 622. (See CHRONOLOGY and MOHAMMED.)

HEIDELBERG, an ancient and interesting city of Southern Germany, in the grand-duchy of Baden, and circle of the Lower Rhine. It stands in one of the most beautiful spots in the whole of Germany, on the left bank of the Neckar (here spanned by a covered bridge of nine arches, and more than 700 feet in length), about 12 miles above its confluence with the Rhine at Mannheim; N. Lat. 49. 25., E. Long. 8. 42. The town is picturesquely situated at the foot of the finely wooded hills which slope towards the river, while the rising grounds on the opposite bank are covered with the richest vineyards. To the S. is the Königstuhl, or king's seat, which, since it was ascended in 1802 by the Emperor Francis, has been called the Kaiserstuhl. On the top of this hill, which is 2000 feet high, a tower has been erected, from which charming glimpses of the distant Rhine are to be had. In fine weather the spire of Strasburg Cathedral, 90 miles distant, is plainly visible. The streets of the town, which diverge nearly all from one central street, the Haupt-strasse, are narrow and gloomy; and the interest attaching to the great public buildings is more historical than artistic. All the splendid monuments of architecture in which it once abounded have long since perished in the many bloody wars, sieges, and conflagrations, from which the town has suffered so terribly. Of the extant buildings may be mentioned the church of the Holy Ghost in the market-place, which is divided by a partition wall, so that the Catholic and Protestant services are conducted simultaneously in the different compartments; and the church of St Peter, the oldest in the town, and memorable as the scene of the daring exploit of Jerome of Prague, who hung up on its gate his celebrated thesis, in which he attacked the doctrines and practice of the Church of Rome. In the adjoining churchyard is the tomb of the learned Olympia Morata, whose history in many respects resembles that of the celebrated Hypatia. There are two other churches of inferior interest, and a Jewish synagogue. The university, of which the buildings stand in a small square near the centre of the town, is, with the exception of that of Prague, the oldest in Germany, having been founded in 1386. The number of students that flocked to it at one time was very great; but their annual average is now not more than about 700. In the departments of law and medicine it still maintains its ancient renown. Mittermeyer the jurist, and Tiedemann the anatomist, are acknowledged to rank among the first of modern authorities on their respective subjects. Near the university is the library, which contains 150,000 volumes, besides numerous and valuable MSS. The famous Palatine library, sacked and pillaged in the Thirty Years' War, was partly restored in 1815 by Pope Pius VII., to whose predecessors a portion of it had been sent as a present by the Bavarians. There is a tradition that Tilly the imperialist general, being in want of straw for his cavalry after the storming of the town, used the invaluable MSS. of the elector's library to litter his horses. In a suburban building, formerly a Dominican convent, are good museums of anatomy and zoology. By far the most interesting relic of the past in Heidelberg is the castle, once the residence of the electors palatine, and a magnificent combination of the palace and the fortress. It is now in ruins, but is sufficiently well preserved to show the tastes of the different occupants, who added to it the architectural styles of the successive centuries, and the horrors of war in the three conflagrations and ten sieges which it had to undergo. In the beginning of last century it was rebuilt and restored to its old magnificence; but in 1764 it was set on fire by lightning, and burnt to the ground, and since that time it has continued to crumble away an untenanted ruin. In one of the cellars is the famous Heidelberg tun, constructed in 1751, and able to contain 800 hogsheads of wine. It has never been filled, however, since 1769. The view to be obtained from the castle-rock is in its way one of the finest in Europe, and has afforded the material for many a poet's song.

The causes of the decay of Heidelberg are not difficult to trace. In 1622, the era of the Thirty Years' War, it was taken by Tilly after a month's siege, and delivered over to plunder for three days. Eleven years later it was recovered by the Swedes, who did the town nearly as much damage as the Austrians had done. But the cruelties and brutalities of this period were far surpassed by those which devastated the town at the close of the seventeenth century, when the French under Turenne turned the whole palatinate into a desert. In 1688 the town was again stormed and plundered by the French under Melac, in comparison with whom the brutal Tilly was a humane commander and a generous foe. Five years later Melac was in his turn outstripped and left behind by Chamilly, whose fiendish excesses have made the French name a byeword of horror and execration in Germany to this day. It is matter of wonder that after such a history Heidelberg should exist at all. It is a place of no commercial activity, and is increasing very slowly. Were it not for the students and the visitors, whom the beauty and cheapness of the place attract in considerable numbers, the general stagnation would be complete. Pop. about 15,000.

HEILBRONN, a fortified town of Würtemberg, formerly a free imperial city, on the right bank of the Neckar, 26 miles N. of Stuttgart. The most interesting of its buildings is the church of St Kilian, a Gothic edifice with a beautiful tower (225 feet high), the lower part of which was built in the thirteenth century, the upper part in 1529. The town-hall is an antique building, in which some interesting ancient records are deposited; and in the outskirts of the town is the tower in which Götz von Berlichingen was confined in 1525. The house of the Teutonic knights is now used as a barrack. Heilbronn has a gymnasium, public library, and a richly endowed hospital. The vicinity produces a tolerably good wine, and the town itself carries on an extensive transit trade between Frankfürt and South Germany. Its chief manufactures are woollen cloths carpets, tobacco, silver articles, and chemicals. Pop. about 10,000.

HEILIGENSTADT, a town in Prussian Saxony, capital of a cognominal circle in the government of Erfurt, 32 miles E.N.E. of Cassel, on the Leine. It has a castle, gymnasium, normal school for Roman Catholics, five churches, and two orphan asylums. Its chief manufactures are woollen yarns and wooden clocks. Pop. (1849) 5240. Under the French Heiligenstadt was capital of the department of Harz.

HEINE, Heinrich, a distinguished German poet and miscellaneous writer, was born at Dusseldorf, Dec. 13, 1799. His father was a Jewish merchant in that city, in circumstances so humble that without the aid of a wealthy brother in Hamburgh he would not have been able to educate the future poet. On leaving school in 1819 the young Heine became a student of law at Bonn, where he wrote the now forgotten tragedies of *Almansa* and *Ratcliffe*, and some short miscellaneous pieces. In the following year he removed to Göttingen, which in a little while he exchanged for Berlin, where he mixed with the fashionable literary circles. In 1823 he returned to Göttingen, and in due time he graduated there as doctor of law. He first attracted notice as an author by his *Reisebilder* (Pictures of Travel), begun in 1826 and finished in 1829. His *Buch der Lieder* (Book of Songs), extended his reputation; and when the expulsion of the old Bourbons from France in 1830 seemed to point to Paris as the future centre of political action and liberty in continental Europe, Heine established himself in that city, and remained there till his death, Feb. 18, 1856. It was in Paris that he wrote his *Salon*, and *Romantische Schule*, two collections of poems entitled respectively *Neue Gedichte* and *Romanzen*, and his *Vermischte Schriften* (Miscellaneous Works), published in 1854. During the ministry of Guizot he enjoyed a pension of 4000 francs from the French government.

Since the days of Voltaire there has been no such scoffer as Heine; and were it credible that his cynicism was wholly genuine, Voltaire might in comparison with him be almost called an orthodox Christian. Nothing that men have ever considered sacred or estimable has escaped his sneer. Christianity of course he mocked at; and when in his latter years he professed himself a convert to it, it was discovered from his own *Confessions* that he had not embraced Christianity, but had merely ceased openly to countenance atheism, because it had grown vulgar. He alternately mocked and praised every generous and noble sentiment; and he found an endless subject of scoffing in the diseases that confined him almost entirely to his bed during the last eight years of his life. The very agonies of mental and physical torment that he underwent he seemed to delight in intensifying by describing them in their minutest details, and then laughing at them and his own descriptions of them. His poetry repays perusal better than his prose, which is often flippant, epigrammatic, and merely smart; but his poetry is in a style peculiarly his own. "Other bards," says a recent critic, "have passed from grave to gay within the compass of one work; but the art of constantly showing two natures within the small limit of perhaps three ballad-verses was reserved for Heine. No one like him understands how to build up a little edifice of the tenderest and most refined sentiment for the mere pleasure of knocking it down with a last line. No man like him approaches his reader with a doleful countenance, and pours in the ear a tale of secret sorrow, and when the sympathies are enlisted, surprises his confidant with a horse-laugh." He ridiculed with merciless sarcasm the very democracy of which he had been at one time the apostle and the martyr.

HEINECCIUS, Johann Gottlieb, one of the most learned jurists of Germany, was born at Eisenberg in Saxony, Sept. 21, 1681. His life is totally unmarked by any event or incident of importance. He held a chair first of philosophy and afterwards of law at Halle, from which in 1724 he was transferred to a similar chair at Franeker in West Friesland. He next migrated to Frankfort-on-the-Oder, where he remained till 1733, when he once more resumed his professorship at Halle, where he died in 1741.

A list of his numerous works will be found in the *Bibliothèque Germanique*, tom. ii., part 1st. The principal are—*Fundamenta styli cultioris una cum Sylloge exemplorum*, Halle, 1719, in 8vo; *Elementa Philosophiæ Rationalis et Moralis, quibus præmissa Historia Philosophica*, Francfort, 1728, in 8vo; *Antiquitatum Romanarum Jurisprudentiam illustrantium Syntagma juxta seriem Institutionum Justiniani*, Halle, 1718, in 8vo; *Elementa Juris Naturæ et Gentium*, Halle, 1738, in 8vo; *Prælectiones Academicæ in* H. Grotii *de Jure Belli ac Pacis libros*, Berlin, 1744, in 8vo; *Prælectiones Academicæ in* Sam. Puffendorf *de Officio Hominis et Civis*, ibid. 1742, in 8vo; *Historia Juris Civilis Romani ac Germanici*, Halle, 1735, in 8vo; *Elementa Juris Civilis secundum ordinem Institutionum*, Franeker, 1725, in 8vo; *Elementa Juris Civilis secundum ordinem Pandectarum*, Francfort, 1756, in 2 vols. 8vo; *Elementa Juris Cambialis*, Amsterdam, 1743, in 8vo. The works of Heineccius were collected and published by Uhl, professor at Frankfort-on-the-Oder, under the title of *Opera ad Universam Jurisprudentiam, Philosophiam, et Litteras humaniores pertinentia*, Geneva, 1744–48, in 8 vols. 4to, reprinted in the same city, with additions, 1771, in 9 vols. 4to; and to these two editions a supplementary volume was at the same time added. After the works of Cujas, this collection is perhaps the most valuable and necessary to a student of jurisprudence. The commentary of Heineccius on the Julian and Papian laws would alone suffice to place him in the rank of the greatest jurisconsults; and if his authority has decreased somewhat in Germany, which we believe to be the case, it is because his successors, profiting by his researches, have been enabled to surpass him. We are also indebted to Heineccius for editions of the *Jurisprudentia Romana et Attica*, Leyden, 1738, in 3 vols. folio, with a learned preface prefixed to the first volume.

HEINSIUS, Daniel, a distinguished Dutch scholar, was born at Ghent, of a noble family, in 1580. The Low Countries were then distracted by civil wars, which compelled his father to fly with him for safety to England. After a short residence in that country, the family returned home, and the young Heinsius was sent to Franeker to study law. He soon exchanged law for Greek, however, and removed from Franeker to Leyden to enjoy the tuition of Joseph Scaliger. After holding some minor appointments at that university, he was made professor of politics and history at the age of twenty-five, and, on the death of Paul Merula, librarian and secretary of the university. His editions of the classics made him so famous that his services were courted by nearly every crowned head in Europe, but he steadily refused to leave his country, whose historiographer he had now become. In 1618 he acted as secretary to the synod of Dort, having already distinguished himself in the theological controversies of the day. In his later years he suffered greatly from the failure of his memory. He died Feb. 23, 1655. His works consist of—Editions of the Greek and Latin classics, or works of criticism connected with them, amounting to eighteen in number—Latin poetry, particularly *Iambi; Auriacus*, a tragedy; *Herodes Infanticida*, also a tragedy; *De Contemptu Mortis*, a poem in four books; fugitive pieces under the titles of *Extemporanea* and *Juvenilia*, and some Greek poems; Latin harangues, which have been collected under the title of *Orationes Varii Argumenti*, Leyden, 1615, 1620, in 12mo; *Rerum ad Sylvam Ducis atque alibi in Belgio aut a Belgis anno* 1629 *gestarum Historia*, Leyden, 1631, in folio. (J. B—E.)

Heinsius, *Nicolas*, was the son of Daniel Heinsius, and obtained nearly equal eminence with his father as a scholar. He was born at Leyden in 1629, and was educated there by his father, as well as by Grotius, Gronovius, and other celebrated scholars. In 1642 he visited England previous to commencing a literary tour through France, Italy, and Sweden. In 1659, on the invitation of Queen Christina, he settled at Stockholm, and remained there till his father's death in 1655 recalled him home. After his return to Sweden he was in 1667 sent as ambassador to the Czar of Moscow, from which he returned with broken health and spirits. The remaining ten years of his life he spent for the most part in Holland, and died at the Hague, October 7, 1681. His principal works were his *Claudian*, with notes, Leyden, 1650, in 12mo, and Amsterdam, 1665, in 8vo; *Ovid*, with notes, ibid., 1652, 1661, 1668, in three vols. 12mo; *Virgil*, without notes, Amsterdam, 1676, and Utrecht, 1704, in 12mo; *Valerius Flaccus*, without notes, Amsterdam, 1680, in 12mo; Remarks on Silius Italicus, Petronius, and Phædrus; A great number of Letters, which may be found in the *Sylloge Epistolarum* of Burmann, in 5 vols. 4to; *Poemata*, the best edition of which is that of Elzevir, Amsterdam, 1666, in 8vo, dedicated by the author to the Duke of Montausier. Peter Burmann the younger also published *Nic. Heinsii Adversariorum, libri v.*, followed by the notes of Heinsius on Catullus and Propertius; and the same author also cites inedited notes of Heinsius on Tacitus, on the dialogue *De Claris Oratoribus*, and on the *Catalecta veterum Poetarum*.

HEIR-AT-LAW, is a person who succeeds to another by descent. Both in England and Scotland, estates, in the absence of a different special destination, descend to heirs in the direct line, however remote. The exclusion of parents, until the extinction of all descendants, both direct and collateral, is almost peculiar to the laws of these kingdoms. By the Jewish law, on the failure of issue, a father succeeded to his deceased son, to the exclusion of the son's brothers, unless one of them married and had issue by his widow. By the Roman law, on the failure of children or lineal descendants, the father and mother, or other lineal ascendants succeeded, together with the deceased's brothers and sisters. As a consequence, however, of the feudal system in Britain, a landed estate descends to sons, in the order of their seniority—the issue of the elder son always excluding the immediate younger son, and so on through the whole sons. It is only in default of such issue that daughters succeed, and then they succeed equally. The children of a deceased child in the order now mentioned, represent the parent, and exclude all relatives which such deceased parent, if surviving, would have excluded. By this rule the son of an eldest son, and failing him and his issue, the daughters of an eldest son, equally among them, and their descendants, exclude the other sons and daughters of the ancestor, and so on through all the ancestor's children. On the entire failure of lineal descendants, the estate goes to collateral heirs—that is, the ancestor's immediate younger brothers in the order above mentioned, and their issue; failing whom it goes to his sisters equally and their issue. On the entire failure of collateral descendants, it goes to the ancestor's father, then collaterally to the ancestor's uncles and their descendants; whom failing, to his aunts (the latter equally) and their descendants. It is only on the failure of all these, that the succession opens to the grandfather, and next to his relatives. There is no succession by or through the mother, unless the estate came from her. In Scotland where an estate is not acquired by inheritance, it is called conquest; and in all competitions among brothers or uncles, or their descendants regarding conquest, it is not the immediate younger brother or uncle, as in heritage, who succeeds, but the immediate elder brother or uncle.

Heir *by Destination*, sometimes called "heir of provision," is a person called to succeed by the will of the proprietor, either directly, or on the failure of persons to whom the estate is primarily conveyed. Any absolute proprietor executing a conveyance of his estate, can regulate the order of succession; but unless the specified destination be protected and enforced by certain legal prohibitions and re-

Heir-apparent
||
Helena.

straints, attention to which require all the skill of the practised conveyancer, a hope of succession is merely created, which may be defeated by each heir as he enters on the possession.

Heir-*apparent* is a person so called in the lifetime of his ancestor, whose right of succession is indefeasible, provided he outlive the ancestor; as the right of the next heir to the throne, or to an estate under a deed of entail, or under the marriage-contract of his parents.

Heir-*presumptive* is one who, if his ancestor should die under existing circumstances, would be his heir, but whose right of succession may be defeated by various contingencies, such as the subsequent existence of a nearer heir, even though by posthumous birth, or the special conveyance of the estate by the ancestor to a different person.

HELDER, a fortified seaport town on a projecting tongue of land at the N. extremity of North Holland. It is separated by the Mars diep from the island of Texel, and stands 40 miles N. W. of Amsterdam. It commands the Mars diep, the channel to the Zuider Zee. East of the town is the fine harbour of Nieuwe diep, accessible to the largest ships. It is connected with Amsterdam by the Helder Canal, by means of which the largest merchant vessels reach Amsterdam without encountering the difficult navigation of the Zuider Zee. This canal is 50 miles in length, 125 feet broad at the surface, and 21 feet deep. The Dutch admiral, Van Tromp, was killed in an engagement off Helder in 1693. It was taken by the British under Sir Ralph Abercrombie in 1799. Pop. about 2900.

HELENA, the daughter of Leda (wife of Tyndareus, king of Sparta), and of Jupiter, who, under the form of a swan, had obtained the favours of the queen. In consequence of this amour she produced two eggs, from one of which sprang Castor and Clytemnestra (both mortal, as being children of Tyndareus), and from the other Pollux and Helena, who were considered immortal, as the offspring of Jupiter.

From her infancy she possessed that dazzling beauty which became in the course of time so fatal to her admirers. About the age of ten she was carried off by Theseus, who concealed her at Aphidnæ, in Attica, under the protection of his mother Æthra. She was rescued by her brothers, Castor and Pollux, who discovered her place of concealment by means of Academus. They carried off at the same time Æthra, who henceforth remained the captive slave of Helen. This adventure did not prevent her from being sought in marriage by all the young princes of Greece. The most celebrated of her suitors were Menelaus, Diomede, Philoctetes, Idomeneus, Merione, Amphilochus, Patroclus, the two Ajaxes, Teucer, Antilochus, Ulysses, with others to the number of thirty. Her father, Tyndareus, was alarmed at the number of her suitors, believing that the preference he showed to one would bring on him the displeasure of all the rest. He was relieved from this dilemma by Ulysses, on condition he should receive the hand of his niece Penelope in marriage. His advice was to bind all the princes by an oath that they would yield implicitly to the will of the princess, and that they would unite to defend her if any attempt should be made to carry her off from the arms of her husband. The rivals consented, and Helen decided in favour of Menelaus, who thus became the heir apparent, and soon afterwards possessor, of the throne of Sparta. By her he had a daughter, Hermione, and two sons, Morrhaphius and Diethus.

Venus had promised to Paris the possession of the most beautiful of women. At her instigation, he proceeded to Sparta during the absence of Menelaus, and succeeded in gaining the affections of Helen, and in inducing her to quit her husband and her country. It was in vain that Menelaus sent to Troy to demand back his wife, in vain that the sons of Atreus threatened that all Greece would march against Troy. During the celebrated Trojan War she remained faithful to Paris, and had by him Bunichus, Agane, Idæus, and Corythus. On the death of Paris she married Deiphobus, the bravest of the sons of Priam after Hector; and on the taking of Troy, she is said to have betrayed him in order that she might ingratiate herself with Menelaus. It appears that Menelaus forgave her, and that they proceeded on their way to Sparta, where, according to some, they did not arrive till the space of eight years had elapsed. Here they received the visit of Telemachus, who had been sent by his mother in search of his father Ulysses. And here the legend of Homer ends. According to Euripides, she was killed by Orestes, her son-in-law, or she was banished by her step-sons, Megapenthes and Nicostratus, when she retired to the island of Rhodes, where she was suffocated in a bath.

Helena, St.

Helena, *St*, the mother of the Emperor Constantine, was born of humble parents in Bithynia. The place of her birth was the little town of Drepanum which her son afterwards raised to the dignity of a city, under the name of Helenopolis. Reasons of state compelled her husband (Constantius Chlorus) to divorce her when he assumed the purple in A.D. 292; but she was amply compensated for this indignity by her son Constantine. After her conversion to the Christian faith, which seems to have been effected by her son, she made a pilgrimage to Jerusalem, where she is said to have discovered the Saviour's tomb, and the real wood of his cross. She exhibited so many virtues and so much Christian zeal and charity, that in due time after her death, which happened in A.D. 328, she was canonized by the church.

HELENA, St, an island in the S. Atlantic, belonging to Britain; S. Lat. 15. 55. 26.; W. Long. 5. 42. 30. It is about midway between Africa and South America, 1800 miles from the Cape of Good Hope, and 600 miles from the Island of Ascension. Its extreme breadth is 7 miles; and its greatest length 11 miles; its area is 30,300 English acres. The geology of St Helena is interesting. The island may be considered as the highest peak of a range of mountains traversing the S. Atlantic, and is most probably an extinct tertiary volcano. Geologists have been unable to fix with exactness its chronological position. The volcanic forces which have produced the complicated disturbances so conspicuous throughout the island, must have ceased at a very remote period, as it has evidently retained for ages its existing conformation.

The climate of St Helena, though within the tropics, is temperate and healthy, and not unfavourable even to European constitutions. In James' Town (600 feet above sea-level), the thermometer seldom rises above 80°; but in calm weather the heat reflected from the sides of the valley is often oppressive. In the open country the temperature is more uniform and mild, scarcely so hot and never so cold as in England. During some seasons the highest point of the thermometer during the summer has been only 72° in the interior; and the ordinary range during winter from 55° to 56°.

The soil of St Helena is clayey, and in many places of considerable depth. Vegetation is very luxuriant in the island, which is abundantly supplied with water from 160 excellent wells.

In some parts of the island iron ore has been found, but the scarcity of fuel prevents it from being smelted. Gold and copper have been observed in small quantities. Concrete limestone is excellent in quality and abundant. The hills are covered with furze and various indigenous shrubs and trees. Of the latter the most abundant is the gumwood, of which there are three kinds, the common, the bastard, and the dwarf gum-tree. Other native trees are stringwood, dogwood, redwood or ebony, and the cabbage-tree, of which the last two are very durable as building timber. Oaks, cypress, and pinaster, have been introduced into the plantations and thrive well. The ferns of St Helena are numerous, and the myrtle grows to the height of 30 feet. The cotton plant also thrives very well. Fruits ripen best in the valleys near the coast, but every farm produces in abundance the common fruits and vegetables both of the tropical and temperate zones. The attempts to grow cereals have not succeeded. Of the 756 species of plants now found in the island only 52 are natives. The cattle, sheep, and goats on the island are of English origin.

The greater part of the surface of St Helena is waste-land; but about 160 acres have been reclaimed and brought into cultivation, 7000 improved as pasture ground, and 28,000 are suitable for grazing sheep and goats. Such roads as exist are wretched.

In 1851 the total revenue of the island was L.17,177, and total expenditure L.16,427.

The supreme authority is vested in a governor, and a council composed of the lieutenant-governor, colonial-secretary, and chief-justice. When the council is not assembled the whole authority of the board centres in the governor.

St Helena was discovered by the Portuguese in 1501. They succeeded in concealing the position of St Helena from other European nations till 1588, when it was descried and visited by Captain Cavendish on his way home from a voyage round the world. Soon after this it became well known to the Dutch and Spaniards. In course of time it was abandoned by the Portuguese, and taken possession of by the Dutch, who in turn abandoned it on the establishment of their colony at the Cape of Good Hope in 1651. On their departure the English East India Company formed a settlement upon St Helena, and about ten years afterwards obtained from Charles II. a charter for its possession. In 1665 the Dutch successfully attacked the island, but in a few months were driven out of it by the English. Again, in 1672, the Dutch recaptured it, through the treachery of the planters; but it was almost immediately recovered by an English squadron, under Captain Munden, and again restored to the East India Company. As the trade of the East India Company increased, the importance of the island became daily more apparent.

But the chief historical interest of St Helena centres in Longwood House, the residence of the exiled Emperor Napoleon from 1815 till his death, May 5, 1821. The house in which the Emperor lived has been allowed to fall gradually into decay ever since his body was removed to France in 1841. (Brooke's *History of the Island of St Helena;* Johnson's *Account of St Helena;* Beatson's *Tracts relative to the Island of St Helena,* &c.)

In 1805, the pop. was 3078; in 1823, 4381 (composed of 1201 whites, 911 in the civil and military establishments, 1074 slaves, 729 free coloured, 442 Chinese, and 24 Lascars); in 1839, 4205; in 1849, the total military force amounted to about 1500 regular troops, besides four volunteer companies of white and black militia. Soldiers are sometimes placed at St Helena to undergo a seasoning previous to being sent to India; and this island and the Cape of Good Hope are the principal stations to which captured slaves are brought, and employed in public works.

HELENSBURGH, a burgh of barony, and a fashionable watering-place, Dumbartonshire, Scotland, on the Firth of Clyde, opposite Greenock. Pop. (1851) 2841.

HELENUS, one of the sons of Priam and Hecuba. He distinguished himself during the Trojan War by his valour, and by the gift of prophecy which he possessed. He became the captive of Ulysses, who afterwards made him over to Neoptolemus, the son of Achilles. When Neoptolemus returned home, he took his prisoner with him, and assigned Andromache to him as his wife. Helenus afterwards became king of a part of Epirus, and was visited there by Ænæas while on his way to Italy.

HELIACAL, a term applied to a star or planet, with reference either to its emergence from the light of the sun, or immergence into it. A star is said to rise heliacally when, after being in conjunction with the sun, it gets at such a distance from it as to become visible before sun-rising. The heliacal setting of a star denotes its entering into the sun's rays, and thus becoming lost in the superior splendour of that luminary.

HELIADES. See PHÆTHON.

HELIÆA, the chief law-court of Athens, at which state-offences were tried, and which was probably presided over by the Thesmothetæ.

HELICON, in *Ancient Geography,* a celebrated mountain range in Bœotia, lying between the Lake Copais and the Corinthian Gulf. It was the fabled abode and favourite haunt of the muses, thence called Heliconides and Heliconiades. On the hill-side was a grove sacred to these deities, not far from which was the celebrated fountain of Aganippe. About twenty stadia from this same grove was the still more famous fount Hippocrene (horse's well), said to have been made by the foot of the winged horse Pegasus. The mountain is nearly equal to Parnassus in circumference, but not much more than half as high. Its highest peak, Paleovuni, is rather less than 5000 feet in height, while Parnassus is more than 8000. The eastern slopes of Helicon are well-watered and fertile, and produce a great variety of trees and fruits. Those on the western side are less productive.

Helicon owes its celebrity chiefly to its poetical associations; and it became famous in Greek poetry, from its neighbourhood to Ascra, the birth-place of Hesiod, the first and greatest poet of his class, who was born in Greece Proper.

HELIER, ST, the capital of Jersey; N. Lat. 49. 11., W. Long. 2. 6. It is situated on St Aubin's Bay, on the S. coast of the island, between two rocky heights, on one of which stands Fort Regent, an irregular fort of great strength, erected in 1806, at a cost of L.800,000. The fortress of Elizabeth Castle, capable of containing 600 men, stands on a small rocky island, which, though about a mile from the shore, is accessible at low water by a long natural causeway. The port is large, and consists of an inner and an outer harbour, the latter completed in 1846. The town of St Helier is rapidly extending; and in the outskirts there are many handsome villas. The court-house in the Royal Square is a plain structure erected in 1647. In it the "states assembly" hold their meetings. The parish church was built in 1341. The theatre is a neat building, with a light portico. St Helier has a public library and reading-rooms, baths, savings bank, hospital, and several other benevolent institutions. Shipbuilding is extensively carried on. The cheapness of living has induced many persons of limited means to settle here. Pop. (1851) 29,133.

HELIGOLAND, properly HELGELAND, *i.e.,* HOLY LAND, a small cluster of islets belonging to Great Britain in the German Ocean, about 25 miles off the coast of Holstein, and about the same distance from the mouth of the Elbe. The group consists of Heligoland (which gives name to the whole cluster), Sandy Island, and a great number of banks, reefs, and uninhabited cliffs, of which latter the largest is called the Monk. The islet of Heligoland is only about three miles in circumference. It consists of two distinct parts, the low ground and the rock. The latter, which rises with an almost perpendicular abruptness to the height of between 150 and 200 feet above the sea, consists of a reddish sandstone, and has a very striking aspect from the sea. The flats at its foot produce a little corn, and are chiefly valuable for the excellent double harbour which they present. To the east of them is an excellent roadstead, well sheltered, and capable of accommodating the largest vessels. Heligoland is said to have been at one time much larger than it is now; and Sir C. Lyell, in his *Principles of Geology,* endeavours to prove, that since the year 800 it has been gradually crumbling away before the action of the currents. Portions of the island, it is quite true, have been swept away; but it has also been thought that the famous map by Meyer, which exhibits the island as containing nine parishes, &c., is a mere fiction. A comparison of the oldest extant maps of good authority shows, that the amount of destruction for the whole circumference in the course of a century does not exceed three feet. The people of Heligoland live chiefly on the rocky part of the island; a few fishermen only inhabiting the flats. The native inhabitants support themselves principally by fishing and piloting. Though the island has been in possession of the English since 1807, there are almost no English residents except the governor and his suite, and the garrison. During the great continental war, however, when Heligoland became the depôt of a vast quantity of merchandise, which was thence smuggled into the Continent, the population rose to upwards of 4000, and the commercial interests of the place became very considerable. A lighthouse and batteries have been erected by the English for the protection of the island and shipping. Heligoland was anciently inhabited by the Frisii, and it is believed that the famous temple of the Frisic god Fosete stood on the island. This temple was destroyed in the eighth century, at the time when the inhabitants embraced Christianity. The existing natives speak the language of the old Frieslanders, whose customs, manners, and dress, they have also retained with slight modifications. Pop. about 2300.

HELIODORUS, the first and best of the Greek romancers, was born at Emesa in Syria, and flourished under Theodosius at the close of the fourth century. Nothing is known of his personal history, except that he became bishop of Tricca in Thessaly, and compelled every married priest in his diocese to put away his wife as soon as he applied for ordination. His famous romance, the *Æthiopica*,—so called, because the scene is laid in Æthiopia,—narrates the loves of Theagenes and Chariclea. The work is interesting, both because it exhibits the first germs of the great modern art of novel-writing, and because the story as a story has very considerable merit. The adventures are, perhaps, too numerous; and, besides following in too rapid succession, are occasionally rather improbable; yet both the main plot and the episodes are well managed, the characters are well drawn, and the scenery is well described. The language, too, though somewhat deficient in point and terseness, is natural and pleasing. The *Æthiopica* was not known to modern scholars except by repute, till the sack of Ofen in 1526, when a MS. copy from the library of Matthew Corvinus fell into the hands of a German soldier, who carried it off with him into his own country. It passed into the hands of Obsopæus, by whom it was printed at Basle in 1538. Other MSS. were discovered, and new and more correct editions followed. The most recent is also the best—that of Coraës, Paris, 1804.

HELIOMETER (ἥλιος, *sun*, and μέτρον, *measure*), the name given by Bouguer, to a kind of double-image micrometer for measuring the diameters of the stars, and especially those of the sun and moon, or any small apparent distance between the heavenly bodies. Mr Savary of Exeter communicated to the Royal Society, in the year 1743, an account of a double-image micrometer, from which the *heliometer* proposed by Bouguer, five years afterwards (1748), does not differ in construction. This instrument is described under the head MICROMETER, in which the various improvements it has received are given in detail.

HELIOPOLIS, *i.e.*, the city of the sun, in *Ancient Geography*, a town in Lower Egypt, on the right bank of the Pelusiac branch of the Nile, not far from the point where it diverges from the main stream. See EGYPT.

HELIOPOLIS, the classical name of Baalbec in Syria. See BAALBEC.

HELIOSTAT, in *Optics*, the name given by s'Gravesande to an instrument devised by him for the purpose of fixing, as it were, the solar rays during the whole time of observation—namely, by reflecting them in the same straight line by a mirror, to which a proper motion is given by means of clockwork. The original instrument is described in his *Phys. Elementa Mathematica;* but it has been greatly improved by Malus and others.

HELIOTROPE (*heliotropium*), amongst the ancients, an instrument or machine for showing when the sun arrived at the tropics and the equinoctial line. This name was also used generally for a sun-dial.

HELIOTROPE, a siliceous mineral of a dark green colour, and variegated commonly with bright red spots, whence it is called *hæmatite*, or *bloodstone*. See MINERALOGY.

HELIOTROPE, a genus of plants of the nat. ord. *Ehretiaceæ. H. peruvianum* and some other species are much cultivated on account of their fragrance.

HELIX (ἕλιξ, *a wreath* or *winding*), a spiral line. In architecture, some authors make a difference between the helix and the spiral. A staircase, according to Daviler, is helical when the steps wind round a cylindrical newel; whereas the spiral winds round a cone, and is continually approaching nearer and nearer its axis. This term is also applied to the caulicules or little volutes under the flowers of the Corinthian capital.

HELLANICUS, of Mitylene, the best of the old Greek logographers, lived and wrote in the fifth century B.C. His exact era is not known; but the best authorities place the date of his birth in B.C. 496, and of his death in B.C. 411. Nothing is known of his personal history except that he died at Perperene, a town of Mysia, opposite the island of Lesbos. His works, which were very numerous, and are frequently alluded to in the classics, are only known to us from the fragments that still survive. They seem to have comprised treatises on mythology, history, and chronology. Of these the most important were his *Atthis*, or History of Attica from the remotest times; his *Æolica*, *Persica*, and *Junonis Sacerdotes.* This last-mentioned work is a History of Argos arranged chronologically according to the succession of the priestesses of Juno in the great temple in that city. It contains, however, besides mere dates, a number of traditions and historical events which were afterwards turned to account by Thucydides. Hellanicus was the first Greek who can be said to have even tried to rise above the method of the old logographers, and his success is very partial. His histories are not so much separate works as detached and isolated fragments of the same work, which he had not the skill to work up into an harmonious whole. Thucydides censures his chronology as incorrect. The fragments of Hellanicus have been published by Sturz, Leipzig, 1787; and again in 1826 in the *Museum Criticum;* and in Müller's *Fragmenta Historicor. Græc.*

HELLANODICÆ, in *Grecian Antiquity*, the chief judges at the Olympic games. They were chosen by lot from the whole body of the Elean people, to whom the entire management of the festival belonged. They were originally only two in number, but were afterwards increased to nine, three of whom superintended the horse-races, three the pentathlon, and three the other sports. A tenth judge was next added, and in the 103d olympiad, when the Elean phylæ were twelve in number, the judges were next increased to twelve, one being chosen from each phyla. In the war between the Eleans and the Arcadians (104th olymp.) the former lost a considerable extent of territory, and the hellanodicæ were reduced from twelve to eight. A few years afterwards, however, their number was increased to ten, and remained unchanged till the time of Pausanias, from whom most of our information on the subject of these umpires is derived. For ten months before the games began the hellanodicæ were trained in their duties by certain Elean magistrates entitled nomophylaces. Their duties, which only lasted over one festival, consisted in seeing that the laws were strictly observed by the competitors and others who took part in the games, in adjudging the prizes, and awarding them to the victors. The hellanodicæ were held in high esteem in virtue of their office, and were allowed to wear a handsome uniform. The best seats at the games were also reserved for them. All the details of the arrangements were controlled by them.

HELLAS. See GREECE.

HELLE, in *Grecian Mythology*, was the daughter of Athamas, king of Thebes, and the goddess Nephele, whom he had married at the command of Juno. Athamas, however, secretly loved the mortal Ino, and at last took her to his home as his wife. Dissensions, of course, sprang up between the wives and their respective families. Athamas went to Delphi to consult the oracle as to the best means of restoring domestic harmony. Ino bribed the priestess, and Athamas was told that it would be necessary to sacrifice Phrixus, the brother of Helle. Thereupon Nephele and her two children fled for safety towards Asia on the back of the ram with the golden fleece. Helle, however, had the misfortune to slip off its back, and the strait into which she fell was called in her honour, *Helles Pontus* or *Hellespont*, the Sea of Helle. Phrixus, after burying his sister, held on his way to Colchis.

HELLEBORE (*helleborus*), a genus of plants of the nat. ord. *Ranunculaceæ*, all of which possess very active purgative qualities. (See BOTANY.) The *black* hellebore was a famous remedy among the ancient Greeks and Romans, especially in mania: and so prevalent was the belief in its efficacy in imparting clearness to the mental faculties, that the most celebrated philosophers used to prepare themselves for intellectual labour by drinking an infusion of the leaves of this plant. The best grew in the island of Anticyra in the Ægean Sea, and the gathering of it was accompanied with superstitious observances.

HELLENISMS are idioms transferred from the vernacular into the Greek by the writers of the New Testament.

HELLENISTS (*Hellenistæ*), a term occurring in the Greek text of the New Testament, and which in the English version is translated Grecians. The authors of the Vulgate, indeed, render it *Græci;* but the Port-Royalists, more accurately, *Juifs-Grecs*, Grecian Jews—that is, Jews who spoke Greek, and who are thus distinguished from the Jews called *Hebrews*, who spoke the Hebrew tongue of that time. The Hellenists, or Grecian Jews, were those who lived in Egypt and other parts where the Greek tongue prevailed. It is to the Hellenists that we owe the Greek version of the Old Testament, commonly called the Septuagint. The Hellenists are properly distinguished from the *Hellenes* or Greeks, mentioned in John xii. 20, who were Greeks by birth and nation, and yet proselytes to the Jewish religion.

HELLESPONT. See HELLE and DARDANELLES.

HELLIN (anciently *Ilunum*), a royal town of Spain, in the province of Murcia, and capital of a cognominal department in the bishopric of Cartagena. It lies on the slope of the Sierra de Segura. The parish church is very elegant, the masonry and marble pavement at the entrance being worthy of special notice. Near Hellin are the mineral baths of Azaraque; and the celebrated sulphur mines, at a distance of twelve miles, are under its jurisdiction. Hellin was sacked by the French under Montbrun; and was the point where Joseph and Soult united with Suchet after Marmont's rout at Salamanca. The industry of Hellin is chiefly confined to the manufacture of earthenware, linens, cloths, hats, flour, oil, and chocolate. Pop. 8818.

HELMET, a piece of defensive armour for the head. In heraldry the helmet is placed over a coat-of-arms as its chief ornament; and, according to its form, position, &c., marks the quality or dignity of the bearer. See HERALDRY.

HELMINTHOLOGY.[1]

(ANNELIDA.)

THE title of this article was formerly bestowed on a much larger group of animated beings than that to which it has been here restricted. The Linnæan group of *Vermes* contained, in fact, the whole of the intestinal and other worms, the molluscous and testaceous tribes, the Zoophytes and Infusoria—which now form the natural materials of many classes. We here apply it exclusively to the ANNELIDA, or red-blooded vermes, of which the medicinal leech and earth-worm afford familiar examples. Bruguière and others have no doubt conjoined them, in comparatively recent times, with the intestinal tribes; and it was at one time our intention (see ANIMAL KINGDOM, § *Divisions*) to have adopted that arrangement. But we conceive it to be more in accordance with the principles adopted in our other systematic articles, to abide by the example of Cuvier, and, referring the latter to the radiated or zoophytical division, to include in the article HELMINTHOLOGY the Annelida alone. In truth, the intestinal tribes exhibit no organs of respiration, either tracheal or branchial—no traces of a true circulation—and their nervous system is extremely obscure. It will therefore become apparent, from the following definition, how greatly the Annelida differ from the creatures just named.

The Annelida or red-blooded worms form the first class of the articulated or annulose division of the animal kingdom.[2] Their blood, of a red colour, resembling that of the vertebrated animals, circulates in a double system of closed vessels, that is, in arteries and veins. This system, though destitute of a heart properly so called, is sometimes provided with one or more distinct fleshy ventricles. Respiration is carried on through the medium of organs, which are sometimes external, occasionally developed beneath the surface of the skin, or sunk more deeply into the interior. They may all be presumed to breathe by means of branchiæ, although the respiratory system of the so-called Abranchial Order is still in some respects obscure. The branchiæ or respiratory organs of the greater number are external, and vary considerably in their size, form, number, and position. Their body, of a softish texture, is more or less elongated, and always divided into numerous rings or segments, of which the anterior, known under the name of head, scarcely differs from the others, except by the possession of a mouth, and of the principal organs of the senses. None of the Annelida possess articulated members properly so called, but in room of these many are furnished with setiferous mammillæ, or fleshy projections, bearing bundles of hairs or bristles, and forming what may be called *pedes spurii*, of which the number is extremely various. These peculiar organs are sometimes composed of two parts, the one superior and dorsal, the other inferior and ventral. The muscular power resides in the interior, and is capable of producing only an undulatory or creeping movement—

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[1] From ἑλμινς, *a worm*, and λογος, *a discourse.*

[2] For a description of these primary divisions of the animal kingdom, see ANIMAL KINGDOM, § *Third Primary Division.*

the locomotive parts being incompetent to sustain the body. The organs of the mouth consist sometimes of parts resembling jaws, more or less developed, sometimes of a simple tube. The organs of the external senses are composed of fleshy tentacula, sometimes articulated, and of certain blackish points, not existing in all the species, regarded as eyes. The nervous system consists of a double ganglionic cord, analogous to that of insects, as already described in our art. ENTOMOLOGY. In regard to their natural habits, most of these creatures are aquatic (the Lumbrici or earthworms excepted), and a great majority marine. Some dwell in holes beneath the waters, others form tubes or tunnels of mud or other matters, or even transude from their own bodies a calcareous secretion, which forms around them a protecting covering.[1] Considered sexually, they are for the most part hermaphrodite, and some require reciprocal communication.

It will be perceived, even from the preceding brief exposition, that the Annelida are animals of a very peculiar nature. Although their nervous system coincides with that of the other articulated classes, and although their bodies are likewise divided by transverse sections, yet their locomotive organs are entirely dissimilar to those of the Crustacea, Arachnides, and Insects. Their setiferous mammillæ are merely retractile sheaths; and the hairs or bristles which they inclose are in no way comparable to the feet of the last-named classes, but are organs of a very different nature.

The Annelida are few in number compared with insects and other articulated classes, and the greater proportion are marine. Their possession of red blood is a singular character in animals so low in the scale, and one not possessed by the molluscous tribes, which are yet regarded as their superiors in other points of organization. Some peculiarities in the circulating fluids of these creatures have been recently described by Dr Williams.[2] With the exception of one or two species, two distinct and separate fluid elements of nutrition exist in these creatures—one, consisting of the proper and true blood, is contained in closed vessels, and moving in a definite orbit, constitutes a well-marked *circulation;* the other is a liquid mass, filling the open space which, in all species, intervenes between the intestine and the integument, holding organic corpuscles in suspension, varying in different species, and performing irregular to-and-fro oscillations under the agency of the muscular contractions of the intestine and integuments. On these two fluids two separate physiological functions devolve, each essential to the maintenance of life in the Annelida. All the recesses and ramifications of the *general cavity of the body* in these animals communicate freely with each other, constituting thus one common space. This cavity is lined by a distinct membrane, which is obviously the anatomical analogon of the *peritoneum,* and is filled by a fluid which is unquestionably an organic fluid. Dr Williams adduces reasons for regarding it as physiologically allied to the chyle of the higher animals, and the containing cavity as the prototype of the *peritoneal.* This general splanchnic chamber he therefore names the peritoneal cavity, and its liquid the peritoneal fluid, or the chyle-aqueous fluid of the peritoneal cavity. As the peritoneal membrane of the Annelida is not vibratory, the oscillations of the fluid contents cannot be caused by ciliary vibration. This fact is regarded as distinguishing the class from the Echinodermata, of which, in all the species, the peritoneal space is richly lined with vibratile cilia. The real character of this fluid was till recently unknown. Its coagulating principle consists of fibrine, and there can be no doubt that the greater portion is composed of sea-water. In a few minutes after removal from the body of the animal, it throws down an unquestionable coagulum, like the clot of true blood. The organic corpuscles cohere into groups and masses, and sink with the clot. Mechanically and physiologically this fluid is immediately essential to the maintenance of life—mechanically, by preventing contact between the intestine and integument, thus favouring the circulation of the blood proper; and physiologically, by furnishing the pabulum out of which the latter fluid is perpetually renewed or reinforced. In the genus *Sabella* this peritoneal fluid is opalescent and thickly corpusculated; it does not change its colour with that of the true blood, since its colour is the same in those species which are distinguished by *green* blood, as in those of which the blood is red, although so generally charged with corpuscles. *Aphrodita aculeata* is an exception, and exhibits a fluid which, bearing no visible morphous substances, seems to depart but slightly from the standard of salt water. The physiological character of this fluid is unequivocally manifested in *Glycera alba,* in which it bears in great abundance *blood-red* flattened oval corpuscles, resembling those of the frog. This is the sole instance of an Annelid with coloured corpuscles in the peritoneal fluid. The blood proper in this species is so faintly red as to be nearly devoid of colour, and is quite incorpuscular.

That the basis of this fluid consists of sea-water is rendered almost certain by the following expedient. If it is collected in adequate quantities (say from *Arenicola* or *Terebella nebulosa*), and carefully filtered, and the clean liquor then submitted to evaporation, the crystalline products will be found identical with those resulting from the evaporation of simple sea-water. Dr Williams infers that this sea-water, under such circumstances, readily assumes the character of an *organic fluid*—that is, becomes *vitalized* with great facility by the solid organic elements contained in the peritoneal fluid. Whether the peritoneal fluid is organically capable of maintaining the nutrition of the solid structures of the system, cannot be directly proved; but it is scarcely susceptible of doubt, from the intricate manner in which the true blood-vessels afterwards coil in the midst of the fluid contents of the general cavity, that the former must absorb from the latter the elements from which the true blood is afterwards manufactured. It presents, in fact, according to our author, the same relation to the contents of the proper blood system of vessels as the chyle of the higher animals does to the true blood; the peritoneal fluid of the Annelida differing from the chyle of the mammalia only in the fact that the latter is contained in vessels, while the former rolls in a capacious chamber.

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[1] "As to the external tube which the Chetopoda (by which term M. de Blainville denominates the setigerous genera of the class Annelida) often inhabit, although it is frequently sufficiently regular and solid, it cannot however in any manner be compared to the shell of the Mollusca, not even where there is the greatest approximation, as in *Dentalium* and *Siliquaria.* These tubes of the Chetopoda are always simple excretions from their body, which are by no means attached to it, and from which the animal may issue forth without dying immediately. We begin to observe something of this kind in the mucosity with which certain species line the hole hollowed in the mud or sand which they inhabit, as in the Arenicolæ, and some Lumbrici. This is analogous to the mucous pellicle of the tube of the Amphitritæ and the Sabellæ; but in the latter, surrounding this mucosity, is attached externally a stratum, more or less thick, composed merely of mud or very fine grains of sand, or, in fine, of debris, more or less thick, of shells and larger grains of sand. These tubes are constantly open at both extremities; there are also some of them more regular, which are completely calcareous. The double opening is a character whereby they are distinguished from tubular shells, the summit of which, on the contrary, is constantly imperforate. These tribes, however, appear constantly to grow, after the manner of tubular shells, by laminæ or strata extremely thin, placed inside of and out-edging one another. From this result striæ, marking the growth, more or less apparent outside; but we never remark longitudinal striæ on their surface, nor anything indicating the delicate working of the edges of a mouth, as in the Mollusca. This character alone might suffice to distinguish them from the true tubular *shells;* but to this we may add, that the constant perforation of the summit of the tube of the Chetopoda never allows the animal, in growing and advancing in its tube, to form partitions there, whereas in the tubular shells the reverse is invariably the case. A final character which distinguishes the tubes of the Chetopoda is, that they are adherent, and fixed flatly, through a greater portion of their extent, on foreign bodies, which never takes place with the tubular shells." (Griffith's edition of Cuvier's *Animal Kingdom,* vol. xiii., p. 58.) We may add, that the young of the shell-bearing Mollusca are always born with shells, because that part forms, in fact, a portion of their *skin;* but there is no doubt that the young Annelida are produced in an exposed condition, and afterwards proceed, by a voluntary effort, to form their protecting habitations.

[2] See his excellent and elaborate paper "On the British Annelida," published in the *Reports of the British Association* for 1851. London, 1852.

Although we are deeply indebted to M. Milne-Edwards for his ample exposition of the colour and distribution of the blood in the Annelida,[1] he appears to have overlooked, if not mistaken, its corpuscular or microscopic character. "Mais, du reste," he remarks, "examiné au microscope, ce liquide ne m'a pas semblé differer du sang des autres animaux sans vertèbres. Les globules qu'on y voit nager n'ont pas du tout l'aspect de ceux propres au sang des animaux vertébrés; ce sont des corpuscules circulaires, dont la surface a une apparence framboisée, et dont les dimensions varient extrêmement chez un même animal." Mr Wharton Jones has also figured and described these blood corpuscles as supposed to exist in the earth-worm and leech.[2] Now, Dr Williams, after the most careful and extended examination, states as follows:—

"*In no single species among the Annelida does the blood proper contain any morphic element whatever!* In all instances, without a single known exception, it is a perfectly amorphous fluid, presenting under the highest powers of the best microscope no visible corpuscles or molecules, or cells whatever; it is a limpid fluid variously coloured, as originally and correctly described by M. Milne-Edwards, in different species. No complete distinction into venous and arterial blood can be observed, and the plan of the circulation renders such a distinction only partially possible. In all cases the colouring matter is fluidified, and uniformly blended with the fluid mass of the blood; the colour therefore must be *developed* in the fluid mass, for there exist here no morphotic elements in the blood itself by which the separation of the coloured substances from the peritoneal fluid can be effected, unless indeed the parietes of the vessels of the blood-proper discharge this eclectic function. With one exception, namely, that of *Glycera alba*, in which they are red, the corpuscles of the peritoneal fluid are in all species destitute of colour. But it is not at all chemically impossible that the coloured ingredients may exist in this fluid in a colourless state, and that these ingredients, through entering into new combinations, may become brightly coloured after transition into the true blood. In consequence of the impracticable minuteness of the quantity, no direct chemical analysis of the blood in the Annelid can be executed. As to the colour, however, analogy removes all doubt that the red tinge is due to the salts of iron, and the green to those of copper. In those species in which the blood is light, yellow, opaque, or lymph-like, it does not follow that the salts of the coloured minerals are altogether absent; they may exist under colourless combinations. The physiologist cannot view with unconcern the question, which in this class of animals affects the mode in which the peritoneal fluid and the blood-proper stand related to each other. That the former is higher than the latter in degree of organization, no doubt can exist; but it is not quite clear that the true blood is reproduced out of the elements of the peritoneal fluid; since the vessels distributed over the parietes of the alimentary canal may take up some of the immediate products of digestion, before the latter exude into the general cavity of the body to mingle with its semi-aqueous contents. Nor can it be affirmed, from the evidence drawn from its composition, that the peritoneal fluid is unfitted to supply the means of nutrition to the solid structures, into the interior of which in every part of the body it intimately penetrates. It is more probable, because more in accordance with analogy, however, to suppose, that it is a manufactory in *itself;* that its corpuscles execute an office by which the mineral substances and proximate principles are vitally assimilated; that the corpuscular elements in the Annelida do in this fluid, what in the higher animals analogous bodies effect in the blood-proper. From these facts the physiologist may advisedly say thus much, that in these animals nature divides the vital fluids into two separate and distinct orders, on one of which the preparative and elaborative cell-agency devolves, on the other the work of solid nutrition. They prove with great clearness, that the corpuscular elements, either in the blood itself, or, as in this case, in some contributory fluid, are essential to the preparation of the blood-proper; for when in the zoological series, as in the higher articulata, this corpusculated fluid disappears, the blood itself becomes corpusculated; or when the peritoneal fluid, as in the Echinodermata, becomes *less organic*, then also morphotic elements are developed in the true blood. From these observations the inference may be further drawn, that between these two nutritious fluids there exists a definite physiological balance; that one is capable of absorbing or merging into the other, according as the observer ascends or descends the organic scale. The peritoneal system of fluid terminates at the standard of the insect, the true blood system traced downwards terminates at the Echinodermata."[3]

The swelling of certain portions of the body in progression may be regarded as due to the interior fluids. These are driven to a given point of the containing cavity, where they are momentarily imprisoned by the contraction of the *circular* integumentary muscles before and behind,—thus producing a bulging. The muscles of the integument are then excited to action, and the fluid is forcibly compressed forwards or backwards, in accordance with the direction of the muscular agency. This is the mechanical use of the chyle-aqueous fluids of the peritoneal cavity, the physiological purposes of which have been already explained. Almost all the Annelida are struck, as it were, by paralysis, when this fluid is made to escape from its cavity by a puncture through the external walls. The power of motion is immediately suspended, and the body becomes flaccid and passive. The peritoneal fluid is really the fulcrum on which all muscular action is based, and without it these creatures cannot make the required contractions with sufficient effect and precision. But this is not the only mechanical use which it affords. It prevents that injurious pressure amid the internal organs which might impede or arrest the circulation of the blood. In the leech tribe it is the fluid contained within the stomach that accomplishes this important object. "Nothing in the history of the Annelida," says Dr Williams, "can be conceived more wonderful than the mechanically perfect and facile manner in which *Linus longissimus*, a worm of many yards in length, performs the feat of locomotion, and that too over craggy and rugged rocks." Without the conjoined action of these internal fluids, the motor apparatus would be incapable of effort.

The Annelida, as a class, may be said to undergo, in their earlier stages, few, if any, metamorphoses. The young

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[1] *Annales des Sciences*, October 1838.

[2] *Phil. Trans*, Part II, 1846.

[3] *Report*, p. 175.

Annelida.

Annelida.

seem at first to be entirely devoid of appendages, but the body does not in any instance exhibit those peculiar transmutations so observable in the growth of insects and crustacea.

In regard to the external parts, we shall here indicate a few of the most important,—premising, that the characters mentioned are not universal to the class, but rather confined to certain races. The head, in such as possess one, is a small anterior swelling, which bears the antennæ commonly so called, and the eyes, and is distinct from the first segment of the body. The Nereids of Linnæus are regarded by Latreille as the only Annelida of which the anterior segment merits the name of head, or possesses organs fit to be compared to eyes, more especially to those of the larvæ of insects. The eyes, where such exist, are simple, extremely small, and appear like blackish points. The organization of the mouth varies greatly in the different orders. The parts called maxillæ by Savigny are hard circumscribed parts, of a corneous or calcareous nature, to which Latreille does not accord the name of jaws. The latter author indeed seems to regard the Annelida as a suctorial rather than a masticating class. Most of them are of carnivorous habits, and live on the blood of other creatures. The trunk or sucker is a contractile fleshy portion, constituting the mouth, and containing the so-called jaws. The latter portions, however, being adherent to the inner coats of the sucker, which is itself nothing more than a prolongation of the œsophagus, can scarcely be regarded as genuine jaws.

Several tribes have their branchiæ uniformly spread over the extent of the body, or over its central portion, while others (and these usually dwell in tubes) bear those organs at their anterior extremity. In the erratic species, or such as are naked, and without fixed dwellings, they are usually disposed longitudinally along the sides of the body, there being one for each foot. Blood-vessels sometimes appear to spread into the setiform processes, and to convert them into respiratory organs.

We have already stated that Linnæus placed the Annelida in his almost unlimited class of Vermes,—a vast and by no means well-combined group, which the later labours of Otho Frederick Müller, Pallas, and other naturalists, failed to cast into a much more natural mould. The great Swedish naturalist separated the true Annelida from each other, placing one portion of the group in the order Intestina, and the other in that of Mollusca. In Cuvier's earliest work (*Tableau Elementaire*, &c., 1789), he restricted the class of worms to the Annelida and intestinal species, a mode of grouping previously practised by Bruguière in the *Encyclopédie Méthodique.* Subsequent investigations induced the French anatomist to raise the former to the rank of a separate class, which he named *Vers à sans rouge*, in a memoir read to the French Institute in 1802. On this same group Lamarck (*Extrait du Cours*, &c., 1812) bestowed the name of ANNELIDES,[1] which has since been very generally adopted. A slight disparity, however, still exists in the constitution of the class, in the works of Cuvier and Lamarck, the former including therein the genus Gordius, which the latter associates with the other Vermes.

But notwithstanding the valuable labours of these and other writers, the external structure of the Annelida cannot be said to have been at all rigorously determined, or viewed in relation to that of conterminous groups, till we received the fruits of Savigny's laborious and most delicate observations, originally presented to the Academy of Sciences.[2] At that period Blainville was also occupied in the study of the same group, which, with the exception of the leeches, forms his class of *Sétipodes.* He published an extract from his labours in the course of the ensuing year.[3] Oken, Leach, Latreille, Dugés, Audouin, Milne-Edwards, and others, have likewise contributed to our knowledge of this curious and important class, in publications, to the majority of which we shall more particularly allude in the course of the present treatise.

In regard to the geographical distribution of the Annelida, our data are not yet sufficiently precise and numerous to admit of any satisfactory generalization. We have already said, that with the exception of the earth-worms (and even these require a moist abode), all the *known* species are aquatic. We may add, that the great majority inhabit the saline waters of the ocean. Most of the Naids, however, occur in fresh water, and some true Nereids are found in the lakes of North America. Annelida of some kind or other are met with in all quarters of the globe, and the species of many genera are very widely distributed; but others, such as the *Amphinomæ*, for example, are characteristic of, if not peculiar to, the warmer seas. Undoubtedly the most magnificent are native to the Indian shores. "It is in general on the coasts of the sea, in the midst of Thalassiophytes, in the anfractuosities of madrepores, in the sand, and particularly in mud, that the Chetopoda are to be found; and if some species are more commonly to be met with in the open sea, as, for instance, the Amphinomæ, named by M. Savigny *Pleione vagans*, it appears that they may have been drawn along with marine plants by the currents, as is the case with many other animals."[4] Their natural movements are extremely slow, and may be compared to those of slugs, although their appendages for locomotion are much more numerous. The Nereides, however, not only creep in a kind of serpentine manner over the surface of solid bodies at the water's edge, but frequently swim very respectably, either by successive undulations of the body, after the manner of eels and serpents, or by agitating their appendages, and thus making these organs serve as oars.[5]

The utility, in an economical point of view, of the Annelida in general, to the human race, is by no means great. According to Pallas, the inhabitants of some parts of Belgium eat those portions of *Aphrodita aculeata* which compose the mouth; the Nereides and Arenicolæ, as well as the earth-worms, are extensively employed as baits for fish, and the medicinal uses of the leech are notorious; but, with these, and, it may be, a few other exceptions, little can be said regarding the direct benefits derivable from this peculiar class. Its subjects, however, are by no means on that account the less important in the eyes of the philosophical naturalist.

Several of the Annelida possess a phosphoric property, from which Linnæus named a certain species Nereis *noctiluca.* Others, characterized by the same attribute, were afterwards described by Sig. Viviani.[6]

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[1] From *annellus*, a little ring. The body of these animals is composed of a series of annuli or rings, a formation which suggested to Lamarck the general name which they now bear. The substance of these rings is neither horny nor calcareous, but soft and fleshy, and thus so far differs from the truly articulated tribes in the entire absence of any approach to a hard skeleton, or the consistent covering of insects. The segments are divided from each other only by a circular band of muscular fibres, the annulations not being perfectly distinct from each other,—the longitudinal muscles passing over and under the constricting circular bands. Thus, as Dr Williams remarks, these segmentations of the Annelida are more apparent than actual. In addition to the works mentioned in the course of this article we would especially recommend Dr Williams' *Report* already referred to, and of which we have made frequent use. We may moreover refer the reader to M. de Quatrefage's elaborate *Etudes sur les types inférieurs de l'embranchement des Annelides*, consisting of many *Memoires* published in the *Annales des Sciences Nat.*, 3me série, for the years 1848, 1850, and 1852. See also Siebold's *Anatomy of the Invertebrata* (translated by Dr Burnett), London, 1854; Dr Carpenter's *General Physiology*, 5th edit., *Ibid.*, 1854; and Mr Rymer Jones's *General Structure of the Animal Kingdom*, 2d ed , *Ibid.*, 1855.

[2] *Systeme des Annelides*, forming a portion of the great French work on Egypt.

[3] *Bulletin de la Soc. Phil.*, Mai et Juin 1818.

[4] Griffith's *Animal Kingdom*, vol. xiii., p. 73.

[5] The lateral parts are hence named *rames* by M. Savigny.

[6] *Phosphorentia maris quatuordecim lucescentium animalculorum novis speciebus illustrata.* Genuæ, 1805.

Annelida.

The presence or absence of the organs of motion, and the position of the branchiæ, furnish natural characters of easy application, which modern zoologists have employed to signalize the primary groups. Lamarck divides the Annelida into three orders—*les Apodes, les Antennes*, and *les Sédentaires ;* and in the system of Cuvier they likewise form an equal number of orders—*les Tubicoles, les Dorsibranches*, and *les Abranches.* In both systems the Serpulæ occupy the highest position in the scale. Savigny's arrangement of these animals consists of five orders, of which the author has as yet treated only of four—viz., *les Néréidées, les Serpulées, les Lombricines*, and *les Hirudinées.* He places the Aphrodites and Nereids at the head of the class. Latreille is also of opinion that these Annelida, especially the Nereides, so far as regards their external organization, are entitled to precedence, and make the nearest approach to the articulated animals provided with feet, such as Insects and Crustacea.

We shall here, in as far as general arrangement is concerned, follow the system of Cuvier.[1]

ORDER I.—TUBICOLÆ, Cuv.

Some form a calcareous homogeneous tube, supposed to result from transudation, like the covering of testaceous Mollusca, but which does not adhere by any muscular attachment; others construct a covering by agglutinating grains of sand, broken shells, and other debris, by means of a membrane, likewise the result of transudation; while a third group are surrounded by a tube of an entirely membranous or corneous nature.

GENUS SERPULA, Linn. The body is composed of numerous segments; its anterior portion is enlarged in the form of a disk, armed on either side by several bundles of stiff bristles; and on each side of the mouth is a fan-shaped plume of branchiæ, usually adorned by lively colours. At the base of each plume is a fleshy filament, one or other of which is always prolonged and dilated at the extremity into a disk of various form, which serves as an operculum, and closes the overture of the tube whenever the contained creature chooses to retire. Of this genus the calcareous tubes cover, by their tortuous windings, the surface of stones, shells, and other submarine bodies. The species are widely distributed throughout the seas of Europe, India, and America. The largest are indigenous to the warmer climates of the globe. Little is known of their instinctive habits or natural economy. They are said to feed on aquatic animalcules, which they seize by means of their branchial tentacula.

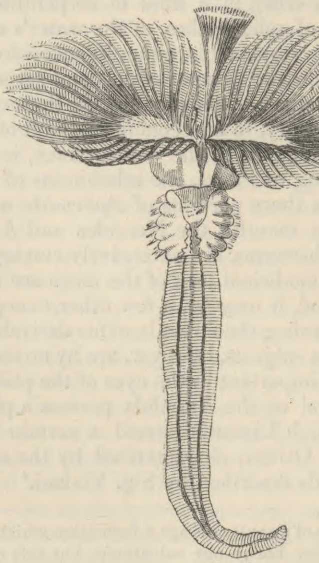

Fig. 1.

Linnæus, and most of the naturalists of his time, placed the Serpulæ among the testaceous Mollusca. They now constitute a numerous genus, of which several species occur in the European seas. They are very contractile, and are supposed to feed on animalcules. A well-known species, *S. contortuplicata* (fig. 1), has rounded tortuous tubes, of about three lines in diameter. Its operculum is tunnel-shaped, and its branchiæ are often of a beautiful red, or varied with yellow and violet. Any object thrown into the sea is apt to be speedily covered by this species.

Annelida.

In tropical seas they usually form their encrusting habitations in the midst of corals, lengthening their tubes as the coral is built up around them. Their extent is sometimes equal to three feet; and the expanded gill-tufts are of extremely vivid colours, equalling in brilliancy the brightest carnations. Some of the many small species which occur along our own coasts are also remarkable for the beautiful tinting of their gills.

GENUS SPIRORBIS, Lam. Branchiæ much less numerous than in the preceding genus (from three to four on each side), placed anteriorly in a somewhat radiated form. A pediculated operculum, with a flat summit placed between the branchiæ. Tube testaceous, and rolled after the manner of a *Cornu ammonis.*

This genus is composed of very small species, which are found attached to fuci, shells, and other marine bodies. They frequently occur in great numbers, though always separate from each other. The animals are of a blood-red colour. We have figured the *Sp. nautiloides* of Lam. (fig. 2) synonymous with the *Serpula spirorbis* of Linn.

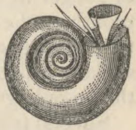

Fig. 2.

GENUS SABELLA, Cuv. *Amphitrite*, Lamarck. Body and fan-shaped branchiæ resembling those of the preceding genus, but both the fleshy filaments adhering to branchiæ terminate in a point, and do not form an operculum; they are sometimes even wanting. Their tube is rarely calcareous, and seems often formed of grains of very fine clay or mud. Most of the ascertained species are of considerable size, and are remarkable for the extreme delicacy and lustre of their plumy branchiæ.

One of the most splendid of the genus is figured by Dr Shaw under the title of *Tubularia magnifica.*[2] It is found on various parts of the coast of Jamaica, adhering to the rocks. It is extremely wary, and when approached instantly recedes within its tube, which on a further alarm also retires into the rock, so that specimens can be obtained only by breaking off portions of the mass. These, when put into tubs of sea-water, may be preserved for months, and the habits of the animals attentively studied. The species in question is characterized by a simple undulated tube of a whitish hue, the tentacula being varied by beautiful alternate bands of red and white. *Sab. vesiculosa* (fig. 3) is a British species described by Montagu.[3] The internal texture of its tube is coriaceous, but the outer coat is invariably covered by coarse sand, intermixed with fragments of shells. Considerable variety exists in the form and aspect of the genus Sabella.

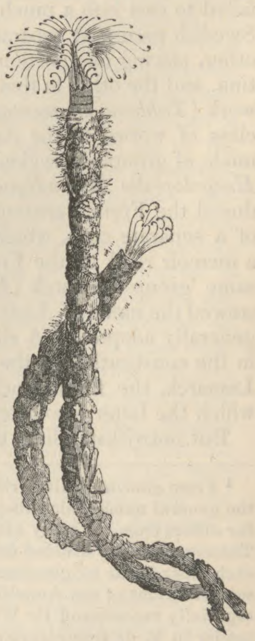

Fig. 3.

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[1] *Règne Animal* (ed. 1830), vol. iii. See also the two following works:—*Synoptische Uebersicht der Ringelwürmer oder Anneliden;* Nach Cuvier's Classification. (Mit vielen Abbildgn.) Lithog. gr. imp. fol., Ebend. 1841. *Schmidt's Neue Beiträge zur Naturgeschichte der Würmer*, Jena, 1848.

[2] *Linn. Trans.* v., p. 228, tab. 9.

[3] *Ibid.* xi., p. 19, tab. 5.

Genus Terebella, Cuv. These, like the preceding, inhabit a tube of their own formation, but composed of coarser materials than that of the generality of Sabellæ. Their body presents much fewer segments, and the head is otherwise adorned. Numerous filiform tentacula, capable of great extension, surround the mouth; and on the neck are placed the branchiæ, which are not fan-shaped, but in the form of little branches.

The animals of this genus, according to Montagu, either prepare a sheath from the tenacious secretion of their own bodies, mixed with adventitious matters, or reside in prepared perforations at the bottom of the sea. Their tubes are in general so extremely fragile as to be easily destroyed, and the animals are then found lurking beneath stones, or forming a new dwelling. Some fabricate their tube in old shells or stones, to which they adhere by their entire length, while others fix a tube perpendicularly in the sand. These tubes are indeed frequently observed to obtrude several inches above the surface of the soil, and when the waters flow, the gills and other appendages are stretched forth, and seem agitated to and fro. The gills or branchial appendages are extremely sensible, of a fine blood colour, and when touched they contract so suddenly as to expel the fluid which they contain, and then they lose their sanguine hue.

The cephalic tentacles form auxiliary organs of respiration, not for the aeration of the blood-proper, but for that of the peritoneal fluid already mentioned, by which they are filled. They exhibit some peculiar features. From their great length and vast number, they expose a large aggregate surface to the action of the surrounding medium. The lower surface of each tentacle is clothed with cilia, and is thinner than the dorsal aspect. The richly corpusculated peritoneal fluid enters freely into the hollow axis of all these tentacles, and is thus brought into contact with the surrounding waters. The tentacles themselves can grasp a grain of sand or other minute fragment, at any point of their length, or, if placed in a linear series, a row of grains. So perfect is the order of the muscular fibres at the extremity of each filament, that it is gifted with the twofold power of suction and ordinary muscular action. When the tentacle is about to seize upon an object, its extremity is drawn inwards (like a portion of the finger of a glove reversed) in consequence of the sudden reflex of the interior fluid. By this movement a cup-shaped cavity is formed, in which the object is securely held by atmospheric pressure—a power immediately reinforced by the contraction of the circular muscular fibres.

In addition to these important purposes, the tentacles of the Terebellæ are also the organs of locomotion. Being outstretched by the ejection into their interior of the peritoneal fluid—a process effected by an undulatory contraction of the body from behind forwards—they are next attached like so many slender cables to a comparatively distant surface, and being then shortened, the otherwise helpless body is hauled forwards. The concentration of the tentacles and branchiæ around the head in this genus, gives a great development in that quarter to the circulating system.

The generative apparatus conforms in its general arrangement with that of the earth-worm, and others, in presenting a segmental repetition of the ovigerous organs, while the male portion is grouped together in a lobated mass at the mesial line. We owe to M. Milne-Edwards a detailed account of the development of the young.[1] On first leaving the egg they exhibit no resemblance whatever to their parents, but might rather be mistaken for the ciliated larvæ of Polypi or Medusæ, presenting no vestige of the annular type of form. Ere long, however, their bodies become elongated, and begin to assume a somewhat symmetrical or two-sided form, consisting of four zones or rudimentary segments, the posterior of which is continuous, provided with a ciliary apparatus. A fifth ring next makes its appearance between the penultimate and terminal joint, while the rudiments of the mouth and alimentary canal become distinguishable. The growth now advances rapidly, the body becoming more worm-like as the segments are added between the last-formed segment and the terminal one. It is observable that the originally ultimate segment continues so to the end. Simple subulate setæ, supported by small fleshy tubercles, begin to appear on both sides, and the larva is no longer apodous. At this period it resembles a minute sub-cylindrical worm, and in a few days the cilia entirely disappear, the body now exhibiting the aspect of one of the erratic Annelids, in no respect resembling the tubicolous genus to which it actually belongs, and is ere long transformed into. This young larva is furnished with a distinct head, an antennary organ, eyes, and feet, provided with subulate setæ; while we afterwards come to know, that the adult or *perfect* state, as we are wont to term it, have neither head, eyes, nor antennæ, and exhibit feet furnished with hook-like appendages. Having lost its locomotive cilia, it now ceases to swim, and begins to inclose itself in a kind of mucous substance, which gradually solidifies into a cylindrical tube, open at both ends. The first stage of its existence, during which it has led an unfixed or erratic life, now closes, and it commences a life similar to that of its parents. The ventral oars, armed with terminal hooklets are successively developed, as are also the tentacular appendages around the head; but it is not till the creature has acquired some forty pair of feet, that the branchial apparatus begins to show itself under the form of two simple tubercles, springing from the lateral regions of the neck.

Dr Williams states that the number of setiferous feet constitutes by far the best character for the fixation of the boundaries of species. Between several of these, as constituted by Montagu, there is no actual difference but that of the age of the observed individuals. Many of the Terebellæ are gregarious, and some are so numerous that the sea-shore after a storm is seen to be covered with their fragments. When their tubes are entire, but a small portion of the body is protruded, with the exception of the long filiform tentacles, which are thrust about in all directions as if in search of food. The branchial appendages previously mentioned as so finely coloured during healthy life, are observed to lose their brightness from day to day as the animals become sickly in confinement.

Terebella gigantea, Mont., the largest of the genus, measures sixteen inches in length, and occurs, though rarely, on the coast of Devonshire.

Genus Amphitrite, Cuv. *Pectinaria*, Lam. Recognizable by the golden-coloured bristles ranged in a coronal or pectinated manner, in one or more rows, on the anterior portion of the head, where they probably serve either as a means of defence, for the purposes of locomotion,[2] or for collecting the materials of their dwelling. Numerous tentacula surround the mouth, and at the commencement of the back, on either side, there are comb-shaped branchiæ.

The gills or branchial appendages of this genus are attached to the anterior part only of the body; and this is the case, in fact, with all the tribes that inhabit tubes, because gills attached to the other parts which are covered, would be useless for the purposes of respiration.[3]

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[1] *Recherches Anatomiques et Zoologiques faites pendant un Voyage sur les Côtes de la Sicile. Annales des Sciences Nat.*, 3e série, Zool. t. iii. (Mars 1845).

[2] Montagu observed *Terebella venustula* fixing its tentacula, and then, by contracting them, draw its body forward.

[3] Griffith's *Animal Kingdom*, vol. xiii., p. 86.

Certain species construct very light and delicate tubes, in the form of a lengthened cone, which they carry along in the course of their travels. Their golden bristles form two combs, the teeth of which are directed downwards. Their intestine is very ample, folded several times, and is usually filled with sand. A well-known European species is the *Amph. auricoma Belgica* of Gmelin, of which we have given two representations (fig. 4). Its tube measures about two inches in length, and is formed of little rounded grains of various colours. Other species attach their tubes to different substances; and their golden setæ form upon the head several concentric crowns, from which an operculum is produced, which closes the tube when the animal is in a state of contraction. Each foot is furnished with a cirrhus, and the body, terminating posteriorly in a tube curved towards the head, is provided with a kind of muscular gizzard.[1] To these belong *Amph. alveolata*, Ellis, *Corall.* 37, of which the tubes, combined in a compact mass, present regularly disposed orifices, resembling the cells of a piece of honeycomb. Another species, *Amph. ostrearia* of Cuvier, forms its tubes on the shells of oysters, and is said to be extremely injurious to the increase of that valuable mollusc.

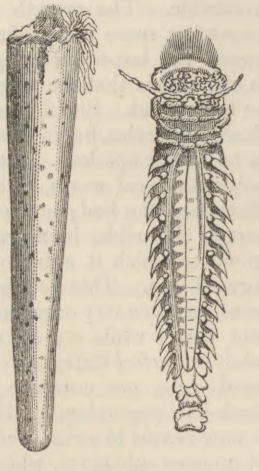

Fig. 4.

Cuvier has placed in this order of Annelida the singular genus Syphostoma (fig. 6), first made known by Dr Otto in a dissertation published at Breslau in 1820. It appears to have two anterior openings or mouths.[2]

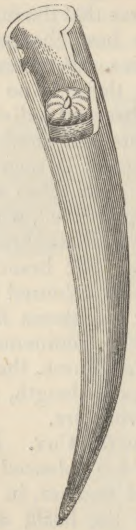

Fig. 5.

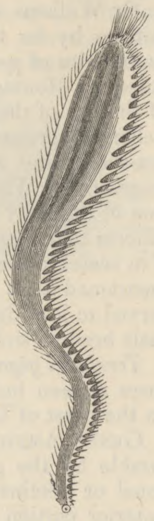

Fig. 6.

Here also, but with a very doubtful claim, the genus Dentalium (fig. 5) is allowed to stand. Its covering is a solid calcareous shell, in the form of an arched elongated cone, open at both ends, and compared by some to a small tusk of an elephant. The animal itself does not appear to be in any way articulated, nor to possess lateral setæ. Its body is of a conical form, like that of the shell, and is very smooth and compact.[3]

It seems now to be determined that the position of this last-named genus in the Cuvierian system was a misplacement. Dr Williams is very clearly of opinion that the researches of Deshayes and Savigny, and more satisfactorily of M. de Blainville and Mr Clark (in *Annals of Nat. Hist.* for Nov. 1849), have proved that the *Dentaliadæ* are gasteropodous Mollusca, ranking somewhere between *Chiton* and *Patella.* In *Dentalium*, the symmetrical sub-ventral position of the branchiæ, the posterior flow of water which takes place in them, and the resemblance of the foot to that of some of the bivalves, appear in a striking manner to prove its connection with the *Conchiferæ*, whilst by its œsophageal cerebral ganglions, and the completeness of its circulating system, its affinity to the Gasteropod is established. But neither can it be disputed that the genus exhibits some peculiar approximations to the Annelida or annulose tribes; such as the red blood, the vermiform configuration of the posterior portion of the body, the tubular figure of the shell, the operation of the operculum, and the apparent resemblance of the branchiæ to those of the *Sabellæ.* All these characters may readily be viewed as prefiguring some of the outward features of the Annelida, although they are in truth only analogies of an apparent and superficial nature. The species have therefore been excluded from the latter class in Dr Williams' *Report.* Our author maintains the close and natural approximation of the Annelida and Entozoa.

Order II.—DORSIBRANCHIA.

The genera of this order bear their branchiæ throughout the length of their body, or are at least along its middle portion, and in the various forms of branches, tufts, plates, or tubercules, in which the sanguineous vessels ramify. The majority of the species live in the mud, or swim freely in the sea. A few dwell in tubes.[4]

Those in which the branchiæ are most highly developed are placed at the head of the order.

Genus Arenicola, Lam. Branchiæ numerous, complicated, bush-shaped, and disposed over the intermediate segments of the body. Mouth terminal, in the form of a dilatable fleshy trunk, without either teeth or tentacula. No apparent eyes. The posterior extremity wants both the branchiæ and the bundles of setæ with which the other segments are furnished. There are no cirrhi to any part of the body.

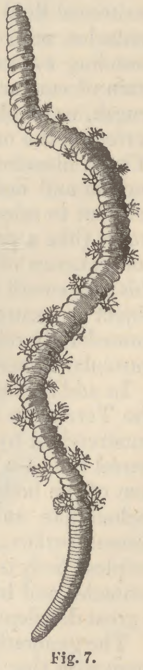

Fig. 7.

This genus was established by Lamarck, at the expense of the old genus *Lumbricus* of Linnæus. The best-known species, *A. piscatorum* (*Lum. marinus*, Linn.) or lug-worm (fig. 7), measures about a foot in length, and bears thirteen pair of branchiæ. It is of a reddish colour, and, when handled, stains the fingers of a fine yellow. It inhabits moist sand by the sea-shore, and is much used as a bait by fishermen.

This Annelid lives almost entirely by the swallowing of sand, and its position is indicated by the numerous little coils so frequent on the sea-shore below high-water mark. The sand traverses the entire extent of the animal's body, yielding for digestion and assimilation whatever it may contain of an organic nature, the residuum being rejected in the form of sand-coils. Deglutition, with this species, can only be performed when the sand is saturated with water. If too dry, it cannot be swallowed; if too wet, it cannot be seized by the proboscis.

Though the lug-worm may seem to inhabit the loose moist sand, or to perforate it merely mechanically, it is well known to secure the sides of the passage from closing in by applying to them a glutinous cement, which unites the particles of sand into a kind of wall or coating. This covering does not adhere to the body, but forms a surrounding tube, within which the animal moves with perfect freedom, and which it leaves behind it as it progressively advances; so that the passage is kept pervious throughout its entire length by means of the lining, which may not inaptly be compared to the brickwork of the shaft of a mine or tunnel.[1]

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[1] These species form the genus *Sabellaria* of Lamarck, and Hermella of Savigny. No department of natural history is more darkened by a confused cloud of synonyms than that which treats of the Annelida. "Ces perpétuels changements des noms," says Cuvier, "finiront par rendre l'étude de la nomenclature beaucoup plus difficile que celle des faits." (*Règne Animal*, t. iii., p. 195.)

[2] See the article *Siphostome*, in the *Dict. des Sciences Nat.*

[3] See Savigny, *Système des Annelides*, p. 98; and Deshayes, *Monographie du Genre Dentale*, in *Mém. de la Soc. d'Hist. Nat. de Paris*, t. ii., p. 321. We may here note, that the genus *Dentalium* (now classed with the molluscous tribes) seems to have been equally abundant in ancient as in modern times,—many of its calcareous tubes being found in a fossil state.

[4] Consult Orsted's *Gronlands Annulata dorsibranchia*, Kjöbenhaven, 1843; and by the same author, *Beschreibung der Plattwurmer*, ibid., 1844.

As allied to *Arenicola*, we may here name a singular Annelid, or sea-worm, called *Palolo*, of which specimens were some years ago presented to the British Museum by the Rev. J. B. Stair.[2] It is described by Mr J. E. Gray as characterized by—"a cylindrical body, separated into equal joints, each joint with a small tuft of three or four spicula on the middle of each side. Head——? Last joint ending in a couple of tentacles. Eggs globular." Most of the specimens examined were unfortunately much broken; and as none of the portions possessed a head, Mr Gray very properly did not describe it. He names the species *Palolo viridis*. It is of a green colour, with a row of round black spots down the middle of the dorsal (?) surface,—one spot on the middle of each joint. The following is Mr Stair's account of its habits and locality:—

"Palolo is the native name for a species of sea-worm which is found in some parts of Samoa (the Navigator Islands), in the South Pacific Ocean. They come regularly in the months of October and November, during portions of two days in each month, viz., the day before, and the day on which, the moon is in her last quarter. They appear in much greater numbers on the second than on the first day of their rising, and are only observed for two or three hours in the early part of each morning of their appearance. At the first dawn of day they may be felt by the hand swimming on the surface of the water; and as the day advances their numbers increase, so that by the time the sun has risen thousands may be observed in a very small space, sporting merrily during their short visit to the surface of the ocean. On the second day they appear at the same time, and in a similar manner, but in such countless myriads that the surface of the ocean is covered with them to a considerable extent. On each day, after sporting for an hour or two, they disappear until the next season, and not one is ever observed during the intervening time. Sometimes, when plentiful at one island in one month, scarcely any are observed the next; but they always appear with great regularity at the times mentioned, and these are the only times at which they are observed throughout the whole year. They are found only in certain parts of the islands, generally near the openings of the reefs on portions of the coast on which much fresh water is found; but that is not always the case.

"In size they may be compared to a very fine straw, and are of various colours and lengths, green, brown, white, and speckled, and in appearance and mode of swimming resemble very small snakes. They are exceedingly brittle, and if broken into many pieces, each piece swims off as though it were an entire worm. No particular direction appeared to be taken by them in swimming. I observed carefully to see whether they came from sea-ward or rose from the reef, and feel assured they came from the latter place. The natives are exceedingly fond of them, and calculate with great exactness the time of their appearance, which is looked forward to with great interest. The worms are caught in small baskets, beautifully made; and when taken on shore are tied up in leaves in small bundles and baked. Great quantities are eaten undressed, but either dressed or undressed are esteemed a great delicacy. Such is the desire to eat palolo by all classes, that immediately the fishing parties reach the shore, messengers are despatched in all directions with large quantities to parts of the island on which none appear."[3]

GENUS AMPHINOME, Brug. A pair of branchiæ on each segment of the body, and two bundles of setæ, and a pair of cirrhi to each foot. The sucker is destitute of maxillæ.

This genus was formed by Bruguière from *Aphrodita* of Pallas, and *Terebella* of Gmelin. Savigny divides it into three, viz.,—

1*st*, Gen. CHLŒIA, containing such as have five tentacula to the head, and branchiæ in the form of tri-pinnate leaves.

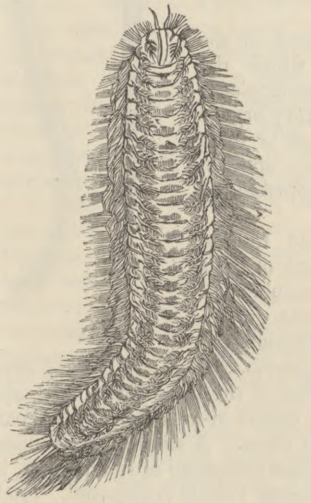

Fig. 8.

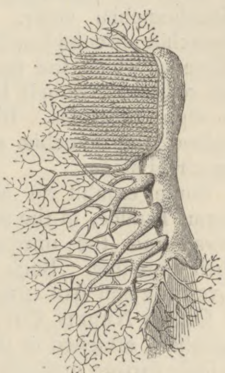

Fig. 9.

We have figured as an example a large and beautiful species, *C. capillata* (fig. 8), remarkable for its long and thick-set bundles of setæ of a brilliant yellow, and its purple branchiæ. It inhabits the Indian Seas. 2*d*, Gen. PLEIONE, containing those species which, with the same number of tentacula, have tufted branchiæ. 3*d*, Gen. EUPHROSINE, containing species characterized by bushy branchiæ (fig. 9), of a complicated structure, and strongly developed. The head is furnished with only a single tentaculum. The known species inhabit the Red Sea.

GENUS EUNICE, Cuv.—*Leodice*, Sav. Branchiæ in the form of plumes, but the mouth or trunk armed with three pair of corneous maxillæ of different forms. Each foot has two cirrhi and a tuft of setæ. The head bears five tentacula placed above the mouth, and two on the nape of the neck. Some of the species are furnished with a pair of eyes.

This genus contains a monstrous worm, *Eun. gigantea*, Cuv., the largest of all known Annelida. It measures from four to six feet in length, and its body consists of 448 segments. Its colour is ashy grey, with an opalescent reflection. It inhabits the Indian Seas. Montagu (in *Linn. Trans.*, vol. xi., pl. 3) has figured and described a species, under the title of

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[1] Maunder's *Treasury of Natural History*, p. 35.

[2] *Proceedings of the Zoological Society*, March 9, 1847.

[3] We owe a recent notice of this marine worm (misnamed a *fish*) to the Rev. William Harbutt, now officiating under the London Missionary Society. The following is an extract of a letter (addressed to Mr R. M. Smith of Edinburgh,) dated Samoa, 9th December 1854:—"I remember I promised to send you a few of the singular fish which annually visits our shores, and only on one morning in the year—the day in which the moon enters her last quarter in November. I should say two days, for on the first day the fish are just seen, few in number, and for a few minutes; on the second in great numbers. This year I had an argument with the people here. They calculated that the fish would appear on the 11th and be taken on the 12th; I, by the almanac, told them the days would be the 12th and 13th, and I proved correct. I was at the fishing, and a busy hour it was." The specimens transmitted to Mr Smith did not arrive in very good condition. *Palolo* seems to be, if not brittle, at least what mineralogists term "easily frangible."

Nereis sanguinea, but which, from the author's description of the jaws, is no doubt referrible to the present genus, or rather to that subdivision of it called Marphysa by Savigny, and distinguished by the absence of nuchal tentacula. The body is long, slightly depressed beneath, and its segments exceed 270, about 40 of which, at the posterior extremity, were of a much paler colour than the others, and appeared to Montagu as if they had been lately reproduced. The rest of the body was of a fine bronze colour, resplendent with changeable prismatic tints. It is a large species, measuring fourteen or fifteen inches in length. *Eun. tubicola* (fig. 10) inhabits the North Sea, and is remarkable for dwelling constantly in a solid corneous transparent tube.

After the preceding genera of the dorsibranchial order, of which the branchiæ are complicated, Cuvier places those of which the respiratory organs are reduced to simple laminæ, or even to slight tubercles. In some species, indeed, the branchiæ are represented by cirrhi alone.

Some exhibit an alliance to the genus Eunice, in the strength of their jaws, and the unequal number of their antennæ. Such are the genera Lysidice and Aglaura of Savigny.

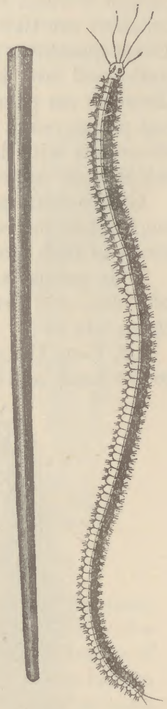

Fig. 10.

Genus Nereis, Cuv.—*Lycoris*, Sav. Tentacula of even numbers, attached to the sides of the base of the head, and a little further onwards two others bi-articulate, with a pair of simple tentacula between them. A single pair of maxillæ in the proboscis. Branchiæ composed of small plates, in which a net-work of sanguineous vessels is disposed. Each foot is moreover provided with two tubercles, two bundles of setæ, and an upper and under cirrhus.

"The Nereides," it is observed in Mr Griffith's Supplement, "most usually live in the excavations of littoral rocks, in the hollows of sponges, in certain alcyones, in univalve or bivalve shells, in madrepores, in the interstices of the radicles of Thalassiophytes, under stones, and in general in all bodies which present fissures more or less profound. There are some which bury themselves in mud or sand, where they excavate a lodge proportional to the dimensions of their body, and sometimes they line this dwelling with a mucous matter issuing from their body, in sufficient abundance to construct a tube or sheath. From this they put forth a greater or less portion of their body, but rarely the posterior extremity, so that they may be able to re-enter on the slightest indication of danger. They all appear to feed upon animal substances, whether in the living state, or in a state of putrefaction more or less advanced. M. Bosc, who has observed the manners of some species on the coasts of the United States, tells us positively that these animals feed upon polypi and small worms, on which they throw themselves, by darting out the anterior part of their body, which they have first contracted. Otho Fabricius tells us of some species of Spio, or Nereides with tubes, that they seize the planariæ on which they feed, by means of their long tentacula."

The species of this genus have a linear-shaped body, more or less convex above, and composed of numerous segments. The term Sea Scolopendræ, sometimes applied to them, expresses not inaptly their usual form. The species represented (fig. 11) is *Nereis nuntia*. *N. margaritacea* of Leach is distinguished by its pearly body, terminated by two long setæ. Its head is tri-lobate, with eight tentacula. This species is common near the Bell Rock, and is subject to great variation of colour.

Near the preceding Nereids may be classed several genera of the same slender form, and with branchiæ reduced to simple plates, or even to threads or tubercles. In some the maxillæ and tentacula are absent.[1]

Genus Phyllodoce, Sav.[2] Tentacula on the side of the head, in equal numbers, with four or five smaller ones in advance. Eyes apparent. Trunk large, and provided with a circle of very short fleshy tubercles. No apparent jaws. Branchiæ broad, and in the form of leaves, thin, flat, and veined. Body linear, with many segments.

Ph. laminosa, Sav., is almost cylindrical, and consists of from 325 to 338 segments. It is of a brown colour, with reflections of purple and violet. Though nearly a foot long, it measures only a line and a half in breadth. It inhabits the shores of Nice. The *Nereis lamelligera atlantica* of Pallas[3] is probably a Phyllodoce.

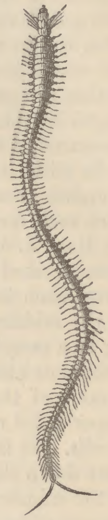

Fig. 11.

Genus Alciopa, Aud. and Edw. Mouth and tentacula resembling those of the preceding genus, but the feet or organs of movement present, in addition to the tubercles which bear the setæ and foliaceous cirrhi (branchiæ), two branchial tubercles, which occupy the upper and under margins.

Genus Spio, Fab. Body slender, with two very long tentacula resembling antennæ. Head furnished with eyes. Branchiæ on each segment of the body, in the form of a simple filament.

The species of this genus occur chiefly in the North Sea. They are of small size, and dwell in membranous tubes. They continually agitate their long tentacula. We have figured as an example the *S. crenaticornis* of Montagu (fig. 12).[4]

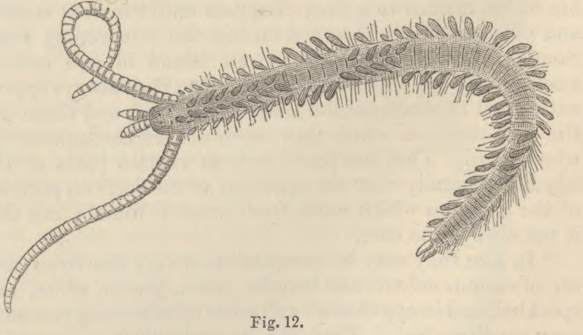

Fig. 12.

The tube of this species is extremely tender, being composed of minute adventitious matter slightly agglutinated. It is usually attached to *Sertulariæ*. In general the feelers or tentacula are alone displayed; these are kept in constant motion, and are turned about in all directions, although they are at the same time capable of instantaneous contraction.

Genus Syllis, Sav. Tentacula of uneven number, and moniliform, in common with the superior cirrhi of the feet. The latter very simple, with a single tuft of setæ.

Some diversity seems to exist in this genus in regard to

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[1] Consult Rathké *De Bopyro et Nereïde*, Rigæ, 1837.

[2] Not to be confounded with the genus so named by Ranzani (in *Mem. di Storia Natur.* dec. prima, pl. i., fig. 2-9), at a period posterior to the publication of Savigny's work.

[3] *Nov. Act. Petrop*, t. ii., 233, tab. 5.

[4] *Linn. Trans.* xi., tab. 14, fig. 6 (not 3, as in the author's *references* to his own figures).

the presence or absence of the so-called jaws. The segments of the body are very numerous.

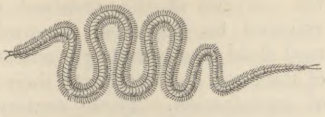
Fig. 13.

S. Monilaris, Sav. (fig. 13) inhabits the Red Sea. Its body is long (consisting of 341 segments), slightly depressed, insensibly narrowed towards the tail, which terminates in two slender moniliform threads.

Genus Glycera, Sav. Recognizable by the form of the head, which bears the shape of a fleshy conical point, resembling a little horn, and of which the summit is divided into four scarcely perceptible tentacula. The maxillæ are alleged to vary as in the preceding genus.

Few of the species have been observed in a recent state. *G. unicornis* is supposed by some to be identical with the *Nereis alba* of Muller and Gmelin. Its native country is unknown. *G. Meckelii* of Audouin and Edwards occurs on the shores of France.[1]

Genus Nephthys, Cuv. The species of this genus are distinguished by a trunk resembling that of Phyllodoce, but they want the tentacula, and have on each foot two bundles of setæ, widely separated, with an intermediate cirrhus.

The only species admitted by Savigny is *N. Hombergii*, discovered by the gentleman whose name it bears, near Havre de Grace.

Genus Lombrinera, Blainv. Tentacula wanting. The body, which is extremely elongated, bears on each segment merely a little forked tubercle, from which issues a small bundle of setæ.

To this genus are referrible, among other species, the *Nereis ebranchiata* of Pallas,[2] and the *Lumbricus fragilis* of Muller.[3] The latter forms the doubtful genus *Scoletoma* of Blainville.

Genus Aricia, Sav. Teeth and tentacula wanting. Body elongated, with two rows of lamellar cirrhi on the back. Anterior feet furnished with dentated crests, which are absent from the other organs of movement.

Genus Hesione, Sav. Body short, thickish, composed of few segments, and these not very distinguishable. A very long cirrhus, probably performing the functions of branchiæ, occupies the upper part of each foot, which has also another beneath, and a tuft of setæ. The sucker is large, but unprovided with either teeth or tentacula.

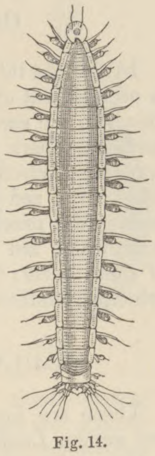
Fig. 14.

The species, though few in number, seem pretty widely distributed. *H. splendida*, Sav.[4] (fig. 14) occurs on the coasts of the Red Sea, and was found by Mathieu at the Isle of France. *H. festiva* greatly resembles the preceding, though of smaller size. It was discovered in the neighbourhood of Nice, by M. Risso.[5]

Genus Ophelia, Sav. Body thick and short, with the segments not very apparent, and the setæ scarcely visible. For two-thirds of its extent long cirrhi serve as branchiæ. The palate contains a toothed crest, and the lips are surrounded by tentacula, of which the two upper are larger than the others.

O. bicornis, Sav., discovered by Orbigny, seems the only species yet distinctly known.

Genus Cirrhatulus, Lam. A very long branchial filament, and two small tufts of setæ on each segment of the body. These segments are very numerous and closely set, and there is an additional range of filaments on the posterior part of what may be called the neck. The head, but slightly apparent, has neither jaws nor tentacula.

To this genus Lamarck (under the name of C. *borealis*) refers the *Lumbricus cirrhatus* of Otho Fabricius.[6] Cuvier considers the *Terebella tentaculata* of Montagu[7] as likewise being a species of Cirrhatulus.

The body of this marine Vermis is long and slender, and composed of more than 200 annulations, each of which is furnished with two fasciculi of very minute bristles. There are no eyes, and the branchiæ are obscure. From the sides of the segments issue very long, red, capillary, appendages, most numerous near the anterior end, the extreme point of which, however, is destitute of them, and becomes acuminated. The mouth is placed on the inferior face. The posterior end is likewise obtusely pointed. The length of this animal is eight or nine inches. The colour of the upper portion is olive green; of the under, dull orange. While in a state of nature, the filiform appendages of the sides are in continual motion, appearing like slender red worms, twisting themselves around the body in all directions. This curious species was taken from a piece of timber that had been perforated by *Pholades*, and was destitute of any natural covering.[8] Although Montagu placed it in the genus *Terebella*, he expressed his doubts as to the genus to which it really belonged.

Cirrhatulus Lamarckii, so abundant between tide-marks on the coast of Swansea, is described by Dr Williams as subsisting almost entirely by swallowing clay. Its long branchial appendages are but slightly, if at all subservient to the seizing of food. The mouth is a small circular orifice, situated ventrally a short distance below the tapering snout in which it terminates, and is well adapted for the suction of semi-fluid food. The native colours of this marine worm are beautifully variegated; the brilliant yellow of the intestine, which begins near the head and continues to the tail, being relieved by the greenish hue of the back, and contrasting well with the vermilion thread which spangles every portion of the body. This creature is capable of throwing out from the general cutaneous surface a considerable quantity of viscid secretion, by which it is enabled to roll itself within an impenetrable coat of mail. The mechanical art of applying the surrounding substances to the body is accomplished by the thready appendages; and nothing can be more exquisite and admirable than the perfect, though very rapid manner in which these microscopic strings accomplish their protecting work. In its natural state, *Cirrhatulus* does not seem so much to inhabit channels, as soft semi-fluid clay, in which it is found beneath stones, near the ebb-mark of the tide.

Genus Palmyra, Sav. Setæ of the upper tufts large, flattened, fan-shaped, and shining with the brilliancy of polished gold; under tufts small. Cirrhi and branchiæ not much developed. Body elongated, with two rather long, and three very short tentacula.

The only known species is *P. aurifera*, a native of the Isle of France, from whence it was sent to Paris by M. Mathieu.

Genus Aphrodita, Linn. Distinguished by its two longitudinal ranges of broad membranous scales, which cover the back, and beneath which the branchiæ, in the form of little fleshy crests, are concealed.[9]

The form of these Annelides is usually flattish, and is shorter and broader than in most of the genera. The interior contains a very thick and muscular œsophagus, susceptible of being in part protruded outwards, like a trunk or sucker; there is likewise an unequal intestine, furnished on each side with a great number of branched cæca, of which the extremities are attached between the bases of the tufts of setæ, which serve as locomotive organs. It is alleged that the sexes are separate in the Aphroditæ, and that the females are oviparous. At certain periods the female is certainly found filled with egg-like substances, which swim in a circumambient liquid, and the male is said to abound with milt.

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[1] *Littor. de la France*, Annelides, pl. vi., fig. i.

[2] *Nov. Act. Petrop.*, t. ii., pl. vi., fig. 2.

[3] *Zool. Dan.*, pl. xxii.

[4] *Ouvrage d'Egypte*, pl. iii., fig. 3.

[5] *Eur. Merid.*, t. iv., p. 418.

[6] *Fauna Grœnlandica*, p. 281, fig. 5.

[7] *Linn. Trans.* ix., pl. vi., fig. 2.

[8] *Ibid.*, p. 110.

[9] In the opinion of some observers, the *Aphroditæ* offer an exception to the characters of their class, in not being possessed of *red blood*, but Cuvier has stated his belief (*Règne Animal*, t. iii., p. 186, *note*) that that feature is distinguishable in *Aph. squamata*.

The ordinal term of dorsibranchiate scarcely applies to the majority of the species, so many of which present no branchial appendages either on the back or elsewhere. They are exceptional also in this respect, that their blood is colourless. Respiration is performed on a different principle from that which pervades the other annelids. The blood-system is in abeyance, while that of the chyle-aqueous is exaggerated, and this fluid of the peritoneal cavity is in this group the exclusive medium through which oxygen is absorbed.

Savigny has raised this genus to the rank of a family, containing three genera, viz., *Palmyra*, already noticed, *Halithea*, and *Polynoe*.

To the genus *Halithea* belongs a well-known British species, *Aph. aculeata*, Linn. It is of an oval form, six or seven inches in length, and nearly two inches broad. The scales of the back are covered, and in part concealed, by a substance resembling tow, which takes its growth from the sides. From these sides also spring groups of strong spines, which partially pierce through the tow-like substance, and bundles of softer and more flexuous bristles, which shine with the brilliancy of gold, or exhibit the various tints of the rainbow, scarcely yielding in beauty, as Cuvier has observed, either to the lustrous plumage of the humming-bird, or the sparkling of precious gems. Lower down is a tubercle, from which spines issue in three groups, and of three different sizes, and lastly, a fleshy cone. There are forty of these tubercles on each side; and between the first two there are a pair of small fleshy tentacula. There are fifteen pair of broad scales, sometimes pursed, upon the back, and fifteen small branchial crests on each side. This curious creature is known along our native shores by the name of *sea-mouse*. Two other species, *Aph. sericea* and *hystrix*, are referrible to the same genus.

It appears from Dr Williams' observations that the true aphrodite type of respiration occurs in *Aphrodita aculeata*. In this species, the actual uses of the "elytra," or dorsal scales, become apparent. Furnished with a peculiar apparatus of muscles, they exhibit periodical movements of elevation and depression. Overspread by a coating of felt, easily permeable by the water, the space beneath the scales, during their elevation, becomes filled with a large volume of *filtered* water, which, during the descent of the scales, is forcibly emitted at the posterior end of the body. It is important to remark that the current thus established laves only the *exterior* of the dorsal region of the body. It nowhere enters the internal cavities, the latter being shut up by a membranous partition from that spacious exterior enclosure bounded above by the felt and the elytra. The peritoneal chamber is very spacious in this species, and is filled by a fluid which only in a slight degree contains organized particles. The complex and labyrinthic appendages of the stomach lie *floating* in this fluid, and in the chambers which divide the roots of the feet. From this relation of contact between the peritoneal fluid and the digestive cæca, *which are always filled by a dark green chyle*, Dr Williams regards it as impossible to resist the conclusion that the contained fluid is really a *reservoir* wherein the oxygen of the *external* respiratory current already referred to, becomes accumulated. From the peritoneal fluid the aërating element extends in the direction of the cæca, and imparts to their contents a higher character of organization. These contents thus prepared by a sojourn in the cæca of the stomach, become the direct pabulum for replenishing the *true* blood which is distributed in vessels over the parietes of those chylous repositories.

Another subdivision of the Linnæan Aphroditæ has none of the flax-like substance on the back—the tentacula are five in number—and the trunk encloses strong corneous mandibles (fig. 15). It is named *Polynoe* by Savigny, and contains most of the old species described by Linnæus, Pallas, Muller, and Otho Fabricius. The *Aph. clava* of Montagu[1] is a Polynoe. Several other generic groups have been recently formed by Audouin, Milne-Edwards, and others, from the genus Aphrodita.[2]

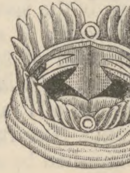

Fig. 15.

In Erichson's *Archives* (for January 1845), we have an interesting note on the development and metamorphoses of *Polynoe cirrata*. It is born under a larva form greatly resembling the young of a very dissimilar genus *Terebella*. The eggs are found in packets on the back of the mother, and are of a bluish colour. The larva, of an ovoid form, and greenish colour, bears in front of its ciliated cincture a cephalic lobe, terminated by a little bundle of ciliæ, and enclosing two blackish eye-shaped points. The mouth is transverse, and is placed behind the ciliated collar.

GENUS CHÆTOPTERUS, Cuv. Mouth with neither trunk nor sucker, provided above with a lip, to which are attached two or three small tentacula. Then follows a disk, furnished with nine pair of feet, followed by a couple of long silky bundles like wings. The lamelliform branchiæ are attached rather to the under than the upper portion, and prevail along the middle of the body.

There is only one species of this singular genus, *Ch. pergamentaceus*, Cuv. which measures from eight to ten inches in length, and inhabits a tube formed of a substance resembling parchment. It occurs in the West Indian seas.[3]

ORDER III.—ABRANCHIA.

In this the third principal division of the Annelida there is no apparent external organ of respiration. Certain species, like the earth-worm, seem to respire over the entire surface; others, like the leech, by interior cavities. We perceive a circulating system of closed vessels, generally filled with red blood, and a nervous knotted cord, as among the preceding groups.[4] Some are furnished with setæ, which aid the locomotion, while others are destitute of these parts; from whence arises a subdivision into two principal families.

FAMILY I.—ABRANCHIA SETIGERA.

These are furnished with setæ, and correspond to the two genera *Lumbricus* and *Nais* of Linn.

GENUS LUMBRICUS, Cuv. Body long, contractile, cylindrical, divided by wrinkles into a great number of apparent rings. Mouth without teeth, subterminal, bilabiate, the upper lip larger than the other, advanced. No eyes.

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[1] *Linn. Trans.* ix., pl. vii., fig. 3.

[2] See *Règne Animal*, t. iii., p. 207.

[3] For descriptive notices (with figures) of several rare and otherwise interesting *British* Annelida, consult a series of papers published in the *Magazine of Natural History* (chiefly volumes 6th and 7th), by an excellent observer, the late Dr Johnston of Berwick.

[4] See M. Ant. Dugés *Sur l'Anat. et Phys des Annel. Abranch.* in *Ann. des Sciences Nat.* for September 1828.

This genus corresponds to *Enterion* of Savigny, and contains the earth-worms and other species. The setæ are rough and short, as if unguiculated. Each segment is provided with eight of these setæ, that is, four on each side, united in pairs, and forming, by their distribution on the body, eight longitudinal rows, of which four are lateral and four inferior. From six to nine of the segments, comprised between the 26th and the 37th, are swollen, and form towards the anterior and superior portion of the body a kind of cincture, especially perceptible during the breeding season. In the interior of these creatures we perceive a straight wrinkled intestine, unprovided with a cæcum, but receiving in its course several muscular fibres (proper to the rings of the body), which form an equal amount of small diaphragms. Some internal whitish glands towards the anterior of the body are regarded as connected with the generative system. The nervous cord consists of a series or infinity of very small ganglia, closely set together. The circulation of the blood among the Lumbrici is by no means difficult to detect. We may perceive arising from the intestinal canal, and from the inner surface of the outer envelope, an infinite number of small veinous vessels, which interlace with a great assemblage of arterial ones. These veins unite in one common trunk, placed longitudinally beneath the belly, and from that trunk proceed five small canals, which unite in a single dorsal vessel, which may be regarded as the heart. From the last-mentioned organ small arteries take their origin, and proceed to form a network with the veins of the superficies of the body,—thus completing the circulation. Respiration appears to be carried on at the surface of the skin, most likely by means of extremely small internal branchiæ.

The appearance of the common earth-worm (*Lumoricus terrestris*) is too familiar to need description in this place. We shall merely mention, that beneath the sixteenth segment there are two pores, the uses of which are still unknown. The mode of production is likewise still disputed. M. Montegre[1] maintains that the eggs descend between the intestine and the outer envelope, around the rectum, where they hatch, and are speedily protruded in the living state. M. Dufour, on the contrary,[2] asserts that they lay eggs resembling those of leeches[3] (fig. 16). The ordinary habits of the earth-worm are well known. They inhabit moist earth, which they pierce in all directions, and a quantity of which they swallow. They also, however, feed on animal and vegetable remains, and always prefer soil imbued with those substances. They seek each other's society chiefly during the night, and in the month of June. Under the specific name of *terrestris*, naturalists have no doubt confounded many different kinds. Savigny, to whom we owe so much in relation to the Annelida in general, has, since the publication of his great work on that class, devoted his attention more particularly to the genus Lumbricus, and has ascertained the existence of about twenty-two species in the environs of Paris alone.[4]

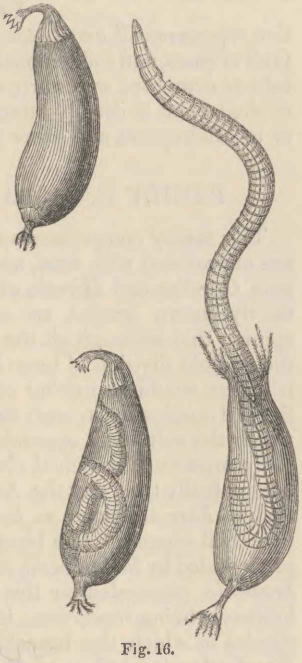

Fig. 16.

Earth-worms undoubtedly possess a certain reproductive power, when deprived of portions of their bodies, but not to the extent of producing perfect individuals from separated portions. It is easy to conceive that the removal of the hinder part of the body, which does not contain any organs essential to life, would not destroy the anterior portion; but that the hinder half, when left to itself, should reproduce the mouth, gizzard, stomach, and other important parts, was much less likely. On cutting an earth-worm into two, the anterior portion, according to Mr Rymer Jones, is generally found to survive; but this is not the case with the other end, which, although it may show signs of vitality for a length of time, possesses no power of reproduction, and eventually dies. The experiments, however, of M. Dugés, certainly go to prove that very important portions may be removed and reproduced. He cut off from four to eight of the anterior rings, thereby, of course, removing the cephalic pair of ganglia, the mouth, and a part of the œsophagus. After the lapse of from ten to thirty days, a conical vascular protuberance was perceived to sprout from the bottom of the wound; and in eight or ten days more, this new portion had become so far developed, that not only were all the removed rings apparent, but even the mouth and upper lip had assumed their pristine form, and the creature began to swallow food, and bury itself beneath the earth. Dr Williams' experiments, again, were attended by an entirely different result. He found that although the anterior half, after the bisection, did not lose the power of locomotion, its movements after a few days became much less active and vigorous. The wounded segment soon began to contract and wither away; and this process of dissolution, creeping onwards from segment to segment, the cephalic extremity, or head itself, soon ceased to live. The tail half loses at once all power of onward motion, and merely writhes about on one spot. Its movements become *excited*, not *voluntary*, and it never re-acquires the power of swallowing earth. The process of decay begins much sooner than in the other half, and, extending towards the tail, implicates first one ring, and then another, till the whole is dead.[5]

The common earth-worm, though apt to be despised and trodden on, is really a useful creature in its way. Mr Knapp describes it as the natural manurer of the soil, consuming on the surface the softer parts of decayed vegetable matters, and conveying downwards the more woody fibres, which there moulder and fertilize. They perforate the earth in all directions, thus rendering it permeable by air and water, both indispensable to vegetable life. According to Mr Darwin's mode of expression, they give a kind of under-tillage to the land, performing the same below ground that the spade does above for the garden, and the plough for arable soil. It is, in consequence, chiefly of the natural operations of worms that fields which have been overspread with lime, burnt marl, or cinders, become in process of time covered by a finely divided soil, fitted for the support of vegetation. This result, though usually attributed by farmers to the "working down" of these materials, is really due to the action of earthworms, as may be seen in the innumerable *casts* of which the initial soil consists. These are obviously produced by the digestive proceedings of the worms, which take into their intestinal canal a large quantity of the soil in which they feed and burrow, and then reject it in the form of the so-called casts. "In this manner," says Mr Darwin, "a field, manured with marl, has been covered, in the course of 80 years, with a bed of earth averaging 13 inches in thickness."

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[1] *Mém. du Mus.*, t. i., p. 242.

[2] *Ann. des Sciences Nat.*, t. v., p. 17; and xiv., p. 216.

[3] This seeming contrariety may be reconciled by bearing in mind that these creatures are in fact *ovo-viviparous*, and are sometimes born in the completed state, sometimes still surrounded by an envelope or egg-like covering. Dr Williams, however, has recently testified to the fact, from experimental observation, that the young escape from the ova before they leave the body of the parent, and are endowed with independent powers of locomotion.

[4] See also M. Morren's Treatise *De Lumbrici terrestris Historia Naturali nec non anatomica*. Brux., 1829.

[5] Hoffmeister has published some valuable researches regarding the various species of earth-worm, in his work, *De vermibus quibusdam ad genus Lumbricorum pertinentibus*, Berol., 1842. To the genus *Lumbricus*, properly so called, he assigns six species, viz., *Lumb. agricola, rubellus, anatomicus, riparius, olidus,* and *agilis*, all of which occur in North Germany.

In the genus *Hypogæon* of Savigny, each segment is furnished with an additional seta on its dorsal surface, and the setæ are long, spiny, and sharp-pointed. The body in form and colour greatly resembles that of the common earthworm, but the segments are less numerous, not exceeding 106, whereas those of the latter amount to 120 and upwards. The only species with which we are acquainted is *Hyp. hirtum*, first observed in the neighbourhood of Philadelphia.

Genus Nais, Linn. Body elongated, linear, flattened, transparent or semi-transparent, and in general provided with lateral ciliæ, simple or in tufts. Segments less distinctly marked than in the earth-worm.

The synonymy of this genus is very confused, its nature and attributes obscure, and its position in the system consequently various, according to the views of different observers. The name, borrowed from the heathen mythology, was first applied by Muller, and was generally adopted by contemporaneous, as it has been by succeeding, naturalists. It was written *Naias* by Bruguière (in *Encyc. Méthod.*), an erroneous alteration, in so far as the latter term had been previously consecrated by Linnæus to a genus in botany. Lamouroux increased the confusion by bestowing the name of *Naisa* on a polypus genus of the family of *Tubularia*, already known by the title of *Plumastella;* and the resemblance of the two names has induced some compilers to refer to them as synonymous, although they in fact signify objects belonging to separate classes of the animal kingdom.

Lamarck and Cuvier, in preserving the name of *Nais* to the subjects of our present notice, do not agree regarding their relations to other groups. The former author places them in the third or concluding order of his class Vermes (*Vers hispides*), thus disposing them between the genus *Gordius* and the *Epizoariæ*. His reason for so doing is, that the structure of the Naides is by no means sufficiently composite to entitle them to a place among the true Annelida; and the fact of their being capable of multiplication by incision, shows that their nature is somewhat anomalous in relation to the last-named class. We may bear in mind, however, that notwithstanding the observations of Trembley and Roesel, their *tomiparous* generation is doubted by Bosc, and denied by Dr Williams; and, all things considered, they may be regarded as more nearly related to the genera *Nereis* and *Lumbricus* than to any other.

The Naides in general are small vermiform creatures, of a few lines in length, of a reddish colour, though diaphanous, extremely active in their movements, and of a voracious disposition. They abound in fresh waters, where some dwell upon aquatic plants,—others beneath stones, or in perforations in the mud. They prey on minute Crustacea, such as the genus *Daphnia*, and on the still minuter animalcular tribes, and are themselves greedily devoured by the fresh-water polypi, which swallow them up, notwithstanding the pointed ciliæ with which their sides are armed. These ciliæ, however, and other apparently indigestible portions, are afterwards disgorged by the polypi, in the same manner as owls and other birds of prey reject from their stomachs little rounded pellets of hair and feathers.

The productive powers of the Naides, by whatever process accomplished, are truly astonishing. They appear in countless thousands in the waters of marshes after the lapse of a few hours, prior to which only some solitary individuals were perceptible. The mouth in these animals is sometimes a simple cleft, sometimes an opening, accompanied by two lips. The *N. proboscidia* of Gmelin, being provided with a trunk, forms the genus *Stylaria* of Lamarck; while certain anomalous species, such as *Lumbricus tubifex* and *marinus* of Muller, constitute the conterminous genus *Tubifex* of the former author. They dwell in perforations in the mud of streams and marshes, and in the sand of the seashore. We may conclude by observing, that the nervous system of the Naides is but obscurely known, and that the ocular points on the heads of certain species, though vaguely named eyes, cannot with actual certainty be regarded as organs of vision.

Genus Climena, Lam. Head without tentacula or other appendages. Body cylindrical, composed of few segments, somewhat swollen about the middle, and attenuated at either end. The posterior extremity is truncated and radiated.

These creatures inhabit fixed tubes of a cylindrical form and membranous texture, open at both ends. Our illustration represents *Cl. amphistoma* (fig. 17), a species taken in the Gulf of Suez, and indigenous to the shores of the Red Sea. Its tube is composed exteriorly of grains of sand and fragments of shells, and is usually attached to the interstices of rocks, or to Madrepores and other productions of the sea.

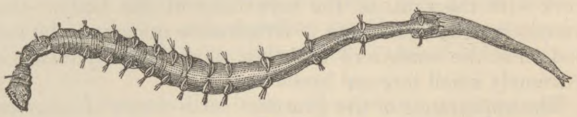

Fig. 17.

FAMILY II.—ABRANCHIA ASETIGERA.

This family comprehends such of the abranchial order as are unprovided with setæ, and is constituted by the old genera *Gordius* and *Hirudo* of Linn., of which all the distinctly-known species are aquatic.[1] Dr Williams is of opinion that although all the Annelida may be comprised in the twofold division of branchiata and abranchiata, such distribution would be neither convenient nor unobjectionable. Several species exist, such as those of the genus *Syllis*, in which the soft pedal appendages do not contain any specially organized branchial element. But the proposition is anatomically true, that the Annelida are really divisible into such as *have* and such as *have not* external and apparent branchial organs. The bipartite arrangement, long since propounded by M. Dumeril, of *Crypto-branchia* and *Gymno-branchia*, proceeded on this conception; the former term, however, being inaccurate, in so far as there is actually no species in which the branchiæ are internal or concealed. Respiration, according to Dr Williams, in all those destitute of external appendages, *is* performed internally, but not by any specially constructed organs. The function, under such circumstances, devolves either upon the general walls of the alimentary canal or external surface of the body, or it is enacted by the fluid which, in nearly all the abranchiate genera (except the leech and earth-worm), occupies the peritoneal cavity. All the external branchial appendages may be sub-divided into two chief divisions. In one, the organ is constructed with special reference to the exposure of the blood-proper to the agency of the respiratory element; in the other, the branchia is a mere hollow process filled with the chyle-aqueous fluid of the cavity just named.

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[1] We do not exactly know what species of the lower tribes is alluded to by Sir T. S. Raffles in one of his letters descriptive of an excursion from Bencoolen. "I must not omit to tell you, that in passing through the forest, we were, much to our inconvenience, greatly annoyed by *leeches;* they got into our boots and shoes, which became filled with blood. At night, too, they fell off the leaves that sheltered us from the weather, and on awaking in the morning we found ourselves bleeding profusely. These were a species of intruders we were not prepared for." Another species of land leech is said to inhabit Madagascar, where it occurs on plants. It seizes greedily on the legs of the passers by, and sucks their blood.

It has been affirmed, as a law of the organization in all abranchiate Annelida, that the system of the blood-proper is more developed on the parietes of the intestinal canal than on the integuments. This fact, whenever the peritoneal space is obliterated by the adherence of the intestinal cylinder to that of the integument, transfers the office of respiration from the latter to the former region; that is, as is practically demonstrable in the instance of *Nais filiformis*, the large volume of water which is incessantly streaming throughout the length of the alimentary canal, holding atmospheric air in solution, while it ministers by its organic particles to the nutrition of the system, contributes also by the air with which it is mixed to the great purpose of aërating the living fluids of the organism.

We may now observe that leeches in general (Hirudines) are characterized by an oblong body, sometimes depressed, transversely wrinkled, and furnished with a dilatable cavity at either extremity—that is, the mouth is surrounded by a lip, and the posterior end is provided with a flattened disk. These latter parts are useful as organs of prehension and locomotion, and also act as suckers. The mouth, placed in the anterior cavity, is furnished with three jaws.

These useful vermes were probably known in very ancient times. The *Halukah* or *Gnalukah* of the Hebrews appears to have been one of this tribe, at least the term has been so translated in our versions of the Proverbs, ch. xxx., v. 15: "The horse-leech hath two daughters, crying, Give, give." The Greek writers make mention of them under the name of *Bdella*, and the Latin authors under those of *Hirudo* and *Sanguisuga;* but the ascertainment of the precise species indicated is by no means easy. After the revival of learning we have various general notices of their history and habits, although it was so late as the time of Linnæus before we attained to any knowledge of their specific distinctions. The Swedish naturalist (in his *Fauna Suecica*) described eight species, and numerous additions have been made in more recent times. For a long period the genus *Hirudo*, as founded by Ray and adopted by Linnæus, experienced no sub-division; but the labours of Leach, Oken, Savigny, Lamarck, and others, have shown the propriety of re-arranging a group, consisting no doubt of natural constituent parts, but composed of beings exhibiting a varied range of structure, and too much extended for the formation of a genus, properly so called.

The structure of these creatures is soft and contractile, composed of a great number of articulations, and generally invested by an abundant supply of mucous moisture. The anterior cavity, which contains the mouth, is named *capula* by Savigny, while the posterior disk bears the name of *cotyla* in the nomenclature of that author. On the anterior segments certain small black points are observable, which are regarded as fulfilling the functions of eyes. They vary in number in the different genera, from two to ten. Various experiments have been made with a view to the ascertainment of their sense of sight. If we place leeches in a vessel surrounded by black paper, and permit the light to enter only by means of a single small orifice, they are by no means slow in directing themselves to that point;—but this observation we deem to be in no way conclusive, in as far as light produces an efficient action and a directing influence, not only upon many of the lowest tribes, which we know to be destitute of eyes, but even upon the subjects of the vegetable kingdom. M. Moquin-Tandon however asserts, that having placed a small piece of red-coloured wood in front of *Nephelis vulgaris*, it evidently turned round on purpose to avoid it.[1] Their perception of the sense of touch is delicate, although they possess no special or circumscribed organs for its reception. The sense of taste is obvious,—that of hearing and of smell imperceptible. No odour affects them,—no sound seems to produce any influence; nor can we detect any organs which may reasonably be deemed the seat of these last-named functions.

The tegumentary system of leeches has been examined in detail in very few species. In the medicinal leech three parts are, however, distinguishable—the epidermis, an intermediate layer which is the seat of colour, and the dermis. The epidermis is extremely fine and delicate, perfectly colourless, and remarkably deciduous, that is to say, it is frequently renewed, even as often as once in every four or five days in warm weather. It adheres intimately to the lower layer, but not by its entire extent—being frequently free between the rings of which the body of the creature is composed. When detached we perceive that it is perfectly transparent at the points which adhered to the coloured layer, and slightly opake, or even of a whitish colour where it became unattached in passing from one segment to another. Under the microscope it is seen to be pierced by an infinity of small holes, through which a mucous liquid flows, which lubricates the surface. The coloured layer, or *pigmentum*, adheres strongly to the dermis on which it lies. The hues which it exhibits are very different according to the species,—sometimes they are dark and uniform, but usually lighter on the under than the upper surface; sometimes the ground colour is varied by spots or streaks of different intensities, while the pigment, if we may so express it, is occasionally almost colourless, and we may then perceive distinctly through the skin all the interior organs of the body. The dermis, or deepest layer, exhibits a curious organization; it consists of a thickish tunic, presenting an appearance of distinct circular articulations, which produce the ringed or wrinkled aspect of the external surface. The spaces which exist between these rings are covered by the epidermis, and seem intended to facilitate the varied movements of the animal.

Beneath the skin, of course, are placed the muscles. We find first a layer of transverse fibres, which adheres intimately to the dermis. This layer covers other muscles, of which the direction is longitudinal; and beneath these we find some more, of which the direction is again transverse.

The *capula* or oral sucker is formed by two extensile lips—the one superior, usually large, sometimes almost lanceolate; the other inferior, and less advanced. Within it are placed the jaws, rarely wanting, and usually three in number, disposed triangularly, and fixed upon a corresponding number of little tubercles. Their consistence is slightly cartilaginous, their form almost lenticular, and their margin, free and cutting, is sometimes smooth, sometimes furnished with a double row of dentations, more or less numerous according to the different kinds. A sort of cartilaginous ring, which frequently surrounds the base of the tubercles, indicates the opening of the intestinal canal, which commences by a species of œsophagus more or less narrow, presenting occasionally some longitudinal folds, but never any lateral pouch-like swellings. The ensuing portion or stomach, on the contrary, usually exhibits throughout its entire extent expansions more or less perceptible, according to the state of repletion. In certain species (such as *Clepsina complanata*) these lateral appendages are never effaced, but constitute permanent cæca. The rectum is generally separated from the stomach by a valvular contraction. The anal opening is on the back, at the origin of the posterior sucker, called *cotyla* by Savigny. The digestive canal is throughout composed of two pellucid tunics, and towards its extremity some muscular fibres are perceptible. Although the existence of a liver in the leech tribe is not so ascertained as to be at all generally admitted (indeed it is denied by some, and doubted by many), yet M. Blainville describes an apparatus for the secretion of bile, consisting of a cellulo-membranous tissue surrounding a portion of the stomach and intestine.[1]

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[1] *Monographie de la famille des Hirudinées.* Montpellier, 1826, in 4to.

All leeches are blood-thirsty and voracious, and support themselves by sucking the life-blood of other animals. Their powers of digestion and assimilation are, however, extremely slow; and hence, probably their reluctance to repeat their operations for behoof of a patient, when their doing so is neither pleasant nor profitable to themselves. After the lapse of days, weeks, and even months, portions of the liquid or solid matters which they may have swallowed are found to remain in the intestinal canal. The kinds used in medicine, moreover, offer this peculiarity, that the blood which they have sucked does not seem to experience any sensible alteration in their stomach, but maintains its natural colour and fluidity. If, however, the leech dies, or the blood is exposed to the air, it speedily coagulates, and becomes of a blackish brown.

In regard to the *bleeding* of leeches, M. Olivier (*Journal de Chirurgie par Malgaigne*, 1844, Mars., p. 88), has proposed the following procedure:—When fully gorged, the creature should be punctured with the point of a lancet in one of the transverse wrinkles of the back, at the termination of the first third of the length of the body, the incision being made parallel with it, between the vein and artery, and in a direction from the anterior backwards. The wound is to be two millimetres in length, and the leech is to be afterwards placed in lukewarm water; in which, by its own contractions, which may be assisted by pressure with the fingers, all the blood which it has sucked escapes through the wound. It should afterwards be placed in rain or river water. It is said that, notwithstanding the carnivorous nature of these creatures, they are benefited by having access to the plant called *Ranunculus aquaticus.* The young are alleged to feed upon its leaves. On contemplating the singular dental apparatus of the leech, and considering the nature of the food (we presume minute aquatic animals) on which it usually subsists, Mr Rymer Jones finds it difficult to avoid the conclusion that such a structure is rather a provision subservient to the alleviation of human suffering, than necessary to supply the wants of the animals themselves. It is certain that in the streams, ponds, and marshes where they usually inhabit, an opportunity of sucking any warm-blooded animal, whether man or beast, must be extremely rare, so that they can but seldom exercise their instinctive love of blood. Neither does it appear that the fluid which they swallow so greedily is fitted to their constitution; for, although it is true that it remains for a considerable time in their interior without corrupting, yet it is well known that the death of the leech is generally caused by the indulgence of such inordinate repletion, provided the greater portion of what has been swallowed is not speedily regurgitated through the mouth.

The nervous system of the leech tribe has been described in some detail by several authors, especially that of *Sanguisuga officinalis*, *Hæmopis vorax*, *Nephelis gigas*, and *Albione muricata.* It is composed of a series of ganglions, extending from the mouth to the extremity of the body, and placed, as among the other articulated classes, beneath the alimentary canal. From each ganglion proceed nervous threads, which ramify *ad infinitum* to the other parts.

The circulating system of leeches has been the subject of still more numerous researches. It is probably more highly developed among these animals than in any other Annelida. In this class the presence or absence of a heart, or heart-like centre, is by no means the true criterion of its amount of evolution. The quantity of blood relatively to the size of the body, the degree of capillary subdivision on the periphery of the blood system, and the proportion of the latter to the peritoneal fluid, give true indications. In the leech there exists no free space between the intestine and the integument, and so the chylous fluid, which in nearly all the other Annelida occupies the general cavity of the body, is transferred into the *interior* of the lateral diverticula of the stomach. We shall here briefly notice the labours of some foreign physiologists. MM. Thomas,[2] Cuvier, Carena,[3] Moquin-Tandon, Dugés[4] and Audouin,[5] have signalized themselves in this laborious field. All the species hitherto examined have presented four longitudinal vascular trunks—one dorsal, another ventral (these two being separated by the alimentary canal), and two lateral. These principal organs communicate with each other, not only by the capillary vessels which meet and intermingle in the different parts to which they are distributed, but also by special branches of considerable diameter, which proceed directly from one vascular trunk to another. The ventral vessel furnishes large branches, which, mounting vertically on either side, embrace the intestinal canal, and open on the dorsal vessel. Dugés names these the *abdomino-dorsal branches.* The lateral branches communicate with each other by means of transverse branches, which pass beneath the medullary cord. These branches have been well figured and described by Jean Muller (in *Archiv. fur Anat. und Phys.* Jan., Marz., 1828), and Dugés names them *latero-abdominal branches.* Lastly, these lateral trunks also send large branches to the dorsal vessel, which bear the designation of *latero-dorsal branches.* In addition to these canals, which thus establish a direct connection between the principal trunks, each of the latter gives rise to an infinite number of small vessels, which carry the blood to the various parts, and especially to the skin, which may be regarded as the principal, though not the sole organ of respiration. That other organ, to which we now allude, consists of certain pouches, amply provided with blood-vessels, which form a net-work on their coats, and proceed from the subdivision of a vessel furnished by the latero-abdominal branches, as well as of a large vascular pouch or bag called pulmonary by Dugés, and which is derived from the lateral trunk. In a species of *Albione* dissected by M. Audouin, the lateral vessels were perceived to be in direct communication with the respiratory pouches by means of two branches, one of which is anterior, the other posterior. He also observed that numerous branches sprang from the anterior portion of the dorsal vessel, and proceeded partly to the pouches, and partly to the lateral trunks. Thus the pouches communicate at the same time, both with the dorsal and lateral vessels. In accordance with these views, the process of circulation is supposed to be as follows:—The lateral trunks are regarded as great veins, which receive the blood from all parts of the body, and transmit it to the respiratory pouches, in which it becomes re-oxygenated; a small portion then flows back to the lateral vessels, while the greater portion enters the dorsal vessel, and then the ventral one, both of which assist in propelling it to all the other parts of the body, from whence it returns to the lateral branches, and thence flows to the respiratory pouches as aforesaid. We must add, however, that M. de Blainville and others deny that the pouches or vesicular sacks just mentioned are of a pulmonary nature.[1] They regard them rather as secreting glands; and it is certain that respiration is carried on in great part through the medium of the skin, or rather that the function of breathing falls on the *united* structure of the intestine and integument. Various kinds of leeches may be often seen fixed by their posterior sucker, and swinging themselves to and fro for hours and even days together, their bodies being at that time more than usually flattened in order to render the motion more effective. They are then respiring after the manner of the Naids, by bringing their cutaneous system into constant contact with a fresh supply of water. During this singular process the pulmonary pouches are almost quite inert, and their sanguineous vessels scarcely perceptible, while the *cutaneous* network, on the contrary, is in full and remarkable activity.

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[1] *Essai d'une Monographie de la famille des Hirudinées.* Paris, 1827, in 8vo.

[2] *Mém. pour servir à l'Histoire Nat. des Sangsues.* Paris, 1806.

[3] *Monographie du Genre Hirudo*, in *Mém. de l'Acad. de Turin*, tom. xxv.

[4] *Recherches sur la Circulation, &c., des Annelides Abranches*, 1828.

[5] Articles *Sangsue* and *Sangsues*, in the *Dictionnaire Classique d'Hist. Nat.*

Leeches are hermaphrodites, like others of their class; but sexual union of separate individuals is indispensable to the process of fecundation. Although in many of their more obvious characters they so nearly resemble the Planariæ, they stand too high in the scale to be capable of reproduction by excision or the cutting of parts. A variety of opinion exists among naturalists regarding the mode of production, whether by eggs or living young. It is probable that such as do not appear to lay eggs are merely ovo-viviparous, and bring forth their young alive, after they have been hatched in the body of the parent. The majority of species in truth lay *oviferous capsules*, each containing several germs. Certain kinds of *Clepsina* are distinguished by a small and peculiar pouch in the abdomen, in which the young seek protection during infancy. They attain to full size rather slowly, and the duration of life is considerable, though not distinctly known. Medicinal leeches have been kept in life for a period of eight years; and it has been inferred that if, with the disadvantages of confinement and irregular supplies of food, they survive so long, their natural term of life must be much greater. This, however, we regard as an inconclusive, if not erroneous mode of reasoning; for we know that among insects and other classes of the more lowly organized departments of animal life, abstinence, and the non-fulfilment of their natural instincts, are uniformly found to prolong their period of existence.

The leech tribe in general is widely distributed over the earth's surface, although, as usual, each species has its own range of localities.[2] Our medicinal kinds seem proper to Europe, although they extend from Russia to the southern point of Spain. All the species are extremely sensible of atmospheric changes. They become agitated during high winds, and often bury themselves in the mud during cloudy weather. Some fanciful observers have even kept them in confinement, that they might serve to indicate the state of the atmosphere; but we incline to think that it is fully as useful, and not more troublesome, to look out of a window than into a phial. On the approach of cold weather they sink into the mud, and pass the winter in a state of lethargy.

We shall now proceed to a brief consideration of the principal genera into which the tribe has been partitioned by modern naturalists.

GENUS SANGUISUGA, Sav. Oral sucker consisting of several segments. Upper lip almost lanceolate. Aperture transversal. Jaws three in number, compressed, and each armed on their cutting edges with two ranges of fine teeth. Eight or ten black points (regarded as eyes) disposed in a curved line; the posterior four more isolate.[3] Anal sucker obliquely terminal.

This genus contains the leeches properly so called, that is, the medicinal kinds; and, according to Savigny, consists of three species. Some recent additions, however, have been made to these by MM. Moquin-Tandon and Carena.

H. medicinalis (fig. 18) of naturalists is the most common kind, and that most frequently used for blood-letting purposes. It occurs throughout the fresh-water marshes of Europe, and measures from four to five inches in what may be called its medium state, although capable of both contraction and extension within and beyond those limits. Its body, including the anterior sucker, is composed of ninety-eight rings, and is of a deep-green colour on the back, with six reddish bands, three on each side. The two inner bands are almost spotless; the two central ones are marked by a chain of small spots and points of velvet-black; the exterior bands are marginal, and each subdivided by a black fillet. The abdomen is of an olive colour, broadly bordered and spotted with black. Savigny distinguishes, under the name of *S. officinalis* (it is the *H. provincialis* of Carena), another species, likewise used in medicine, and frequently confounded with the preceding (fig. 19). It is vulgarly known as the *green leech*, and resembles

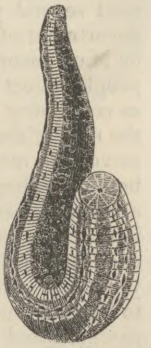
Fig. 18.

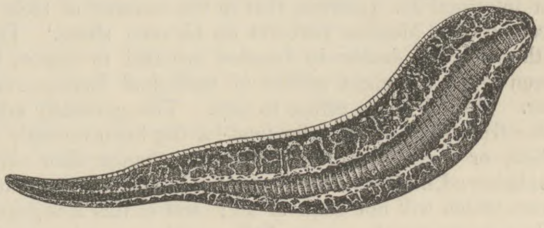
Fig. 19.

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[1] Cuvier seems to express no very decided opinion on the subject above referred to. "On voit dans plusieurs en dessous du corps deux séries de pores, orifices d'autant de petites poches intérieures que quelques naturalistes régardent comme des organes du respiration bien qu'ils soient la plupart du temps remplis d'un fluide muqueux" (*Règne Animal*, t. iii., p. 213). Dr Williams has more recently shown that the so-called pulmonary vessels are in fact ovario-uterine organs.

[2] We observe it stated in several continental works of authority, that leeches are unknown in, or at least not indigenous to, the western world. We were inclined *a priori* to doubt the accuracy of this statement, and lately instituted some inquiries on the subject, in which we were aided by an excellent physiological naturalist, Dr Allen Thomson. We find that in the Dispensatory of the United States, by Drs Wood and Bache (published at Philadelphia in 1833), there is a description of a true American medicinal leech. These authors state, that at New York, Boston, and elsewhere, European leeches, that is, the gray and green varieties of the *Hirudo medicinalis* of Linnæus, are chiefly employed, and are imported in great quantities; but that in Philadelphia and the neighbourhood the indigenous *Hirudo decora* is used. It is this species which is described in Major Long's *Second Expedition* (vol. ii., p. 268). The back is of a deep pistachio-green colour, with three longitudinal rows of square spots, twenty-two in number, and placed on every fifth ring. The abdomen is spotted with black. This kind usually measures two or three inches in length, occasionally attaining to the extent of four or five inches. It is carried to Philadelphia by the country people from Bucks and Berks county. It is said to draw less blood than the European leech, and does not cut so deeply. About three American do not more than correspond to a single European leech in their suctorial powers.

[3] The eyes of leeches are easily detected by the assistance of a lens, under the form of a semicircular row of black points, situated above the mouth, upon the sucking surface of the oval disk, a position evidently calculated to render them efficient agents in detecting the presence of food. According to Professor Müller, they do not exhibit any apparatus of transparent lenses adapted to collect or concentrate the rays of light, but each *ocellus*, or visual speck, would seem to be merely an expansion of the terminal extremity of a nerve

the common kind in size, and the number of its segments; but the colour of the back is not so sombre, and the abdomen is of a more yellow green, and, though bordered with black, is without spots. The six anterior eyes are very projecting, and have more truly the appearance of organs of vision. The third species mentioned by Savigny is the *S. granulosa.* It was brought by M. Leschenhault from Pondicherry, where it is used in blood-letting after the manner of our European kinds. *S. obscura* and *interrupta* are both described by M. Moquin-Tandon as indigenous to the vicinity of Montpellier; and *S. verbena* of Carena occurs in the Lago Maggiore.

With the exception of the last-named species, and that from Pondicherry, M. Blainville refers all the others to the *H. medicinalis* of Linn., of which, according to his peculiar views, he establishes five varieties; the grey, the green, the spotted, the black, and the flesh-coloured. With that love of change for which too many modern naturalists are remarkable, he names the genus *Jatrobdella.*

We have already mentioned that leeches are abundant in all the countries of Europe. France furnishes an immense supply, and their collection in some of her provinces affords the materials of an important branch of commerce. Some curious details on the subject were read several years ago to the agricultural society of the department of Seine-et-Oise. Towards the month of April or May, according to the nature of the season, the country people collect the cocoons or capsules formerly mentioned as containing the eggs. These they find in abundance in the mud of shallow marshes, and convey them to various reservoirs in other quarters, so as to spread and propagate the breed. They do not use them commercially till they are about eighteen months old. Leeches are very numerous in the lakes and marshes in the neighbourhood of Nantes; and their collection is carried on throughout the whole year, but chiefly during summer.. They are transported to Paris in linen bags, each containing about 500, placed in panniers, and surrounded by wet moss. During a favourable season the dealers of Nantes will sometimes receive at the rate of fifty thousand every day; and a Parisian druggist informed M. Audouin, that in the summer of 1820 he received from Moulins 130,000 for his own share.[1] Four of the principal dealers in London are said to import between seven and eight million of medicinal leeches every year. Many leeches refuse to bite. This generally arises either from their appetite for food having been recently satisfied, or from their being about to change their skins. It is believed, however, that capricious individuals sometimes occur, which will not suck at all; and of this it is impossible to ascertain the cause. Inflammation occasionally follows the infliction of the bite, and in this case a vulgar prejudice exists that a horse-leech has been applied. This is in every way an error, for the horse-leech refuses to fasten upon the human body. The means used for the preservation of leeches in confinement are various. The most common mode consists in placing them in a bottle of water frequently renewed. Some apothecaries find advantage from placing moss or aquatic plants at the bottom of the vessel, which aid in freeing them from slime. The chief dispenser of the marine hospital of Rochefort keeps his leeches simply in moistened clay, in which the creatures form holes and galleries, where they live happily for years.

Mr Brightwell states that a dealer in Norwich keeps a stock of about 50,000 in two large tanks of water, floored with soft clay, in which the creatures burrow. On examining these tanks he found many capsules or ova deposits of the leech, which the owner, ignorant of their nature, stated to be at times very numerous, but which he neglected, and indeed generally destroyed.

(The curious in leeches may consult the following works, in addition to those already quoted:—*Histoire Naturelle et Medicale des Sangsues,* &c., par T. L. Derheims, 8vo, Paris, 1825; *Observations sur la conservation et la reproduction des Sangsues,* par Chatelain, 8vo, Paris, 1826; *Monographie des Sangsues Medicinales et Officinales,* par A. Charpentier, Paris, 1838; *Sur la Multiplication des Sangsues,* par T. B. Hazard, 8vo, Paris, 1841. See also some observations *On the Minute Anatomy of the Horse leech,* by J. E. Quekett, in the *Zoologist,* pp. 17, 88, 324.)

GENUS HÆMOPIS, Sav. Differs from the preceding chiefly in the jaws being not compressed, and furnished with less numerous dentations.

H. sanguisorba, Sav. *(Hirudo sanguisuga,* Linn.), commonly called the *horse-leech,* is a well-known species, somewhat larger than the medicinal kinds, and of a uniform greenish-black colour. A great diversity of opinion seems to exist regarding the blood-drawing propensities of this species. Many allege that it causes wounds extremely dangerous both to man and beast. Linnæus asserts that nine will kill a horse. MM. Huzzard and Pelletier, on the other hand, maintain that the horse-leech, improperly so called, never attacks any vertebrated animal whatever;[2] while M. de Blainville again is of opinion that these writers have mistaken their subject of observation, and have described the black leech (his *Pseudobdella nigra*), which is truly characterized by the jaws being nothing more than folds of toothless skin, and may therefore be inferred to confine its attacks to the lower orders of creation. We agree with Cuvier in thinking that the subject deserves a fresh examination. In addition to the common species, Savigny describes three other kinds,—*H. nigra, luctuosa,* and *lacertina.*

GENUS BDELLA, Sav. Dentations of the jaws entirely wanting. Eyes only eight in number.

As far as we know, this genus consists of only a single species, the *Bd. Nilotica* (fig. 20), found in Egypt, and familiar to the Arabs under the name of *Alak.* It appears to have been known to the ancients; and Herodotus (*Hist.* lib. ii., cap. 68) describes it as a parasite of the crocodile. It is of a chestnut-brown colour above, of a lively red below.

GENUS NEPHELIS, Sav. In this genus the eyes are also only eight in number, the four anterior being disposed in a crescent form, the four posterior ranged on each side on a transverse line. The jaws are reduced to three simple folds.

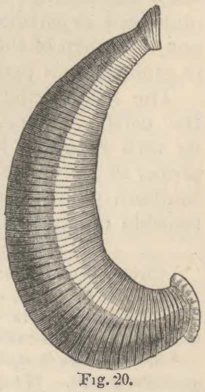
Fig. 20.

Savigny describes three species, *N. rutila, testacea,* and

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derived immediately from the brain, spread out beneath a kind of cornea formed by the delicate and transparent cuticle, behind which is a layer of black pigment, to which the dark colour of the ocular points is due. We ourselves entertain no doubt that leeches have eyes, but the evidence (from written authorities) is very contradictory. Weber was the first to show the true nature of the black specks in *H. officinalis* (Meckel's *Archives,* 1827, p. 301). More recently Wagner (*Lehrbuch d. vergleich, Anat.* 1835, p. 428) has described, in the interior of the pigment layer, a transparent body, composed of two parts, which he regards as consisting of a crystalline lens and a vitreous portion. Brandt has even traced the ten optic nerves from the brain to the eyes (*Med. Zool.* i., p. 250). On the other hand, Moquin-Tandon, in the revised edition of his work (*Monographie des Hirudinées,* Paris, 1846), states that these black specks contain neither lens nor vitreous humour, although they are light-receiving organs; while Leydig (in Siebold and Kolliker's *Zeitsch.* i., 1849, p. 103) goes so far as to assert, in relation to the alleged eyes of the parasitical genus *Piscicola,* that they neither receive a nerve, nor contain a light-refracting body. He regards them as simple ornaments, analogous to the corresponding pigment dots on the pedal shield, with which they also correspond both in colour and distribution.

[1] *Dict. Class d'Hist. Nat.* t. xv., p. 108.

[2] *Journal de Pharmacie,* Mars 1825.

cinerea. The two former occur near Paris; the last named is frequent in the marshes of the forest of Fontainebleau. Of *Nephelis tessellata,* Müller observes that the female is sometimes found filled with 300 young. *N. vulgaris* is frequent in our fresh waters, and the brown capsules containing the ova may be found on the underside of the leaves of many water plants, among the ova of the *helices.* Mr Brightwell kept several species through the summer, and carefully observed the deposition of the ova, and development of the young. On the 2d of June *N. vulgaris* deposited one capsule containing ova, on the 5th another, on the 10th a third, and on the 15th two more, each containing from seven to ten eggs. On the 22d the young appeared in the capsule deposited on the 2d, and on the 13th July they emerged from the capsule, and in six weeks they left it, fully developed. He detected rotiferous animalcules in their stomach.

The genus Trochetia of Dutrochet does not seem to differ from the preceding, except by an enlargement near the position of the generative system. One species (*Geobdella trochetii* of Blainville) comes on shore in pursuit of earth-worms. Another minor genus has been established by M. Moquin-Tandon, under the name of Aulastoma. The jaws are represented by numerous projecting folds. The eyes are ten in number. We may here also mention M. Odier's genus Branchiobdella, of which the jaws are two in number, and the eyes wanting. It inhabits the gills of cray-fish.[1]

In all the preceding groups or genera of leeches, the anterior sucker is but slightly distinguishable from the adjoining portion of the body; but in the two following genera it is rendered more perceptible by a restriction, and is composed of only a single segment. In the genus Hæmocharis of Savigny, the eyes are eight in number, the body slender, and indistinctly ringed. The species do not swim, but march after the manner of the *surveyors* or geometric caterpillars. They attach themselves particularly to fishes. The genus Albione of the same author differs from the preceding in its body being beset by tubercles, and in possessing only six eyes. The species inhabit the sea. We may mention, as an example, the *Hirudo muricata* of Linn.

The genus Branchellion of Sav. is distinguished by what some regard as projecting branchiæ. The epidermis is loose and ample, and seems to enclose the animal as in a sack. The species are parasitical, and attach themselves chiefly to fish of the torpedo kind. With the leeches, Cuvier also places the genus Clepsina, Sav., which is characterized by a broadened body, possessing only a posterior sucker. The anterior portion is a simple orifice, without any appearance of the usual disk. The species make a near approach to the *Planariæ,* and the one represented by the annexed cut was described and figured by Mr Kirby, under the name of *Hirudo crenata* (fig. 21).[2] The development of the ova in this genus has been described by Grube.[3] *C. complanata* usually deposits from five to seven ova, enveloped in a very transparent, soft, succular egg-case, while in *C. bioculata* there are only three or four, and in *C. marginata* only a single ovum in each capsule. These egg-cases are glued by a peduncle to water plants, and continue hanging thereto, but the young, when excluded, attach themselves to the abdomen of the mother. Other genera, allied to the preceding in their enlarged form and absence of the oral disk, have been established by Oken and Blainville. Of these, however, we cannot give account within our prescribed limits, and we shall therefore conclude the present treatise by a short notice of the more distantly related,

Genus Gordius, Linn. Body filiform, smooth, or with very slight transverse markings. Neither branchiæ nor tentacula of any kind.

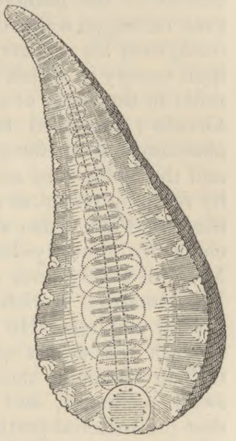

Fig. 21

A well-known species of this genus (*G. acquaticus,* Linn.) is distinguished in this country by the name of the *hair-eel.* It occurs in springs and marshes, and among moist sand, and also dwells in mud, which it perforates in all directions. It is believed by some to be parasitic in the abdominal cavity of many insects. A list of these latter, so infested, has been published by Professor Siebold (*Entomologische Zeitung.* Yahrg. 1843, p. 77). The position of the genus is variously regarded by different naturalists, and the extreme tenuity of form in these creatures has probably opposed obstacles in the way of a precise knowledge of their structure. The nervous system being composed of a ganglionic cord, seems, however, a strong reason for placing them among the Annelida. We follow the Baron Cuvier in so doing, although we are aware that Rudolphi and Blainville combine them with the genus *Filaria,* which contains the noted Guinea worm (*F. Medinensis*), and is usually regarded as belonging to the intestinal class. (J. W.)

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[1] *Mém. de la Soc. d'Hist. Nat.,* t. i., pl. iv.

[2] *Linn. Trans.* ii., tab. 29 p. 318.

[3] *Zur Anatomie und Physiologie der Kiemenwürmer,* Königsberg, 1838.

HELMONT, Jean Baptiste Van, a celebrated chemical inquirer, was born at Brussels in 1577. He was educated at Louvain, and began the study of natural science under the Jesuits in that city. Their hard and dry philosophy, however, had few attractions for a nature so ardent and imaginative as his. Turning for relief to other systems, he found no rest except in the mysticism of à Kempis and Tauler. From them he learned that wisdom is the gift of the Supreme Being; that it must be obtained by prayer; and that we must renounce our own will if we wish to participate in the influence of the divine grace. From this time he began a life of exemplary meekness and humility, made over his property to his sister, and retired from the high society in which he had hitherto walked. He sought relief in the study of medicine; pored over Galen and the Greeks; mastered them, and finding their inadequacy, abandoned them for ever. He then turned to Paracelsus and the alchemists, and conferred a real boon on humanity by rescuing chemical science from the erratic absurdities of the post-Paracelsian alchemists, and applying to it the principles of the newly-discovered induction. He graduated as M.D. in 1599; and, after travelling through France and Italy, married a rich lady of Brabant, by whom he had several children. He died in Holland in 1644 in the sixty-seventh year of his age. Science is under real obligations to Van Helmont, though at one period of his life he was a sworn alchemist, and revived the old doctrine of Thales, that the material particles of the universe consist essentially of nothing but water. To him is due the invention, or at least the first application, of the term *gas* in the sense in which it is now used. He also discovered that gas was disengaged in abundance by the application of heat to various bodies, and during the solution of various carbonates and metals in acids. His theory of the formation of urinary calculi is also nearly correct.

The personal character of Van Helmont, as given by his biographer Lobkowitz, is interesting:—"He was pious, learned, famous, a sworn enemy of Galen and Aristotle. The sick never languished long under his hands, being always killed or cured in three days." His works were published at Amsterdam in 1648 by his son Mercurius, who aspired to rival his father, and is described on his tombstone as being *nil patre inferior*. The best edition of these is that of Elzevir, 1652.

HELMSLEY, a small market-town of England, North Riding of Yorkshire, on the Rye, 21 miles N. of York. The inhabitants are chiefly employed in agriculture and the linen manufacture. Helmsley Castle, now in ruins, was built in the time of Edward I. and Edward II., and was taken and dismantled by Fairfax in the civil war. Pop. of township (1851) 1481.

HELMSTEDT, or Helmstadt, a walled town of Germany, duchy of Brunswick, on the high road from Brunswick to Magdeburg, 20 miles E. of the former city. The ditches which formerly surrounded the town have been filled up, and converted into public walks, planted with trees. A university, founded here in 1575, was suppressed by Jerome Bonaparte in 1809, and a portion of its library transferred to Göttingen. The university building is now used as a court-house. The church of St Stephen and the town-hall are the principal buildings of the town. It is a place of considerable trade, and has manufactures of flannel, soap, hats, spirits, &c. Pop. about 6000.

HELMUND, a river of Afghanistan. See Afghanistan.

HELOS, in *Ancient Geography*, the name of several towns, so called from their position among, or near, *fens*. The most important town of this name was in Laconia, at the mouth of the Eurotas, in a plain close to the sea, marshy yet very fertile. In the Dorian conquest of the Peloponnese Helos was taken, and its inhabitants carried off to Sparta, and reduced to slavery. Their name is said to have been applied by their masters generally to all the bondsmen or helots that fell into their power. This, however, is a mere etymological fancy. (See Helot.) The name Helos is still given to the champaign country at the mouth of the Eurotas; and ruins, said to belong to the ancient town, are still visible near Bizani. Leake identifies Helos with *Priniko*; but as the remains there do not go further back than the middle ages, the first supposition is the more likely to be true.

HELOTS, in *Grecian Antiquity*, the serfs or bondsmen of the Spartans. Etymologically the word signifies, beyond doubt, a *captive* or *prisoner*, and is derived from the root ἑλ found in ἑλεῖν, ἥλων, and other verbs. A fanciful etymon of the word is mentioned under the art. Helos. (See Helos.)

The inhabitants of Sparta were classified under four general heads,—the Spartan citizens themselves; the Periœci, who enjoyed civil but not political privileges; the Helots, the serfs or bondsmen, *adscripti glebæ*; and the Neodamodes, who were Helots liberated by the state in reward for service in war, and who probably received some civil rights which entitled them to rank above the Periœci. Of these classes the Helots were the lowest. They were looked upon as the property of the state, which, though it made over their services to individuals, still retained the right of setting them free, as it might see fit. They were *adscripti glebæ*—attached to the soil, and could not be sold away from it. In time of peace they tilled the land, which was allocated in the proportion of one lot to six or seven families. For each lot they paid their masters an annual rent in kind—82 medimni of barley, and a corresponding quantity of wine and oil. The domestic servants of the Spartans were all Helots. In times of war the Helots used to share in the campaign as light-armed troops, and a certain number of them, varying from two to seven, was allotted to each Spartan hoplite. They were only allowed to serve as hoplites in great emergencies; but if they fought well they were generally rewarded with their freedom.

Much has been said of the cruel treatment to which the Helots were subjected by their masters; but it only holds true of the later history of Lacedæmon, when the number of Spartan citizens had been so reduced by continual wars that the Helots became an appreciable power in the state. There can be no doubt that originally their position was an enviable one beside that of the slaves in all the other states of Greece. Every care was indeed taken to distinguish between them and their masters, even in the matter of dress; but, as Grote observes, they formed "a part of the state, having their social and domestic sympathies developed, a certain power of acquiring property, and the consciousness of Greek lineage and dialect—all points of marked superiority over the foreigners who formed the slave population of Athens and Chios." But after the Messenian wars, when their numbers had made them formidable in the reduced state of the country, there is only too much reason to believe that no cruelty was held too severe to be practised towards them. The evidence is strong that the *Crypteia*, instituted ostensibly for the purpose of inuring the Spartan youth to hardship, was in reality intended to reduce the number of the Helots by assassination. It is known from Thucydides that the Spartans did not scruple to employ this method of keeping their slaves down when they became too numerous. On one occasion, when the Helots had rendered the state some great service, their masters, to try their temper, offered liberty to such as thought they had deserved it. Two thousand of the Helots, tempted by the offer, came forward to claim the reward, and were immediately put to death.

Helots, when emancipated, were known under the name of Neodamodes, or *newly-enfranchised*, and took rank next to the citizens proper. These Neodamodes were again subdivided into several classes, to which special functions were assigned.

Who the Helots were has been matter of much dispute; but it seems now agreed that they were the aborigines of Laconia, who at the time of the Dorian invasion were reduced to slavery by their conquerors. Their numbers were greatly increased at the close of the second Messenian War by the incorporation of the conquered Messenians, who were classed among the Helots, and subjected to all the hardships of slavery till their restoration by Epaminondas after the battle of Leuctra.

HELSINGFORS, a seaport town and naval station of the Russians in the Gulf of Finland, on a peninsula to the W. of the River Wanna, 180 miles W. of St Petersburg, 100 S.E. of Abo, and 60 N. of Revel; N. Lat. 60. 10., E. Long. 24. 57. It is the capital of Finland, the seat of the principal authorities, and an archbishop's see. It was founded by Gustavus I. of Sweden in the sixteenth century, burnt by the Russians in 1728, and again in 1741. In 1742 it was taken by the Swedes under Lewenhaupt. In 1808 it was defended by Admiral Cronstadt against the Russians; but after his unaccountable surrender of the fortress of Sveaborg, which defends the entrance to the town, Helsingfors, with the whole of Finland, was ceded to the Russians by the treaty of 1809.

Within little more than thirty years the town of Helsingfors has undergone a complete change. It is now regularly laid out in streets and squares, and adorned with public buildings. Of these the principal are the senate-house, governor's house, university, barracks, hospital, assembly rooms, and a handsome Lutheran church with four porticoes. Some of these, as well as the quay, are built of granite.

It was not till the destruction of Abo by fire that Helsingfors rose to importance. In 1819 the government, and in 1827 the university, were transferred from the old to the new capital. The university comprises 4 faculties, with 22 professors, and about 500 students. The library, which is kept in the senate-house, amounts to 80,000 volumes, containing the editions of the classics taken from the monasteries by Charles XII. Besides the library there are museums of mineralogy and zoology, botanic gardens, and an observatory, which commands a fine view.

Its trade in time of peace was considerable in grain, fish, deal and other wood, iron, &c. The inhabitants manufacture sail-cloth, linen, tobacco, &c. Pop. 16,000. (For the fortress of Sveaborg, see SVEABORG.)

HELSTONE, a municipal and parliamentary borough and market town of England, county of Cornwall, on the left bank of the Loe or Cober, 15 miles S.W. of Truro, and 276 from London. It was made a borough by King John, and a coinage town by Edward I. Previous to the Reform Act it returned two members to parliament. Among its public buildings are the market-house, town-hall, and old coinage-hall. The church is surmounted by a tower 90 feet in height, forming a conspicuous object at sea. Helstone has a grammar, national, and other schools. It is important as being the centre of an extensive agricultural and mining district. Market-days, Wednesday and Saturday. At Portleven, about three miles distant, a considerable export and import trade is carried on. Shoes are extensively made in the town. It returns one member to parliament. Pop. (1851), of parliamentary borough, 7328; of municipal borough, 3355; registered electors, 400.

HELVELLYN, one of the highest mountains of England, county of Cumberland, about half-way between Keswick and Ambleside. Height 3055 feet above the level of the sea. It is easy of ascent, and commands an extensive view of the lake district.

HELVETII, in *Ancient Geography*, a warlike and powerful Celtic tribe in Gaul, inhabiting the country now represented by the western portion of Switzerland. In the time of Cæsar, when they first became historically important, their country was bounded by the Rhine on the E. and N., by Mount Jura on the W., and by the Rhone and the Lake of Geneva on the S. It was divided into four *pagi* or cantons, containing in all, according to Cæsar, 12 towns and 400 villages. Of the names of these *pagi* only two are known, the *Tigurinus* and the *Verbigenus;* or, as it is sometimes, though less correctly written, *Urbigenus.* It is conjectured that the other two were held by the Tugeni and the Ambrones. The brief history of the Helvetii is known to all who have read the *Commentaries* of Cæsar. They aspired to make themselves the sovereign people of Gaul. Their own territory had become too small for their numbers, and was inferior in climate and fertility to the rest of the country, and they were exposed to incessant attacks from their restless neighbours of Germany. Such were probably the motives that induced them to leave their homes in a body and set out in quest of a happier clime, after burning their towns, villages, and personal property, all but the proportion of corn which it was decreed that each man should carry with him. The utter failure of their expedition, and the fearful slaughter with which it was accompanied, are described in the first book of the Gallic War by the great captain who alone, with a few legions, overthrew the vast host of the Helvetii. Of the 368,000 souls that left the Helvetian territory, only 110,000 returned to it. The survivors were compelled to rebuild all the towns and villages that had been burnt down; and as they had lost everything in the expedition, their neighbours, the Allobroges, received instructions from the conqueror to assist them with everything necessary for their support till they were once more able to support themselves. (The whole question of the Helvetian expedition is very fully discussed in Smith's *Dict. Geog.* by Mr George Long.)

HELVETIUS, CLAUDE-ADRIEN, a famous French *philosophe* of the last century, was born at Paris in 1715. He was educated at the Jesuit College of Louis-le-Grand in that city, and while there gave no sign of that talent which afterwards carried him on to such distinction. While his class-fellows were busy with their themes, he was assiduously developing the personal advantages he had received from nature. He was eminently handsome, was one of the best fencers and dancers of his day, and was so popular with the fair sex, that he had good reason to boast, as he often did, of his *bonnes fortunes.* After a short apprenticeship under his uncle M. D'Armancourt, *directeur des fermes* at Caen, he obtained, through the influence of the queen Marie Leczinska (whose physician his father had been), the office of fermier-general. With the vast fortune thus placed at his disposal he performed many acts of kindness, selecting chiefly as the objects of his generosity the struggling litterateurs of the day. He settled an annual pension of 3000 francs on Saurin, and a nearly equal sum on Marivaux. These and countless other acts of generosity he managed with that delicate tact which carefully avoided to humble or wound the self-respect of his protegés, whom he always succeeded in persuading that he was the obliged party. On one occasion Marivaux, in a hot dispute with his benefactor, lost his temper and became grossly abusive. When he left the room Helvetius merely remarked, "How I would have answered him, had he not laid me under an obligation by accepting my good offices." This extreme gentleness of heart showed itself afterwards on a greater scale. When he found that the faithful discharge of his duties involved an oppression of his countrymen similar to that at one time practised by the English towards their subjects in Eastern India, he resigned his highly lucrative appointment, after in vain attempting to reconcile himself to the work by the gentlest possible exercise of his authority. With his savings he pur-

Helvetius.

chased the office of *maître d'hôtel* to the queen; and as it did not necessitate a constant residence in Paris, he retired to the estate of Voré in La Perche which he had purchased. He took with him his newly-married wife, Mlle. de Ligneville, niece of the famous Madame Graffigny. In compliment to her he had reformed his dissolute habits of life, and directed into the field of literary enterprise his mind which still craved morbidly after distinction of any kind. So insatiable indeed was his appetite for applause, that he once danced on the stage of the opera, under the mask and name of the famous Javillier. His beautiful figure, graceful carriage, and exquisite dancing, prevented the trick from being discovered. A higher ambition, however, had seized him before he retired from Paris. He aspired to scientific and literary fame. He began with mathematics, which Maupertuis had made the fashion; and his ambition was fired to rival that philosopher, whom he had seen in the gardens of the Tuilleries surrounded by a circle of the most brilliant court beauties, and engrossing their attention despite his grotesque bearing and strange dress. Then he thought to rival Voltaire by philosophical epistles, a poem on *Happiness*, and a tragedy. The prodigious success of Montesquieu's *Esprit des Lois*, published in 1748, decided him to raise a monument which he hoped posterity would allow to stand beside that of his illustrious countryman. Immediately on his retiring into the country he began the composition of the work that was to divide the praises of future times with that of Montesquieu. Though he worked at it with the most conscientious assiduity, he yet found time to fulfil his duties at court (where he regularly spent four months of the year), and also towards his own tenantry, whose condition he did his best to improve, by administering justice among them, establishing manufactures, and teaching improved modes of agriculture. He was very jealous, however, of his seignorial rights, and was particularly severe in punishing infractions of the game-laws. The right of hunting he reserved strictly for himself and his friends. These duties and pleasures engrossed his spare time during the seven years he spent on the composition of his work. At last, in 1758, it was published anonymously under the title of *De l'Esprit*. The motto from Lucretius prefixed to the work, indicates its object better than any exposition :—

> ——— unde animi constet natura videndum,
> Qua fiant ratione, et qua vi quæque gerantur
> In terris.

The Encyclopedists and their partizans received the book warmly, and sounded its praises everywhere; but it was denounced at court by the priests as subversive alike of good government and sound morality. The first to express his dissatisfaction with the author and his work, was the dauphin (the son of Louis XV.), and Helvetius, terrified at the storm which he had raised, sought to allay the tempest by a series of recantations, each more humbly penitent than its predecessor. His apologies, however, were unavailing, especially as the priest party, then powerful at court, succeeded in persuading the court that the *De l'Esprit* was nothing other than a résumé of all the dangerous and immoral tenets of the Encyclopédie. The doctors of the Sorbonne took up the question, and formally condemned the work, which was forthwith burned publicly by the common hangman, along with some others of an equally obnoxious cast. The doctrines themselves which excited such general reprobation were merely those that had been brought into fashion by the Encyclopedists, expounded with the grossest literality. He posits as an axiom, that man is purely a creature of sensations; that these sensations when they impel to action, show themselves under different modes called passions; that pleasure or pain are the end and object of all human existence; and that consequently to seek the former and avoid the latter, is the only duty and object of man. As natural results of these postulates self-interest comes to be the sole principle of all our actions and judgments, and virtue and vice only another way of distinguishing the agreeable or disagreeable, the useful or hurtful qualities of things. The other parts of Helvetius's system are of a piece with those already stated. He maintained that as all men had received from nature the same physical constitution, they are naturally on a footing of equality in regard to their intellectual and moral powers; that the passions are the only mode of all development; and that to cultivate these passions is to educate the man. It were time thrown away here to refute a system so irremediably gross and grovelling, and which, after a brief career of fashion rather than of popular acceptance, passed away even before its author. It only remains to say, that as a literary performance, the *De l'Esprit* is well and consistently argued throughout. The arguments are enforced by numerous and often apt illustrations; while the style is viciously rhetorical. To escape the storm he had unwittingly raised, Helvetius passed over to England in 1764, and in the following year visited the Great Frederic of Prussia, who received him with every mark of honour and respect. After leaving the Prussian court Helvetius returned to his own country, where he died, Dec. 26, 1771. His posthumous work, *De l'Homme, de ses facultés intellectuelles et de son Education*, may be regarded as a sort of commentary on the work which first made him famous, though in a literary point of view it is infinitely superior. Many of the old theories, however, are rejected, others are greatly modified, and an attempt made to establish the principles on a better foundation.

Helvoetslius
‖
Hemans.

There are numerous editions of Helvetius' complete works, of which may be mentioned those of Liége, 1774; London, 1777; Paris, 1794, again in 1796, and a third time in 1818. They have also been translated into most of the languages of modern Europe.

HELVOETSLIUS, or HELLEVOETSLIUS, a strongly fortified seaport-town of Holland, province of South Holland, on the right bank of the River Flakkee or Haringvliet, the largest mouth of the Rhine, 16 miles S.W. of Rotterdam. It has an excellent harbour and large naval dockyard. Pop. about 2000. William III. embarked here for England 11th Nov. 1688.

HEMANS, MRS, one of the most pleasing of English poetesses, was born at Liverpool in 1793. Her maiden name was Felicia Dorothea Browne. Her father was a Liverpool merchant, who, meeting with some reverse in business, retired with his family into Wales, where his daughter imbibed that love of nature that glows in her works. Before she was fifteen she published a volume of poems, which had no great success, but the popularity gained by her second publication (a poetical volume on *The Domestic Affections* which appeared in 1812), encouraged her to persist in her literary career. In the same year she married Captain Hemans, but the union was not a happy one; and though it was never formally dissolved, yet when the Captain was obliged by bad health to seek a more genial clime in Italy, his wife remained at home to educate her children, and they never met again. In 1819 Mrs Hemans gained the prize of L.50 offered by a patriotic Scotsman for the best poem on the subject of Sir William Wallace. Her next considerable effort was a tragedy entitled *The Vespers of Palermo*, which, though produced on the London stage by John Kemble (he and Young taking the principal parts), was not successful. It is matter of much regret that she should have been obliged to waste her powers on occasional pieces which she produced in great numbers for the periodicals of the day. But the expenses of her children's education compelled her to exert herself in this way, and it may be doubted, even if she had had the leisure necessary for the production of a great work, whether her powers of mind were equal to such a task. The *Lays of Leisure Hours, National Lyrics, Songs of the Affections*, &c., under which titles her fugitive pieces were republished, all show that her genius was lyrical and reflective in its character, and hardly equal to any great narrative or dramatic effort. Her best pieces, it must be confessed, are those which, from their shortness, give no scope for the inflation and mannerism that disfigure most of her more ambitious efforts. These small poems exhibit much purity of sentiment, a fine vein of feeling, and a dangerous ease of versification. Her powers of description are very considerable; and as Lord Jeffrey remarked, "a lovely picture serves as a foreground to some deep or lofty emotion." It may be doubted if much of Mrs Heman's poetry will be read by posterity. Sir Walter Scott hinted that "there were too many flowers for the fruit;" and it is true that her works, though they fill the ear and the fancy, leave the heart and the intellect unsatisfied. Mrs Hemans' personal character was in all respects exemplary and amiable. After various changes of residence she settled in Dublin, where she died in 1835. There is a complete edition of her poems, with a biographical memoir by her sister, 6 vols. Edinburgh, 1839.

HEMATINE, the colouring principle of logwood. See Dyeing.

HEMEL-Hempstead, a market-town of England, county of Hertford, 24 miles N.W. of London. It stands on the acclivity of a hill rising from the small River Gade, and consists of one main street of considerable length. The parish church is a cruciform, and partly Norman structure, surmounted by a lofty octagonal spire. The town-hall is a long narrow building with an open market-place underneath. Market-day, Thursday. Straw-plaiting is extensively carried on. In the vicinity are several large paper mills. Pop. (1851) 2727.

HEMEROBAPTISTS, a sect amongst the ancient Jews, so called from their bathing every day, as a religious rite necessary to salvation. Epiphanius, who mentions this as the fourth heresy among the Jews, classes the hemerobaptists doctrinally with the Scribes and Pharisees, with this exception, that, like the Sadducees, they denied the resurrection of the dead.

HEMERODROMI, in *Grecian antiquity*, were, as the name imports, runners or couriers, who could keep running all day. In a country like Greece, where the roads were few and bad, the Hemerodromi were indispensable for the rapid diffusion of important news. Every Greek state made a point of training a number of these men who could travel great distances in an incredibly short space of time, and at every dangerous crisis were stationed on commanding points to observe and report at head-quarters what it was necessary for the authorities to know. Some interesting information concerning these couriers is given by Herodotus. He dwells at considerable length on the efficiency of those in the service of the Persian kings. The men were called *angoroi*, and the service *angereïon*. Instances are on record of the extraordinary swiftness of foot attained by the Hemerodromi. A little before the battle of Marathon, Phidippides, a professional courier, was sent to Sparta by the Athenian generals with the news of the impending fight, and arrived there on the second day after leaving Athens,—the distance between the two cities being nearly 150 miles. Pliny mentions that Anystis, a Lacedæmonian, and Philonides, a courier in the service of Alexander the Great, ran from Sicyon to Elis in one day—a distance of 1200 furlongs. Many other equally wonderful cases are on record in the classics. Among the Romans these couriers were known as *Cursores*; they travelled sometimes on foot, sometimes on horseback. Gibbon commends their swiftness and regularity. It is a well-known fact that running footmen attended the Duke of Marlborough in his wars in the Low Countries and in Germany. (See Courier.)

HEMI, a word employed in the composition of different terms. It signifies the same with *semi* or *demi*, viz., half; being an abbreviate of ἡμισυς, which signifies the same thing. The Greeks retrenched the last syllable of the word ἡμισυς in the composition of words; and, after their example, we have done so too in most of the compounds borrowed from them.

HEMINGFORD, Walter, or, as he is called by Leland, Hemingoburgus, one of the old Latin chroniclers of the fourteenth century, was a canon regular of the Austin Priory of Gisborough in Yorkshire. His chronicle relates the history of England from the time of the Norman Conquest till the twentieth year of Edward III. The first three books of this work (extending from the Conquest to 1273) were published by Gale in his *Scriptores Quinque*, and the remainder by Hearne, at Oxford, 2 vols. 1731. Hemingford died in 1347.

HEMLOCK, the *Conium maculatum* of botanists, is an umbelliferous plant possessing narcotic and powerful poisonous properties. It may readily be distinguished from most other umbelliferous plants by the numerous dark purple spots which cover its *smooth* stem and leaf stalks, and by the strong heavy odour, resembling that of mice, which it exhales. The poisonous properties reside in every part of the plant, and are owing to the presence of a peculiar volatile oleaginous alkaloid, called *conia* or *coneine*, capable of forming salts with acids, which are equally energetic as the conia itself.

It was long doubted whether this plant furnished the κωνειον or poison with which the ancient Greeks despatched their state prisoners, and which the death of Socrates has immortalized. This obscurity appears to have resulted from the circumstance that the symptoms observed in cases of reputed poisoning with the roots of this plant were different from those attributed to the ancient state poison—a difference now explained from other roots having been mistaken for it. Recent research has now, however, demonstrated that the action of this plant as a poison closely corresponds with the description given by Plato of the action of the state poison, so that no reasonable doubt now exists as to its identity. Hemlock is an energetic poison, especially in the form of its alkaloid conia, causing rapid death by inducing general paralysis of the muscles, and consequent stoppage of the breathing, without bringing on convulsive spasms or insensibility. In medicine hemlock has been much used in the form of poultices of the fresh leaves in cancerous affections, and seems to relieve the lancinating pain by its narcotic action. It is also applied externally in the form of poultices, extract, tincture, &c., to glandular tumours, scrofulous sores, &c.; and internally it has been administered in cancerous and strumous affections, enlargements of the liver, spleen, and glands, chronic catarrh, hooping-cough, neuralgia, hypertrophy of the heart and other affections attended with an excited state of the circulation. Its virtues, however, have not been sufficiently investigated. (J. S—K.)

HEMP, a tough fibre yielded by the large annual plant *Cannabis sativa*, of the natural order Cannabinaceæ. There are, however, several other fibres known in commerce to which the term is more or less commonly applied. For example—Juté hemp is obtained from *Corchorus capsularis* and *C. olitorius*; Manilla hemp from *Musa textilis*; Brown hemp from *Hibiscus canabinus*; Pité or Pita hemp from several species of agave and aloe; Sunn hemp, Madras hemp, brown Bombay hemp, and Malabar hemp, from *Crotalaria juncea*; Jubbulpore hemp, from *Crotalaria tenuifolia*, and several others.

The true hemp (*Cannabis sativa*) has been recognised as a useful plant from a very early period, although probably not of the same antiquity as flax. Herodotus is the first writer who mentions it (iv. 74), but he speaks of it in a manner which shows it must have been then well-known, for he describes the hempen garments made by the Thracians as being equal to linen (flax cloth) in fineness. Its use for making cordage is noted as early as 200 years B.C. by Moschion, who mentions that a large ship, the "Syracusia," built by Hiero II., was rigged with ropes made from hemp brought from the Rhone.

The original country of the hemp-plant is not positively known, but it is generally believed to have been the mountainous districts in the extreme north of India, whence it spread westward through Europe, and southward through the peninsula of India. Its cultivation in each direction had in all probability a different object; for it is found to produce under tropical culture an inferior fibre, and a powerfully intoxicating drug, but in cold and temperate climates it yields an abundance of strong fibres in great perfection for textile purposes, and loses its narcotic qualities. The similarity of its name in various languages is a strong indication that it has taken the course here indicated; thus, in the Sanscrit it is called *goni*, *sana*, or *shanapu;* Persic, *canna;* Arabic, *kanneh* or *kinnub;* Greek, *kannabis;* Latin, *cannabis;* Italian, *canapa;* French, *chanvre* or *chanbre;* Danish, *kamp* or *kennep;* Lettish and Lithuanian, *kannapes;* Slavonic, *konopi;* Erse, *canaib;* Scandinavian, *hampr;* Swedish, *hampa;* German, *hauf;* Anglo-Saxon, *haenep;* and English, *hemp.* In India other names are applied, indicative of its intoxicating or narcotic powers; thus, according to Dr Royle, it is called the "increaser of pleasure," the "exciter of desire," the "cementer of friendship," the "causer of the reeling gait," the "laughter mover," &c.; and he also suggests that it may have been the *nepenthes* ("assuager of grief") of Homer, given by Helen to Telemachus.

The intoxicating properties of hemp reside in a peculiar resinous extract naturally secreted by the plant when growing in a hot climate. So remarkable is this peculiarity, that botanists until lately insisted upon the hemp of India being a distinct species (*C. indica*). It is now, however, decided that there is really no specific difference, the change being simply climatal.

The secretion is deposited by exudation upon the surface of the leaves, the slender branches, and the flowers. According to Dr O'Shaughnessy, it is collected during the hot season by men clad in leathern dresses, who rush with violence through the hemp fields; the resin adheres to their dresses, from which it is scraped off and kneaded into lumps which have the appearance of pieces of linseed oil cake in colour and texture, and a peculiar and by no means agreeable smell. In this state it is called "churrus;" and there are evidently several varieties of the substance, as Dr Pereira describes it as being "in masses of the shape and size of a hen's egg, or of a small lemon, and formed by the adhesion of superimposed elongated pieces. It has a dull grayish-brown colour, and not much odour;" whereas one specimen in the writer's collection differs in being in large shapeless fragments of the colour of amber, with the loose friable texture of linseed cake, and a heavy unpleasant odour. Another specimen has a resinous lustre, a dark-brown colour, and is formed into an elongated oval shape, but not larger than half a hen's egg. This is almost odourless, and is probably the *momeea* or *waxen churrus*, said to be collected with great care by the hand, and to be highly prized. The dried plant, after it has flowered, and from which the churrus has not been removed, is compressed into bundles of twenty-four plants each, and is sold in the bazaars of India under the name of gunjah. The larger leaves and capsules, without the stalks, are also compressed into irregular sized masses, which receive the names of bang, subjee, or sidhee, in India. The háshish of the Arabians consists of the tops of the small branchlets after inflorescence, carefully gathered and dried. Both this and the two previously mentioned preparations are extensively used for smoking and chewing—the gunjah and bang in India and Persia, and the háshish in Africa. When the bushmen of Southern Africa were brought to England, they passed much of their time in smoking this narcotic in pipes made of the long teeth of alligators, hollowed out for the purpose. Its use as a means of intoxication is said to have given rise to our word assassin, from the fact that the low Saracen soldiery, called *hashashins*, when intoxicated with háshish, were sent into the camps of the crusaders for the purpose of killing whomsoever they met, the drug rendering them quite regardless of the consequences. The physiological effects of the various preparations above mentioned are most remarkable, and are unlike every other narcotic at present known. It produces inebriation and delirium of decidedly hilarious character, inducing violent laughter, jumping and dancing. The writer several times witnessed its effects upon the bushmen. After inhaling the smoke for some time they rose and began a very slow dance, which was gradually quickened until they became perfectly frenzied, and finally fell down in a state of complete insensibility, from which they were a considerable time in recovering. Dr O'Shaughnessy relates some most remarkable effects of the churrus, particularly its power in producing a state of true catalepsy. The same effects do not appear to take place upon Europeans, but this point has not yet been fairly tried, as the drug evidently suffers some change in its transmission by sea.

But it is not as a narcotic and excitant that the hemp plant is most useful to mankind; it is as an advancer rather than a retarder of civilization, that its utility is made most manifest. Its great value as a textile material, particularly for cordage and canvas, has made it eminently useful; and if we were to copy the figurative style of the Sanscrit writers, we might with justice call it the "accelerator of commerce," and the "spreader of wealth and intellect." For ages man has been dependent upon hempen cordage and hempen sails for enabling his ships to cross the seas; and in this respect it still occupies a most important place in our commercial affairs.

For its valuable fibre hemp is very largely cultivated in Europe, but chiefly in Russia and Russian Poland. It undergoes the same process for decomposing the parts of the stem as that described in the article on FLAX, called *water-retting*, by which the cellular tissue of the bark and medulla is destroyed, and the long fibres of the woody part are set free. This is not done by simply soaking in the waters of ponds and streams, for it requires to be dried both previously and subsequently to the retting process; after which it is beaten with wooden beetles or mallets, or by an apparatus called a *break* or *brake* worked by a treddle. Sometimes, however, this laborious operation is effected by water or steam-power. Some of the finer kinds of hemp are more carefully prepared; the seed is sown broad-cast instead of in drills, by which the stems are grown more slender and the fibres finer; and after the water-retting each stem is taken in the hand, and the epidermis is stripped or *peeled* off, and the reed or boon is then submitted as before mentioned to the *breaking* process. In both cases after *breaking* the stalks are conveyed to the *scutching-mills*, where the separation of the fibres is still further effected by rubbing and striking, after which it is heckled or hackled—the heckler taking as much as he can conveniently hold and drawing it through a number of iron spikes fixed in a board forming a kind of comb.

The process called dew-retting, described in the article on FLAX, is also adopted for very fine varieties of hemp, such as the white crown Marienburg, and the Italian garden hemp; and in Russia and Sweden another method called snow-retting is used. After the first fall of snow the hemp which has been put up in stacks is spread out over the snow, and left to be buried by successive falls. It thus remains covered until the snow disappears, and is then sufficiently retted.

We have hitherto received the largest quantity of hemp from Russia—St Petersburg, Memel, and Riga being the chief ports of shipment; but the late war, which put a stop to the supply from this source, is likely to produce a beneficial result to our colonies. The indefatigable exertions of Dr Royle on behalf of the Indian government have led to the knowledge of various fibrous substances which are produced in the greatest abundance in our Indian empire, several of which are rapidly taking the place of hemp both in the manufacture of cordage and canvas; so that having been forced into a knowledge of our own resources, it is not probable we shall ever be so dependent upon Russia in future for this necessary article.

The best substitute appears to be the Caloee or Rheea fibre produced by a plant of the nettle tribe (Urticaceæ), *Boehmeria nivea*. The Rheea fibre can, it is expected, be produced very much cheaper than Russian hemp, and it is nearly twice as strong. Hitherto hemp has had one great advantage over all other fibres in the manufacture of cordage, and it remains to be seen whether the Rheea fibre has this qualification. When a hempen rope is worn out, if it has not been tarred, it is valuable for making paper; and if it has been tarred, it is even more useful for oakum. This is not the case certainly with the fine ropes of Manilla hemp (*Musa textilis*), which, though stronger than the best Russian hemp, are almost useless when worn out. The same may be said of the admirable coir ropes now so extensively used for ship's hawsers and other cordage exposed to water. These ropes are made of the fibres from the husk of the common cocoa-nut.

The fibre called New Zealand flax, which is procured from the long sword-shaped leaves of *Phormium tenax*, a liliaceous plant, has been much recommended of late; but whether from the difficulty of preparing it, or from the inadequacy of the supply, it has not yet become a regular article of commerce. The epidermis of its leaves is more compact and harder than that of the stalks of the plants previously mentioned, and this may cause great difficulty both in retting and scutching.

We import hemp from Russia, Italy, Holland, Turkey, the East Indies, and latterly from the United States. That from America, however, is of inferior quality and blackish colour. The East Indian hemp is coarse, and is in small hanks plaited about the thickness of a man's arm. The Italian hemp is very fine, that variety called garden-hemp being the longest of any kind; its superiority is supposed to be the result of spade culture in very suitable soil. It is also as white and soft as the finest white Russian.

Of the Russian kinds the St Petersburg clean and the Riga rein (or clean) are the best for general purposes. The variety called white crown Marienburg is remarkably short, white and soft; it is only fit for fine canvas.

The quantity of hemp imported into the United Kingdom was—

	From Russia.		From other countries.
In 1851.........	33,229 tons	In 1851.........	31,441 tons
... 1852.........	26,857 ...	... 1852.........	26,551 ...
... 1853.........	40,320 ...	... 1853.........	20,619 ...
... 1854.........	1,044 ...	... 1854.........	35,927 ...
... 1855.........	nil. ...	... 1855.........	28,010 ...

The price of Russian hemp has ranged from £38 to £90 per ton during the last five years, the maximum price being caused by the war. Considerable quantities are also raised in England and Ireland.

Of the figures just given those relating to Russia may be depended upon, but those referring to the imports from other countries are by no means satisfactory; for owing to the slovenly manner in which our commercial statistics are collected by the government, all articles which bear the trade name of hemp are included, such as Manilla hemp, and very often even juté.

There is one other useful quality in the hemp plant; it produces an abundance of seed, which not only yields a valuable oil, but the seed is extensively used in feeding singing birds. As the hemp is *diœcious*, only about one half the plants produce seeds; but these yield it in such abundance that an acre will yield from three to four quarters at about 40s. per quarter. As this is independent of the fibre produced it is a profitable crop in countries like Russia where the land is not too valuable.

For fuller information upon the subject consult Dr Royle's *Illustrations of the Botany of the Himalayan Mountains*, and his *Fibrous Plants of India;* Dr O'Shaughnessy on the *Preparation of the Indian Hemp or Gunjah;* and the erudite work *Textrinum Antiquorum*, by James Yates, Esq., M.A. (T. C. A.)

HEMS or HOMS, the ancient *Emesa* or *Emissa*, a city of Syria, 90 miles due N. of Damascus. It stands on the N.E. shore of a small lake formed by the River Orontes, which affords abundant supplies of water for the irrigation of the neighbouring districts. Besides a considerable trade, Hems possesses woollen, cotton, and silk manufactures; and its gold and silver thread are in high repute. The mosques, churches, and bazaars, are numerous and handsome. In ancient times Hems was celebrated for its splendid temple of the sun. One of the priests of this temple was, at the early age of fourteen, made emperor of Rome, under the name of Heliogabalus. It was in the vicinity of this town that Zenobia, the renowned queen of Palmyra, was defeated by the emperor Aurelian, A.D. 272.

HÉNAULT, CHARLES-JEAN-FRANÇOIS, author of the *Abrégé Chronologique de l'Histoire de France*, and president of the parliament of Paris, was born in that city in 1685, and died there in 1770. His father was one of the fermiers-généraux, and he himself, partly from his inherited wealth, partly from his position in the queen's household, of which he was controller-general, and partly from his personal qualities, was received into the best society of the French capital. He was in early life gay, witty, graceful in his manners, a good musician, and a neat song-writer. He had all, in short, that could make him (what was then the chief ambition of most Frenchmen to become) a man *a-la-mode*. In literature he attained such considerable distinction by his comedies and fugitive poems, that in 1723 he was received into the French Academy, and afterwards into the leading literary societies of Europe. After his fiftieth year he retired into private life, and devoted the remainder of his days to study and religious exercises. But as the Marquis d'Argenson remarks, "his devotion was as free of fanaticism as his writings of pedantry." His friendship for Voltaire remained undiminished till the close of his life; and it was a kindly motive that impelled him at the age of eighty to write seriously to that arch-scoffer, praying him to desist from his ceaseless pasquinades against Christianity. Henault will be remembered chiefly for his *Abrégé Chronologique*, first published in 1744, without the author's name. Between that date and 1756, there appeared numerous editions of it; but it was not till the latter year that Henault proclaimed himself as the author of the book. The *Abrégé* is a perfect model of its kind, and though it has now fallen somewhat into disuse, yet that result is rather a reaction against the excessive praise that was at first lavished on it, than a proof that it has been superseded. In the compass of two volumes, Henault has comprised the whole history of France from the earliest times to the death of Louis XIV. His information is, for the most part, drawn from original sources. The results of deep researches and lengthened disquisitions on public law are summed up in a few words. Controverted points of history, on which volumes have been written, are cleared up sometimes in a single sentence.

The moral and political reflections are always short, and generally as fresh and pleasing as they are just. A few masterly strokes reproduce the leading features of each age, and the characters of its illustrious men. Accurate chronological tables set forth the most interesting events in the history of each sovereign, such as his birth, accession, marriage, death, &c., and the names of the great men that flourished during his reign. Interspersed throughout the work are occasional chapters on the social and civil state of the country at the close of each era in its history.

Hénault's other works are his *Histoire Critique de l'établissement des Français, dans les Gaules, ouvrage inédit du Président Hénault, imprimé sur le Manuscrit original écrit de sa Main*, Paris, 1801, in 2 vols. 8vo; *Lettre du Président Hénault sur la Régale, addressée à l'Abbé Velly*, originally published in the *Mercure de France; Lettres du Président Hénault à Marmontel, au sujet d'un Extrait de l'Abrégé de l'Histoire de De Thou*, in the collection of Fontanieu; *Mémoire sur les Abrégés Chronologiques* (*Mém. de l'Acad. des Inscrip.*); *Discours qui a remporté le prix d'éloquence de d'Académie Française*, 1701, *par Hénault, Conseiller au Parlement*, Paris, 1707, in 4to; *Pièces de Théâtre, en Vers et en Prose*, a collection which contains *Cornélie Vestale, Françoise II.*, the *Petite Maison*, the *Jaloux de Lui-même*, the *Réveil d'Epiménide*, and the *Temple des Chimères*.

HENBANE (*Hyoscyamus niger*), a narcotic plant of the nat. ord. Atropaceæ, the Deadly Nightshade order. The juice has the property of causing the dilatation of the pupil of the eye; and it has long been used in medicine as a sedative and narcotic. It is said that swine can browse with impunity on this very poisonous plant. See Botany.

HENERY Isle, a small island lying due S. from Bombay. It is about 600 yards in circumference, and nearly of a circular form. It is fortified and well inhabited. In 1790 it belonged to Ragojee Angria, and was a principal rendezvous of private vessels, though within sight of Bombay. Near it is another small island named Kenery, which is also fortified, and of considerable strength. It was taken possession of and fortified by Sevajee in 1679. In 1790 it belonged to the Peshwa, and was also the haunt of pirates. Henery is situated in E. Long. 72. 50., and N. Lat. 18. 42.

HENGIST, the brother of Horsa, was the first Saxon chief who established himself in England. He reduced the south-eastern corner of the kingdom, and ruled over Kent under the title of king. He fixed his residence at Canterbury, where he died in A.D. 488. (See England.)

HENG-KIANG or Siang, a river of China, rising in the mountains, which separate the province of Honan from that of Kwang-tung, and falling into the lake of Tung-ting, after a northward course of about 300 miles.

HENG-TCHOU, a city of China, capital of a cognominal department in the province of Honan, on the Heng-Kiang River. N. Lat. 26. 55., E. Long. 112. 23. Paper is extensively manufactured here.

HENLEY-IN-ARDEN, a market-town in the W. of Warwickshire, on the Alne, 8 miles W. from Warwick, and 102 miles from London. It contains a church of the time of Edward III., remarkable for its beautiful interior, and the remains of an old market-cross. Nails, needles, and fish-hooks are made here. Market-day, Monday. Pop. (1851) 1143.

Henley-on-Thames, a municipal borough and market-town of England, Oxfordshire, on the left bank of the Thames, 22 miles S.E. from Oxford, and 35 from London. It is pleasantly situated at the foot of the Chiltern Hills. The principal streets, four in number, are well lighted and paved. The Thames is here crossed by an elegant stone bridge of five arches. The church is a handsome Gothic structure, with a lofty tower, and is supposed to have been built by Cardinal Wolsey. It has an endowed grammar-school, founded in 1605; united charity and other schools; reading-room, library, and a number of charitable institutions. The town-hall is a neat building, supported by Doric columns; the under part is used as a market-house. Market-day, Thursday. Henley carries on considerable trade in corn, flour, malt, and timber. It is governed by a mayor, a high steward, 10 aldermen, and 16 burgesses. Pop. (1851) 2595.

HENNA, the name of a yellow pigment obtained from *Lawsonia inermis*, a plant of the nat. ord. Lythraceæ. It is much used in Egypt, Arabia, Persia, and throughout the East generally, for staining the nails of the fingers, the manes and hoofs of horses, &c.; and some have attributed the yellow tinge of the nails of the Egyptian mummies to the use of this dye, though probably without sufficient reason.

HENNERSDORF or Seifhennersdorf, a large manufacturing village in Saxony, on the Bohemian frontier circle, 20 miles S.S.E. of Bautzen. Pop. 5600, who are engaged in the manufacture of linen and nankeen, as well as in bleaching. Hennersdorf is the name of numerous small villages in Germany.

HENOTICUM, an edict of the Emperor Zeno, published A.D. 482, and intended to reunite the Eutychians with the Catholics. It was procured from the emperor by Acacius, patriarch of Constantinople; and was in the form of a letter, addressed by Zeno to the clergy and people of Egypt and Libya. As it contained a favourable mention of the council of Chalcedon, it was supposed to favour the Eutychian party; and after much opposition, was at length formally condemned by Pope Felix II.

HENRY, the name of a succession of sovereigns in England, France, and Germany. The English kings of this name are:—Henry I., surnamed Beauclerc, third son of William the Conqueror. He succeeded his brother, William Rufus, and reigned from 1100 to 1135. Henry II., son of Geoffrey Plantagenet, Earl of Anjou, and Matilda, daughter of Henry I. He succeeded Stephen, and reigned from 1153 till 1189. Henry III., son of King John, reigned from 1216 till 1272. Henry IV. usurped the throne in 1399, died in 1413. Henry V., his son, succeeded him in 1413, and died in 1422. Henry VI. was crowned in 1422, when only ten months old, and was killed in the Tower in 1471. Henry VII., founder of the Tudor dynasty, came to the throne in 1485, and reigned till 1509. Henry VIII. reigned from 1509 till 1547.

Four kings of the name of Henry or Henri have reigned in France. Henri I., son of Robert, and grandson of Hugues Capet, reigned from 1031 till 1060. Henri II. succeeded his father, Francis I., in 1547, and was accidentally killed at a tourney in 1559. Henri III., the third son of Henri II. and Catherine de Medici', succeeded his brother, Charles IX., as king of France in 1574, and was assassinated in 1589. Henry IV., called Henry the Great and Henry of Navarre, was virtually king of France from 1589 till his assassination in 1610.

The German emperors of the name of Heinrich or Henry are seven, viz.,—Henry I., 919–936; Henry II., 1002–1024; Henry III., 1039–1056; Henry IV., 1056–1105; Henry V., 1111–1125; Henry VI., 1190–1197; Henry VII., 1308–1313.

The histories of these sovereigns are given in full under the special heads of England, France, and Germany.

Henry *of Huntingdon*, an ancient English chronicler, was born about the end of the eleventh century, and was brought up by Alcuinus of Anjou, a canon of Lincoln Cathedral. After taking orders he was made archdeacon of Huntingdon. The date of his death is not known. His *History of England*, in eight books, extends from the invasion of Julius Cæsar to the accession of Henry II. (A.D. 1154.) It has been nowhere printed except in Savile's *Scriptores post Bedam*, Lond. 1596. In so far as it is a contemporary history, Huntingdon's work possesses little or no value, but in an antiquarian point of view it is one of the most valuable heir-looms transmitted to us by the twelfth century. It is interspersed with a good deal of verse, partly original and partly copied. The author himself states that, taking Bede as his model, he added much from other sources, and borrowed from the chronicles which he found in ancient libraries. In vol. ii. of Wharton's *Anglia Sacra* is a long letter from Huntingdon to a friend, full of interesting anecdotes of the kings, prelates, and other notable personages of his day.

Henry, *Matthew*, the author of the celebrated *Exposition of the Old and New Testaments*, was born in 1662 at Broad Oak, a farm-house near Iscoyd, in Flintshire. He was the son of Philip Henry, one of the 2000 ministers who were ejected from their livings in 1662 for refusing to conform to the *Act of Uniformity*. Unlike the majority of his fellow-sufferers, Philip Henry was spared all personal privation or hardship as the consequence of his non-conformity by the accident of private means which he had received with his wife. He was thus enabled to give a good education to his son Matthew, who, after making considerable progress in the study of law at Gray's Inn, abandoned that profession, and took orders as a dissenting minister. In 1687 he was appointed to a charge at Chester, where he remained till 1712, in which year he was translated to Hackney. Two years later (June 22, 1714), he died suddenly of apoplexy at Nantwich while on a journey from Chester to London.

Matthew Henry's *Exposition*, the work by which he is now remembered, is a commentary of a practical and devotional rather than of a critical kind, ranging over the whole of the Old Testament, and extending into the New as far as Romans. At this point it was broken off by the author's death, but the work was finished by a number of clergymen, whose names are recorded in most editions of the book. In a critical point of view, the *Exposition* is quite valueless; yet its freshness, variety of thought, its high moral tone, and its well-sustained flow of good writing, have secured it the foremost place among the works of its class. There are few better things in English literature than the comments on the parable of the prodigal son. That, however, must be acknowledged the finest passage in the whole work. Besides the *Exposition*, Matthew Henry wrote a *Life of Mr Philip Henry; Directions for Daily Communion with God; A Method for Prayer; A Scriptural Catechism*, and several other works.

There are two *Lives of Matthew Henry;* the first by W. Tong, 8vo, 1716, and the second (a much better one) by Mr. Williams, prefixed to his edition of the *Exposition*, 3 vols., Lond. 1828.

Henry, *Robert, D.D.*, the author of the *History of Great Britain, written on a new plan*, was born in 1718 at a farm-house in the parish of St Ninian's, near Stirling. He was educated first at the school of his native parish, afterwards at the grammar-school of Stirling, and finally at the University of Edinburgh. Beginning public life as master of the grammar-school of Annan, he afterwards (in 1746) took orders and became the minister of a Presbyterian congregation at Carlisle. In 1760 he removed to a similar charge at Berwick-upon-Tweed, where he married a Miss Balderston, daughter of a surgeon in the town. It was during his stay at Berwick (where he signalized himself by his public spirit and zeal in promoting the local charitable schemes) that the idea of his *History* first occurred to him. But the dearth of books and the other difficulties of a provincial situation compelled him to postpone the execution of his design, till, through the influence of his wife's relations, he was translated to Edinburgh as minister of the New Greyfriars. He was then encouraged by the abundance of resources opened to him in the public libraries, and the ease with which he had access to them, to proceed with his great design. The first volume of the *History* appeared in 1771, and the others followed at irregular intervals till 1785, in which year the fifth was published, bringing down the narrative to the accession of the Tudor dynasty. The historian, who had been made a D.D. by the University of Edinburgh, died in 1790, before his sixth volume was quite ready for the press. Four years after his death it was published under the care of Malcolm Laing who supplied the missing chapters, and performed the editorial work with great accuracy and ability.

Henry's *History* was undoubtedly a great advance upon all the works of the kind that had been attempted in England before his day. His design, which, up to the measure of his knowledge and ability, he carried out with decided success, was to engraft upon the narrative of the great political events of each era an account of the domestic state and social progress of the people within the same period. Despite the care with which Henry conducted his researches, his work is now superseded. The true sources of history were at that time hardly open to the writer, and Henry was consequently obliged often to adopt authorities even then doubtful and now wholly exploded. Nor are his faults redeemed by the qualities that still make Hume's the standard *History of England.* He does not conceive or draw the characters of the great personages that figure in his *History* with any depth of insight or skill in delineation. He is likewise totally wanting in that philosophic power which enabled his illustrious contemporary to take the wide and generalized views of history that distinguish his work. These faults of Henry's were even in his own day pointed out by his arch enemy, Gilbert Stuart, with a ferocious malignity worthy of the worst frenzy of John Dennis. There is a large substratum of truth in Stuart's criticisms, yet they breathe so completely the spirit of a literary cut-throat, as their author undoubtedly was, that our moral sympathies go entirely with the victimized historian. Stuart made no secret of his resolution to ruin the sale of Henry's work, and by his ruthless reviews of it in various influential journals he gained his point—at least for a time. But it was only for a time, for Henry realized altogether from his work L.3300, and in 1781, through the influence of Lord Mansfield, was rewarded for his labours with a pension of L.100 a year by George III. (The details of Henry's life are to be found in a biographical sketch prefixed to the posthumous volume of his *History.* An account of his quarrel with Gilbert Stuart is given in Isaac D'Israeli's *Calamities of Authors*, vol ii., p. 63.)

Henry, *William*, a distinguished chemical philosopher, was born at Manchester, December 12, 1774. He was the son of Mr Thomas Henry, a zealous cultivator of chemical science. In early life an accident disqualified him for the sports of boyhood, and thus early developed a taste for study which was fostered by his first teacher, the Rev. Ralph Harrison, one of the best instructors of youth at that time in the north of England. On leaving Mr Harrison's academy, Henry became private secretary to Dr Percival, a physician of great general accomplishments and refined taste, who directed his course of reading with equal kindness and judgment. For five years he remained in the house of this valuable friend, and after some preliminary medical study in the infirmary of Manchester, removed, in 1795–6, to the University of Edinburgh, where some of the greatest masters of moral and physical science were then teaching. So powerful was the stimulus there given to his mental powers, that he often said, the rest of his life, active as it was, appeared a state of inglorious repose when contrasted with this season of unremitted effort. Prudential considerations obliged him to leave Edinburgh at the end of a year; but in 1805 he once more resumed his studies there, and two years later received his diploma of M.D. The interval between the two periods of his residence at Edinburgh was spent partly in the duties of medical practice at Manchester, and partly in superintending a chemical work commenced by his father, which gave him great facilities for prosecuting original researches in his favourite science. In 1797 he sent to the Royal Society of London the first of a long series of scientific memoirs, with which he enriched the *Transactions* of that body. Its object was to re-establish the title of carbon to be ranked among elementary bodies, which had been denied by Austin, Beddoes, and other eminent chemists. He afterwards discovered a fallacy in his own reasoning, which he detected and exposed, in a subsequent memoir, before it was noticed by any other chemist. In 1800 he published in the *Philosophical Transactions* his experiments on muriatic acid gas. Previous to the discoveries of Davy oxygen was regarded as the sole principle of acidity; and muriatic acid was consequently believed to be composed of oxygen associated with an unknown radical. Henry's experiments had been made with the view of disengaging this imaginary element. When Davy's theory was propounded, many years after this date, Henry was one of the earliest converts. In 1803 he published his elaborate experiments on the quantity of gases absorbed by water at different temperatures, and under different pressures. The result of these was the establishment of the law that "water takes up of gas, condensed by one, two, or more additional atmospheres, a quantity which would be equal to twice, thrice, &c., the volume absorbed under the common pressure of the atmosphere." In 1808 (the year in which he became a Fellow of the Royal Society) Henry described in the *Philosophical Transactions* a form of apparatus adapted to the combustion of larger quantities of gases than could be fired in eudiometric tubes. This apparatus, though now superseded, gave more accurate results than had ever before been attained. In the following year, 1809, the Copley gold medal was awarded to him for his valuable contributions to the *Transactions* of the Royal Society. For the next fifteen years he continued his experiments on the gases, making known the results of them from time to time to the Society. In his last communication, in 1824, he claimed the merit of having conquered the only difficulty that remained in a series of experiments on the gaseous substances issuing from the destructive distillation of coal and oil, and proved the exact composition of the fire-damp of mines. Availing himself of the property (recently discovered by Döbereiner) in finely-divided platinum, of causing gaseous combinations, he proved the exact proportions which the residues, after the action of chlorine on oil and coal gases, bear to each other.

All the experiments of Dr Henry to which we have hitherto alluded bore upon aëriform bodies; but though these were his favourite subjects of study, his acquaintance with general chemistry is proved by his *Elements of Experimental Chemistry* to have been both sound and extensive. This work was one of the first on chemical science published in this country, which combined great literary elegance with the highest standard of scientific accuracy. His comparative analyses of many varieties of British and foreign salts were models of accurate analysis, and were important in dispelling the prejudices then popular in favour of the latter for economical purposes. His memoir on the theories of galvanic decomposition earned the cordial approval of Berzelius, as being among the first to maintain that view to which he himself pinned his faith.

It is to be regretted that Dr Henry did not contribute more to the literature of science. His biographical notices of his great contemporaries, Priestley, Wollaston, and Davy, have been justly pronounced as among the best examples of that kind of composition in the English language. His contrast between Davy and Wollaston may recall Playfair's celebrated contrast between Black and Hutton, both in the qualities common to the minds compared, and in the vigour which marks both compositions. Especially is it to be regretted that he did not live to carry out the great literary project for which he had collected materials—a history of chemical discovery from the middle of the last century. He could have made it one of the most popular books of science in our tongue. His son and biographer claims a very high degree of merit for his literary compositions, and particularly for his familiar letters. The concurrent testimony of all authorities proves that the general estimate of Dr Henry appended by his son, Dr Wm. Charles Henry, to his *Biographical Account of the late Dr Henry*, is by no means partial or overdrawn. "In the general intercourse of society Dr Henry was distinguished by a polished courtesy, by an intuitive propriety, and by a considerate forethought, and respect for the feelings and opinions of others; qualities arising out of the same high-toned sensibility that guided his tastes in letters, and that softened and elevated his whole moral frame and bearing. His comprehensive range of thought and knowledge, his proneness to general speculation in contradistinction to detail, his ready command of the refinements of language, and the liveliness of his feelings and imagination, rendered him a most instructive and engaging companion. To the young, and more especially to such as gave evidence of a taste for liberal studies, his manner was peculiarly kind and encouraging."

At intervals during his whole life Dr Henry suffered severely from the effects of the accident already mentioned which befell him in early life. This produced paroxysms of intense neuralgic agony, which rendered the extirpation of the principal nerves of the hand necessary: but this failed to afford the expected relief; and latterly, the irritation of the whole nervous system deprived him of sleep, and caused his death on September 2, 1836.

HENRYSON, Robert, one of the best of the old Scottish poets, flourished in the latter half of the fifteenth century. Very little is known of his personal history. He is described as having been the chief schoolmaster of Dunfermline. In one of his works he alludes to himself as "ane man of age;" and from Sir Francis Kynaston we learn that, "being very old, he dyed of a diarrhea or fluxe." As to the time of his death it is certain that he predeceased Dunbar, who, in his *Lament*, printed in 1508, says—

> "In Dunfermling he has taen Broun
> With good Mr Robert Henrysoun;"

but the exact date of his death is unknown.

The best of Henryson's pieces is the beautiful pastoral of *Robene and Makyne*, the earliest specimen of that kind of composition in Scottish literature, and one of the best pastorals in any language. The conduct of the story is as skilful as the diction is terse and elegant. It was first printed in Ramsay's *Evergreen*, Edinb., 1724, but became much more widely known when reprinted by Percy in his *Reliques*. Besides this pastoral, Henryson wrote a supplement to Chaucer's *Troilus and Cresseide;* which in the editions of Chaucer, is generally appended to that poem, under the title of *The Testament of Fair Cresseide*. This poem is so beautiful in many of its parts, and displays such richness of fancy, and such touching earnestness of pathos that we must ever regret the poet's unfortunate choice of a theme. His largest work, however, is a collection of fables, thirteen in number, of which the best is undoubtedly the tale of the *Vponlands Mouse and the Burgesse Mouse*. Most of the subjects of these fables are drawn from Æsop, but not all. Among the Harleian MSS. in the British Museum are preserved the *Morall Faibillis of Esope*, compylit be Maister Robert Henrisoun, Scolmaister of Dunfermling, 1571. A few years later appeared the *Fabulous Tales of Esope, the Phrygian*, compiled moste elegantly in Scottishe meter by Mr Robert Henrison, and now lately Englished: London, printed by Richard Smith, 1577. A reprint of Henryson's *Fables* was made in 1832 for the Maitland Club of Edinburgh, from the edition of Andrew Hart, of which the only copy known to exist is preserved in the Advocates' Library of that city. The disputed tale of *Orpheus and Eurydice* is attributed to Henryson by Dr Irving and Mr Laing, though it is decidedly inferior to nearly all his other works.

HEPHÆSTÆA. See Lampadephoria.

HEPHÆSTION, a grammarian of Alexandria who flourished about the middle of the second century. He is believed to have been one of the preceptors of the emperor Ælius Verus; at least he is generally identified with the Hephæstion described as holding that office by Julius Capitolinus in his Life of Verus. From Suidas we learn that he was a very voluminous writer; but of all his works none have descended to us except a treatise on the Greek Metres ('Εγχειρίδιον περὶ Μέτρων). This work, though neither complete nor perfectly reliable, is important as forming the basis of our knowledge on the subject. It was first printed at Florence in 1526; again, by Turnebus at Paris, with Scholia, in 1553; and a third time by Hudson, with the *Prolegomena*, attributed to Longinus, Oxford, 1710. Later editions are those of Pauw, Utrecht, 1726; and Gaisford, Oxford, 1810, with the *Chrestomathia* of Proclus. This edition was reprinted at Leipzig in 1832.

HEPHÆSTUS. See Vulcan.

HEPPENHEIM, a walled tower in Hesse-Darmstadt, and capital of the province of Starkenburg, 16 miles S. of Darmstadt. It contains a church built by Charlemagne. On an eminence behind the town, and upwards of 1000 feet high, stand the ruins of the castle of Starkenburg, which has given name to the province. Pop. 4200.

HEPTAGON, a seven-sided figure. See Geometry.

HEPTARCHY, a general term for the seven petty independent kingdoms into which England was parcelled out by its early Anglian and Saxon conquerors. These were Kent, Sussex, Wessex, Essex, Northumbria, East Anglia, and Mercia. See England.

HERA. See Juno.

HERACLEA, in *Ancient Geography*, a large and important city of Magna Græcia. It was situated in Lucania, between the small streams Siris and Aciris, a little way inland from the shore of the Tarentine Gulf. Its early history is obscure, but it seems to have been colonized from Thurii and Tarentum, B.C. 432. It soon attained to great prosperity, especially after having been fixed upon as the seat of the general assembly of the Greek cities in Italy. In the wars with Pyrrhus it sided with Tarentum against Rome; but it afterwards abandoned its parent state, and became an ally of the Roman people. It suffered severely during the social war, but still retained a considerable measure of importance and prosperity. When, or from what causes, it fell into decay is unknown; but nothing remains to mark its former greatness, or even its site, but mounds of stones and the upturned foundations of old buildings. Antiquities of great value are occasionally found among the ruins. Of these the most important are the *Tabulæ Heracleenses*, two bronze tables on which is inscribed the Lex Municipalis of Julius Cæsar, and which constitutes our chief authority on the subject of the municipal law of Rome. This inscription has been published by Muratori, Haubold, and Mazocchi, and largely illustrated by Savigny in his miscellaneous works. Heraclea is said to have been the birthplace of the famous Zeuxis; but whether that be true or not, it is known that the arts found in the city a congenial home.

Heraclea, surnamed *Minoa*, in *Ancient Geography*, a Greek city of Sicily, at the mouth of the Halycus (now the *Platani*), 20 miles N.W. from Agrigentum. The surname seems to have been originally the name of the town, which is first mentioned in history as a colony of Selinus. About the end of the sixth century B.C. it was recolonized by the Spartans, and had attained to great prosperity and power, when it was destroyed by the jealousy of the Carthaginians. After remaining in their power for about 200 years, it fell into the hands of Agathocles, and then of Pyrrhus. It was next recovered by the Carthaginians, who retained it till at the end of the first Punic War the whole of Sicily was made over to the Romans. In the second Punic War it reverted to the Carthaginian sway, but was finally attached to the Roman empire by Marcellus shortly after the fall of Syracuse. After the servile war, Heraclea was repeopled by the Romans, and continued to flourish till the time of Cicero, who alludes to it as a place of importance. Before the age of Ptolemy it seems to have sunk into decay, and at this day its very ruins can hardly be traced.

Heraclea Pontica, now *Erekli*, a Greek city of Bithynia, on the S. shore of the Euxine Sea, about 130 miles from Byzantium. It was a joint colony of Megara and the Bœotian Tanagra; but the date of its foundation is unknown. From its position and its excellent harbours, it soon attained to great prosperity and power, and reduced under its sway the Mariandyni and the other tribes lying between the Parthenius and the Sangarius, a distance of nearly 120 miles. Its decline began with the quarrels between the people and the aristocracy, in the course of which a private citizen, by name Clearchus, usurped the power about B.C. 380. Under him and his immediate successors, the city still continued to flourish, but a combination of the Bithynian princes, jealous of its prosperity, stripped it of its territory. Its ruin was completed by the Romans in the Mithridatic War. Aurelius Cotta took the town, and its splendid library, baths, and temples, were burned to the ground. Under the emperors, however, the town revived, and is described as a flourishing port so late as the reign of Manuel Comnenus. The modern town of Erekli rises in the form of a sort of amphitheatre from the sea, and presents many traces of its past magnificence. Its walls, in many places of great height and thickness, are crumbling into ruins, as its castle has already done. The harbour, though neglected, is still a good one, and some ship-building is carried on. Erekli exports in considerable quantities timber, silk, and wax; and has, besides, a large import trade.

HERACLEONITES, a sect of Gnostics in the second century, were the followers of Heracleon, a pupil of Valentin. They held the existence of a good and evil principle, coexisting now, but not alike eternal, and ascribed to man an heavenly, in addition to his reasonable soul. The anointing of the dying according to certain formularies, and prayers addressed to the Demiurgus, was by them termed salvation.

HERACLIDÆ, the descendants of Hercules. In a general sense, the term is applied to all the families of Greece that traced their origin to the great mythic hero of their country. In a more limited sense it is restricted to those descendants of Hercules, who, along with the Dorians, conquered the Peloponnese. They were, in fact, the Normans of Grecian history. The story goes, that after the death of Hercules (who had been deprived of his lawful rights by Eurystheus through the craft of Juno), his children were obliged to take refuge for their lives in Attica. They were there welcomed by Theseus, who furnished them with the means for taking the field against the usurper Eurystheus. With the aid of the Athenians, they defeated and slew the tyrant, and settling quietly in their ancient homes, effected what is known in Greek history as the "return of the Heraclidæ." At the end of the first year of their return, however, they were once more driven out by a pestilence. Again they sought refuge in Attica, and subsequently among the Dorians. Backed by a band of Dorians, they once more made for the Peloponnese. At the Corinthian isthmus they met the army of the Pelopidæ, their chief opponents, under the command of Echemus, king of Tegea. In single combat with this chief, Hyllus, the Dorian leader and son of Hercules, was killed. Hereupon his followers retired, after promising to make no further attempt on the Peloponnese for 50, or, as some say, 100 years from that time. They broke their promise, however, for, 30 years after the Trojan War (which itself began 10 years after the death of Hyllus), Cleodæus, the son of Hyllus, headed the third expedition which, like its predecessors, failed. Cleodæus fell in battle, and his son Aristomachus, who, 20 years later set out to avenge his death, met the same fate. The fifth attempt was at length successful. Temenus, Cresphontes, and Aristodemus, the three sons of Aristomachus, fitted out a powerful fleet on the Corinthian Gulf, and with the assistance of the Ætolian Oxylus, defeated the Peloponnesian forces under Tisamenes, the grandson of Agamemnon, and reduced the whole of the Peloponnese except Achaia and Arcadia. The conquerors then proceeded to divide the spoil. Cresphontes obtained Messenia; Argos was allotted to Temenus; and Lacedæmon to Procles and Eurystheus, the two sons of Aristodemus, who had been killed just before the expedition set sail. The conquered natives were either driven into exile, or reduced to slavery.

Thus was accomplished the great event of the "Return of the Heraclidæ." The traditionary accounts of it vary considerably in many of the details, many of which are no doubt purely mythical. But that under the myths there lies a substratum of historical narrative is universally agreed. But it is difficult, nay impossible, to say where the myths end and the history begins. In the meantime, we may with most safety accept the verdict of K. O. Müller in his *Dorians.* After carefully comparing all the legends about the Heraclidæ, as found in the classics, that scholar inclines to deny the conclusions of the ancients that the Peloponnese was conquered by Dorian adventurers under Achæan chiefs. He attributes to a later period those parts of the legend that described the Heraclidæ as the sons of the Tirynthian Hercules, and prefers to trace them back to a Doric hero of the same name. Historically it is not true that the Peloponnese was thus early and totally subdued. Its subjugation by the Dorians was reserved to a much later date.

HERACLIDES, surnamed PONTICUS, a Greek miscellaneous writer, was a native of Heraclea in Pontus (whence his surname), and flourished in the fourth century B.C. He was a man of wealth, and indulged his taste for travel and literature by removing from his birth-place to Athens, where he studied under Plato, whose favourite pupil he is said to have become. He wrote voluminously upon a great variety of topics; but of his numerous works only a small fragment *On Statecraft* has descended to us. This essay was first printed with the *Variæ Historiæ* of Ælian, at Rome, in 1545; but the best editions are those of Köler, Halle, 1804, and Coraes, Paris, 1805. The *Homeric Allegories*, which used to be fathered upon him, are the work of a very different hand. Of Heraclides' personal history nothing is known, except that he was a very vain man, very fond of good living, and very fat. There were some silly stories afloat about him. On his death-bed he is said to have requested a friend to hide his body as soon as he died, and to put a serpent in its place, that his townsmen might believe that he had been carried off to heaven. But this and the other trifles to the same effect may very safely be rejected.

HERACLITUS, of Ephesus, the "Weeping Philosopher," as he was called from his gloomy and sombre views of life, may be identified with the Ionian philosophy, though he held many of his tenets independently of it. His era has been much disputed. According to Fynes Clinton, his *floruit* may be assigned about B.C. 513. His father was one of the leading citizens of Ephesus, with means ample enough to send the future philosopher abroad to enlarge his mind by foreign travel. His name is variously given as Blyson, Bioson, or Bauson. On his return home Heraclitus was offered the chief-magistracy of Ephesus, but he waived the honour in favour of a younger brother. He had little sympathy with the character of his fellow-townsmen, and used to play at dice with little children in the streets near the great temple of Diana, saying that he would rather throw away his time on this frivolous sport than undertake the task of governing such wretches as the Ephesians. He is said to have begun the study of philosophy under the Pythagorean Hippasus of Metapontum; others say, of the Eleatic Xenophanes, but he claimed for himself, and on good grounds, the merit of being entirely self-taught. His unsocial and caustic humour remained with him to the last, and even grew in bitterness with his advancing years. To such an extreme did he carry it, that he at length retired to the mountains and refused all further intercourse with his kind. Limiting his diet to vegetables, he soon brought on a mortal disease, which compelled him to return home. But he only came back to die. At the time of his death he is said to have reached his sixtieth year. It is not necessary to repeat the silly stories about the manner of his death.

The philosophy of Heraclitus was embodied in a prose work entitled Περὶ φύσεως *(On Nature).* The style of this work was so obscure that it gained him the title of σκοτεινος, which, however, may have a reference to the gloomy tenor of his general views. It must also be borne in mind that at the time Heraclitus wrote there was no good prose philosophical style in existence. Verse had, till about his time, been the favourite vehicle of thought, and it was not to be looked for that the earliest prose-writers should make the leap all at once from a poetical to a purely scientific way of regarding common things. The language of Heraclitus, accordingly, had a strange and mysterious import, which he himself happily compared to the utterances of the sibyl. The object of all philosophy, according to him, is to discover the vital principle that inheres in all the phenomena of nature. This principle he held to be fire; not the fire of domestic life, but a kind of hot and elastic fluid "self-kindled and self-extinguished," which, subtilely permeating everything, developes and moulds it according to fixed laws into various forms. In one of its modifications this fluid, as the soul or principle of life, is endowed with intelligence and powers of ceaseless activity. In this way everything that exists is merely seen at the moment; it is undergoing a change, and consequently exists, and does not exist at the same moment. It is this ceaseless activity that creates in the subjects of its action a constant tendency to want on the one side and satiety on the other. These forces meeting in certain degrees of intensity, produce the phenomena of life and death. For a final cause of all the changes going on in nature, Heraclitus appeals to destiny. With him, whatever is, is right; and in his moral system he laid down as the highest good, a perfect acquiescence in the decrees of that overruling destiny—a sort of philosophic fatalism, which was afterwards worked out under a different form by the Stoics, and again appears in a different guise in the Hegelian philosophy.

The philosophy of Heraclitus has been constructed out of fragments of his works preserved in Plutarch, Clemens of Alexandria, and Sextus Empiricus. These fragments were collected by Henry Stephens, and published by him along with some others, under the title of *Poësis Philosophica*, Paris, 1573. A detailed analysis of his doctrines is given by Brandis and by Ritter in their respective histories of ancient philosophy.

HERACLIUS, one of the most remarkable of the Roman Emperors of the East, reigned from A.D. 610 to 641. He was first brought into notice by the success of his attempt against the Emperor Phocas, whose throne he usurped. After assuming the purple, he began to display that extraordinary energy of character which marked the first years of his reign. He restored discipline to the army, renewed the treaties with foreign powers, and prepared for war against the Avars, who had devastated Thrace, and were marching on Constantinople, when they suddenly saw fit to retire to their homes beyond the Danube. The next foe he had to meet was Persia, whose illustrious general, Sarbar, after taking Jerusalem, had fought his way into Africa, had taken Alexandria, and by devastating the African granaries of the empire, had reduced Constantinople almost to starvation. Another Persian army laid waste Asia Minor; and the King Chosroës (Khosru), emboldened by victory, called on Heraclius to renounce Christianity and worship the sun. During all this time the Roman Emperor was quietly but vigorously organizing his defence, and when all was ready he crossed over into Asia with his legions, defeated the enemy in every encounter in a five years' war (622–627), and penetrating into the very heart of the Persian Empire, seized and pillaged the royal palaces, from which he carried off spoils of untold value. He returned to his capital in triumph, and received the congratulations of every potentate from the Indus to the Atlantic, on having for ever crushed the hereditary foe of his race. Better still, he received the blessings of his own subjects, whom he had endeared by his victory, and by splendid exhibitions of personal valour in nearly every battle which he fought. But another power had in the meantime struggled painfully into existence in the East, which Heraclius would have done well to anticipate. Mohammed and his Arabians having conquered every foe that opposed them, found themselves at length confronted by the Roman Empire of the East. A pretext for war between powers contending for the sovereignty of the world was not long wanting, and Heraclius, whom disease and weakness prevented from heading the Roman legions in person, saw the fruits of his long and bloody wars with Persia wrested one by one from his grasp. The contrast between his declining and his opening years became now fatally apparent. Sunk in a slothful sensuality, which he alternated with the excitement of religious controversy, he allowed his empire to fall to pieces before his eyes, and helped on that process of decay which some centuries later offered the Roman Empire of the East an easy prey to the crescent of the False Prophet. Heraclius died in 641, and was succeeded by his eldest son Heraclius, who reigned under the title of Constantine III.

The character of Heraclius is a curious riddle which it is not very easy to solve. His Persian campaigns are admitted by modern strategists to rank him among the greatest soldiers of antiquity. His personal valour was not surpassed by that of any hireling soldier of his day; while his talents as a diplomatist, so long as he chose to exert them, bade fair to re-establish the Roman Empire on its ancient footing of glory and security. In marvellous contrast to these great qualities stands the vicious imbecility of his later years, arising partly from physical causes, and partly from moral defects. A parallel to his character, in some respects a very striking one, is to be found in our own Edward IV. Both were in a sense usurpers; both unexpectedly displayed great military talents and the most extraordinary personal courage; both gained great victories against great odds; and both debased great faculties by the most miserable vices. The parallel holds good even to the destiny of their respective families.

HERALD (Gr. κῆρυξ, Lat. *fecialis*, *fætialis*, *vel fetialis*, Ger. *herold*, Fr. *héraut*, Span. *heraldo*). As the Germans were the first among modern European nations to reduce heraldry to a system, and as we are undoubtedly of German origin, it may be safely concluded that the English word is derived from the German.

Heralds appear to have been important and prominent persons among the older Asiatic nations, as well as among the Greeks and Romans, and their privileged and almost sacred character was generally recognised. Though the herald of Nebuchadnezzar is the only one mentioned in Holy Writ,[1] these officers are frequently alluded to by the Greek poets and historians, while the members of the Roman College of Heralds established by Numa were generally selected from noble families, and held in very high estimation.[2] Their most ancient and most important duties were to carry messages of amity or defiance to foreign powers, and to proclaim the national will or that of the sovereign on great occasions.

In the middle ages the presence of heralds at tournaments was considered as indispensable as that of the knightly combatants themselves; and the task of instructing young knights on their installation, very generally devolved on the senior heralds or kings-of-arms.[3] But their chief glory and source of wealth passed away with the days of chivalry; their ambassadorial functions have also fallen into desuetude; and now their chief occupation is to record and illustrate pedigrees, and armorial bearings (see HERALDRY), and to marshal great national solemnities.

Heralds were in high repute in Germany and France before they were known in this country. Hither, however, they came from the latter country in the days of chivalry, and soon found favour with those whose high descent and noble deeds formed their constant themes of praise.

Mention is made of Chester herald so far back as the reign of Richard II.; but the first English herald advanced to a higher dignity appears to have been William Tyndale, appointed Lancaster king-of-arms by Henry IV. In Scotland, at the coronation of Robert II. in March 1371, Lyon-king-of-arms appears to have been summoned with his attending heralds by the Lord-Marischal of Scotland, and then sworn and crowned. In England, before the institution of Heralds' College, the heralds belonged exclusively to the Royal Court as "Household Servants," though there are instances, after that period, of their being permanently attached to, or occasionally employed in the households of powerful noblemen,[4] gentlemen of good estate, and dignitaries of the Church. Thus we find that the fifth Earl of Northumberland, of 1512, assigned x. marcs yearly to each of his heralds, and v. marcs to each pursuivant; and we are told by Cavendish that the pursuivant of Cardinal Wolsey carried before his lord "a great mace of silver gilt."

It may now be proper to notice in their order the three existing associations of heralds in the United Kingdom—viz., the College of Arms, or Heralds' College of England; the Lord-Lyon's Court, or Heralds' Court in Scotland; and the Office of Arms, in Ireland.

HERALDS' COLLEGE. In 1483 Richard III. constituted the heralds of England a collegiate body, like the *collegium fecialium* of Rome, incorporated them by letters patent, and assigned to them as an habitation[5] "one messuage, with the appurtenances, in London, in the parish of All Saints, called Pulteney's Inn, or Cold Harbore, to the use of twelve the most principal and approved of them." Edward VI. freed them from taxes, and Philip and Mary were also benefactors to the institution. In the latter reign Stanley or Derby House was granted to the heralds in lieu of their first habitation. of which they had been deprived by Henry VII.

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[1] *Cruden's Concordance*, art. *Herald*.

[2] Those who wish to prosecute an inquiry into the various functions of the Roman heralds will find ample means of gratifying their curiosity in *Pitiscus*, tom. i., *voce Feciales;* and in *Hofmann*, tom. ii., under the heads *Fetiales* and *Heraldus*.

[3] Selden's *Titles of Honor*, p. 703 (Ed. 1672).

[4] *Household Book of the Earls of Northumberland* (Ed. 1827, p. 47); Cavendish's *Life of Wolsey* by Singer, 2d ed., p. 106.

[5] *Rymer*, vol. xii., p. 215; Dallaway's *Inquiries*, p. 134.

The present college, situated in Doctors' Commons, was built, after a design of Sir Christopher Wren, on the site of old Stanley House, which was burned in the fire of London. The president or superior of the college is the Earl-Marshal of England, who nominates, for appointment by the sovereign, all the members of the collegiate chapter, consisting of three kings-at-arms, six heralds-at-arms, and four pursuivants-at-arms.

The office of *Magister Marescallus*,[1] or Chief Marshal, is of great antiquity, and appears in the reign of Stephen to have been hereditary in the family of *Marescalli.* This officer was styled at different times *marescallus regis*, *marescallus Angliæ*, and *comes marescallus.* The Earl-Marshal is eighth in rank among the great officers of state; and the dignity is now, by virtue of a grant of Charles II. in 1672, hereditary in the family of Howard Duke of Norfolk.

The royal commands regarding great public ceremonies are addressed to the Earl-Marshal; and under his direction are prepared the programmes which regulate order and precedence on such occasions. He still holds a court in Heralds' College, though it is but the shadow of what was in olden times the court of chivalry or honour, as constituted by Richard II. From the decisions of the Earl-Marshal an appeal may be made to the Sovereign in council.

The three kings-of-arms are styled Garter, Clarenceux, and Norroy. Of these Garter is the principal. As may almost be inferred from his name, one of his chief duties is to assist at all ceremonies connected with the Order of the Garter, either at home or abroad. "He was ordained," says Ashmole,[2] "by King Henry V., with the advice and consent of all the knights' companions, who, for the honour of the order, was pleased he should be the principal officer within the College of Arms, and chief of the heralds." The first Clarenceux king-of-arms was also appointed by Henry V., and Norroy was created by Edward IV. When the College of Arms was erected, the kings-of-arms proceeded to divide England into two districts—viz., north and south of the Trent. To Clarenceux the southern, and to Norroy the northern provinces were committed. Hence they were called the "provincial kings," each having jurisdiction independent of the other, while Garter, as principal, presided over all.

The six heralds are styled Chester, Lancaster, Richmond, York, Windsor, and Somerset. They are esquires by creation, and rank according to seniority of appointment.

The four pursuivants are Portcullis, Rouge-dragon, Bluemantle, and Rouge-croix: and though these officers form a class subordinate in rank to the heralds, they now generally succeed the latter on any vacancy occurring by death or preferment.

Though the members of this college have certain limited stipends, and fees on the creation of peerages, baronetcies, &c., their chief source of income is derived from fees for professional advice and assistance in tracing pedigrees and the descent of properties and titles, for the registration of nominal and armorial additions and distinctions sanctioned by the sovereign, and for granting coats of arms when the royal assent is not indispensable.

The importance of genealogies in relation to history is too obvious to require comment; and in countries like our own, where one branch of the legislature is in its nature hereditary, the most carefully compiled genealogies are essentially necessary.

The older records of the college are most curious, valuable, and authentic. Among these are the heralds' visitations of counties—documents giving the results of certain progresses made by the heralds through different districts of England. Though various visitations undoubtedly took place at an earlier period, they seem to have proceeded on no regular commission till 1528. The visitation books, the most valuable portion of the college library, contain elaborate pedigrees and representations of the coat-armour of the nobility and gentry existing in the counties, and at the dates, to which they refer; and they tend to throw much light on national as well as family history. When the 6th Duke of Norfolk, at the request of Evelyn,[3] bestowed the Arundelian library on the Royal Society, he stipulated that the herald's chief officer should have those that concerned heraldry and the marshal's office, books of armoury, and genealogies; and these now form part of the College library.

The daily occupation of the various members of the College of Heralds naturally leads them to much antiquarian research, and in this field and in general literature many of them have exerted themselves successfully. But above all, the names of Camden, Dugdale, Ashmole, and Vanbrugh shed peculiar lustre on this ancient institution.

Besides the members of Heralds' College, extraordinary heralds are occasionally appointed to assist the former on great occasions, and there is an officer called Bath king-of-arms, permanently attached to the Order of the Bath.

Heralds' Court, or Lord Lyon's Court in Scotland.—According to Chalmers, the origin of Lyon king-of-arms, and the body of Scotch heralds, is lost in the mist of antiquity.[4] Their first appearance on record was, as already stated, at the coronation of Robert II. in 1371. At that time they were apparently dependent on the Great Marischal, or Lord-Marischal of Scotland; bearing the same relation to him that the English heralds bore to the Lord-Marshal of England. The dignity of Marischal of Scotland seems to have been hereditary in the family of Keith for several centuries. The first who bore the title lived in the time of Malcolm II., but no mention is made of the title Earl-Marischal till 1458. The dependence of the heralds on this nobleman ceased, however, long prior to the extinction of the family of Keith, Earls-Marischal in Scotland; and Lyon has for an extended series of years held his place by commission under the Great Seal, and has been recognised as the head of the Scotch office of arms. He doubtless derives his name of *Lyon* from the cognizance of Scotland, as one of the *signiferi* or *pursuivants* is called Unicorn, in allusion to the supporters of the national shield. Lyon is generally appointed for life, is the sole principal herald or king-of-arms, and holds his court in the General Register-House at Edinburgh. The last grant of the office of Lyon was made by George III. in 1796 to the then Earl of Kinnoull and to his son. The latter is now Lord-Lyon.

Jurisdiction in arms, which at one time was vested in all the heralds jointly, is now exercised by Lyon alone, who performs the duties of his office by deputies of his own appointment. This devolution of duty on a deputy may be traced nearly as far back as 1663, when Lyon first obtained the title of Lord-Lyon, king-of-arms.

The heralds, six in number, are styled Rothesay, Marchmont, Albany, Ross, Snowdon, and Islay, and rank according to seniority. The pursuivants are also six in number, and bear the names of Kintyre, Dingwall, Carrick, Ormond, Unicorn, and Bute. All these officers receive their commissions from the Lord-Lyon, and usually for life, and their duty is now confined to attendance at royal proclamations, coronations, and other great public ceremonies.

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[1] Madox's *History of the Exchequer*, vol. i., pp. 43–48.

[2] Ashmole's *Order of the Garter*, chap. 8.

[3] Evelyn's *Diary*, 29th Aug. 1678.

[4] Chalmers' *Caledonia*, vol. i., p. 762, note.

The *macers* at one time were reckoned among the officers at arms, but from the institution of the Court of Session or College of Justice, they were entirely detached from the heralds' office, and now wait only on the judges of the supreme law courts. After the *pursuivants* are accordingly to be ranked the *messengers*-at-arms, of whom there are many in every county. They are admitted and removed by the Lord-Lyon, and their duty is to execute the "process and letters" of the superior courts. The jurisdiction and authority of the Scottish king-of-arms is thus twofold; one over the officers at arms, in which respect he may not inaptly be regarded as, in some respects, at the head of the executive department of the law in Scotland; and the other in relation to bearings and ensigns armorial. The Lord-Lyon is now empowered by statute "to assign arms "to all 'virtuous and well deserving persons' on their application to him for the same; and this whether they belong "to families already possessing them or not." There is a marked difference between the present and the old law on this subject; for, by 12 Jas. VI., cap. 127, Lyon was empowered to *imprison during his pleasure* such as improperly assumed armorial bearings![1] To the court of the Lord-Lyon are attached a procurator-fiscal, to sue before his lordship; a clerk and registrar, and a messenger who acts as macer. The principles which regulate the Herald's Court at Edinburgh are stated in the Report, dated 1821, of the Commission on Courts of Justice in Scotland.

The decisions of the Lord-Lyon are now subject to the review of the Court of Session, though probably at one time his judgments, like those of the Earl-Marshal of England, could only be reconsidered by the Sovereign in council.

Office of Arms for Ireland, or Ulster's Office.—It is situated in the Record Tower of Dublin Castle; and the professional staff consists of one king-of-arms, two heralds, four pursuivants, one registrar, and one clerk of the records. The chief officer is styled Ulster king-of-arms. He holds his appointment from the Crown, and acts under the immediate direction of the Lord-Lieutenant of Ireland. According to Rymer,[2] the first Ulster king-of-arms, Bartholomew Butler, was appointed by letters patent of Edward VI., dated at Westminster, June 1, 1552; and Philip Butler, son of Bartholomew, was on the 28th of the same month appointed by letters patent Athlone herald. The two heralds of the present day are called Cork and Dublin; and the senior pursuivant bears the title of Athlone, the others being called pursuivants of St Patrick. The functions of Ulster's office are very similar to those exercised by the English College of Heralds. The records of the Irish Office of Arms consist of pedigrees of the Irish nobility and gentry, certificates of their deaths and funerals, &c., from the time of Henry VIII. down to 1700; and grants of arms, &c., for the same period, and down to the present time, with volumes relating to religious ceremonies, processions, &c. It would appear, from an official list, or heraldic calendar, published by the Registrar of the Irish Herald's Office in January 1846, that upwards of 1850 noblemen and gentlemen then living (including the members of their several families) had recorded their pedigrees, and registered their armorial bearings in that office. (H. G. R.)

HERALDRY.

HERALDRY is the science of blazoning or describing, in appropriate and technical terms, all that belongs to the bearing of armorial insignia. It likewise professes to describe the duties of the officers appointed as heralds to perform certain solemnities at coronations, the creation of peers, and such like public ceremonies. The consideration of the subject here will be confined principally to the science of coat-armour, and its various accessories.

Whatever causes led to the introduction of heraldry, it is certain that two circumstances contributed powerfully to its real development—first, the institution of jousts and tournaments in the time of Henry I.; and, secondly, the crusades in the time of Richard I. That its foundation was subsequent to the Norman Conquest may be proved negatively; for, in the Bâyeux tapestry of that period, no sign of the heraldic shield is to be found. It was not till the reign of Henry II. that *hereditary* armorial bearings seem to have been adopted. On the accession of that monarch he assumed the lions of Normandy and Poictou, and added to them the lion of Aquitaine. The shield at Mans of Geoffrey Plantagenet, who married the daughter of Henry I., and who died in 1150, affords one of the earliest specimens extant of heraldic bearings, as used by a subject. In the reign of Richard I. armorial bearings or shields became numerous; and from this period we may safely date the establishment of hereditary heraldry.

One essential principle in heraldry is its *hereditary* character; but there is reason to believe that neither at the earliest period, nor in several instances subsequently, was it so entirely of this nature. On reference to the oldest rolls of arms, it will be found that those of sons and of collateral relations differed from each other, and from the paternal coat, very materially. Arms first appear on the seals of private families in the reign of Richard I., at the close of the twelfth century. Those attached to the Barons Letter to the Pope in 1300, deposited in the chapter-house at Westminster, afford excellent evidence of the use of armorial ensigns at that period. The prevalence of arms during the reign of Edward I. is shown on the monumental brass of Sir John D'Abernon, 5th Edw. I. Upon encaustic tiles, and in architectural decorations of the thirteenth century, arms form the frequent subject of ornaments. Some of the earliest instances of heraldry may be found on monumental sculptured effigies, as in the Temple Church, London; and there is an instance on that of Sir Richard de Montfort at Hitchenden in Buckinghamshire, of about 1270. Of somewhat earlier date, there is a very fine specimen on an incised slab, in Bitton Church, Somersetshire, over Sir John Bitton, who died in 1227.

Rolls of arms in the reigns of Henry III., Edward I., and Edward II., display the simplest forms of heraldry. The roll of Carlaverock, A.D. 1300, is peculiarly rich and resplendent. From these evidences are derived the earliest heraldic ordinaries.

Shields varying in form at different periods are amongst the first recipients of heraldic figures. Arms are found emblazoned on the *surcoat*, a military garment. This practice seems to have originated with the Crusaders to distinguish the many different nations serving under the banner of the Cross, for at first the surcoat was without any mark of distinction, except that of colour. Surcoats were first worn in England in the time of Henry II., but they displayed no armorial bearing till the reign of Henry III. The monumental effigy of De Lisle in Bampton Church, Cambridgeshire, gives an instance of arms emblazoned on a surcoat in the reign of Henry III. (1216–72). The surcoat continued to be worn till about the time of Edward II. (1307), and gave rise to the designation of

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[1] See *Abridgement of Scotch Acts*, p. 162, Edin. 1685.

[2] Rymer's *Fœdera*, tom. xv., p. 305.

"Coats of Arms." The *jupon* and *cyclas*, which succeeded the surcoat, and continued in use till about the end of the reign of Edward III. (1370), were likewise emblazoned with arms. The effigy of Sir Oliver de Ingham, in Ingham church in Norfolk, A.D. 1343, affords an example of this sort. The *tabard* was the next military garment, which became general during the reign of Richard II. (1377-99), and continued till that of Henry VIII. (1509-47). The monumental brass figure of Sir George Felbrigg at Playford in Suffolk, A.D. 1400, represents him in his tabard of arms. After the reign of Henry VIII. the tabard ceased to be worn, except by the heralds, who have uninterruptedly continued down to the present time to wear them embroidered with the arms of the sovereign.

Armorial insignia were borne on *banners* from the earliest date of heraldry; in later times the forms of banners varied according to the degree of the person whose arms were displayed upon them. They were not only used in the field, but floated over the castles of the nobility, and were carried at their funerals, and hung up in churches with other heraldic achievements.

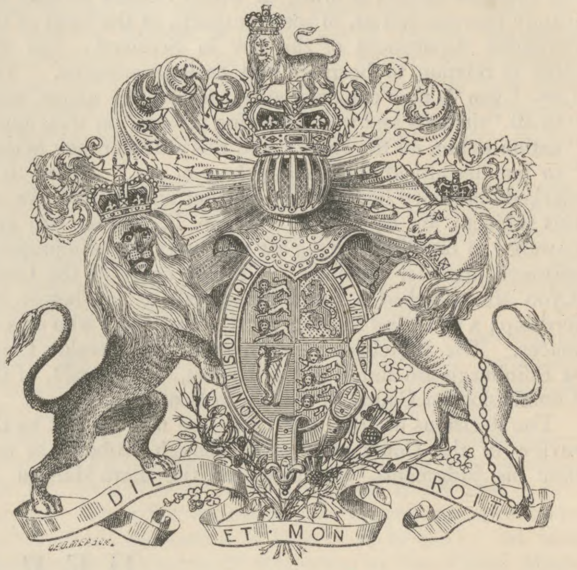
Arms were impressed on our gold *coins* immediately on their first introduction, in the time of Edward III.; and in the time of Henry VII. on silver coinage.

The first instance of the use of arms on the *seals* of the sovereigns of England was upon the Great Seal of Richard I., which bore *two lions combatant.* Henry II. is said to have given these arms to Richard; and to his other son John, *two lions passant,* which may be seen on his seal. Both Richard and John afterwards bore *three lions passant guardant.* Alexander II. (1214-1249) is said to have been the first of the kings of Scotland who bore the arms of that kingdom on his seal.

Having thus given an outline of the origin of heraldry, and of the earliest evidence of the period of its adoption, it may be as well to notice that arms have been *conventionally* attributed to several kings and princes who preceded that period. Thus certain arms have been assigned to the Saxon kings of England, and to the Conqueror and his sons. Without, however, more particularly referring to the arms so assigned by ancient writers on heraldry to various heroes and personages of the first ages, we may feel surprised that so late as the time of James I. of England, Segar, Garter King of Arms, compiled for that sovereign a collection of arms of the kings of England long prior to the twelfth century. And this compilation obtained as settled a notoriety for heraldry of the tenth and eleventh centuries as if it had then existed in all the pomp and splendour it afterwards acquired. It is quite evident, notwithstanding, that long prior to Segar this conventional heraldry was understood, as the arms ascribed to Edward the Confessor appear sculptured in Westminster Abbey as early as the time of Edward II. (1307-27), and were borne by Richard II. (1377-99) in honour of the martyred saint and king, whom he adopted as his patron.

Whatever were the real motives and circumstances that occasioned the display of those specific bearings upon shields, which constitute the *ensign armorial*, it seems that before hereditary heraldry supplied the charges for the shield, it was usual for knights to have their shields blank till they had achieved some deed which was worthy of being pourtrayed. In the infancy of heraldry the armorial shield was confined to knights, and was given only by princes or lords paramount. Subsequently, when other classes of the community became important, or possessed influence in the state, arms became the insignia of families generally, without the degree of knighthood being necessary. The earliest charges in heraldry appear to have been adopted in reference to military achievements and deeds of courage. Some had allusion to personal qualities in the bearer; others to the spoils of the enemy; and very frequently to surnames, after they became common. Early authors enumerate arms of dominion, pretension, concession, and patronage, with other similar ramifications. But generally these heraldic ensigns will range themselves into three principal classes—Arms of *states*, of *communities*, and of *persons* and *families.*

ARMS OF STATES are those assumed by sovereign princes, which denote their respective kingdoms, and there is scarcely an European state, however small, that has not displayed some distinguishing heraldic ensign or bearing. We shall briefly notice those which appertain to the United Kingdom.



THE ROYAL ARMS OF ENGLAND.—It has been already stated that hereditary heraldry did not originate earlier than the reign of Henry II.; but the arms said to have been borne by the Conqueror and his son William were *gules, two lions passant guardant or.* Henry II. is said to have borne *three lions,* though no armorial bearing appears on his seal. These arms, *gules, three lions passant guardant in pale or*, form those of England, and were so borne by the kings of England till the reign of Edward III., who, in 1340, quartered with them, in the first quarter, the arms of France, azure, *semeé of fleurs-de-lys or.* Thus the arms of the kingdom continued till the latter part of the reign of Henry IV., when the fleurs-de-lys of France were reduced to *three or.* No alteration occurred in the royal achievement during any of the succeeding reigns till the accession of James VI. of Scotland to the throne of England, when that sovereign introduced the royal arms of Scotland into the second quarter (France and England occupying the first and fourth quarters), and the arms of Ireland into the third quarter. The royal arms were thus borne by all the monarchs of the House of Stuart, till the reign of Anne. It must, however, here be noticed that William III. bore over the quarterings of the royal arms those of his Dutch dominions—the House of Nassau. In the reign of Anne an important change again took place, occasioned by the union of England and Scotland; and the arms of these kingdoms were impaled in the first and fourth quarters (England on the dexter, Scotland on the sinister); France was removed to the second; and Ireland retained its former position. On the accession of the House of Brunswick, in 1714, the fourth quarter in the royal shield gave place to the arms of his Majesty's German dominions, an arrangement which continued till 1st January 1801, when upon the Union of Great Britain and Ireland the arms of France were excluded; England occupied the first and fourth quarter; Scotland the second quarter; and Ireland its old position in the third quarter; over all, on an escutcheon of pretence, were placed the arms of Hanover, ensigned with the electoral bonnet, which was in 1816 displaced to give way for the Hanoverian crown. Thus the royal achievement continued to be borne till the end of the reign of William IV., when the arms of Hanover were removed upon the sovereignty of that kingdom being severed from the crown of England. The royal arms were then simply those of the three kingdoms, as now borne by her present most gracious Majesty. It may be remarked that in Scotland the preference has been given to the royal arms of that kingdom, by placing them in the principal place on many of the official seals in use for that part of the United Kingdom.

The Royal Arms of Scotland are,—*or, a lion rampant, within a double tressure flory and counterflory, gules.* As has been already observed, they appear first on seals in the reign of Alexander II. (1214-49). It is very probable that they had an earlier origin; but they are not so remote as is supposed by an author, who tells us that the fleur-de-lys was assumed by Achaius King of Scotland before the year 819, who is said to have taken them into his imperial ensign to adorn the double tressure, the badge between him and Charlemagne of France.

The Arms of Ireland were said originally to have been *azure, three crowns in pale or;* and, in support of this supposition, some Irish coins of the times of Edward IV., Richard III., and Henry VII., have been referred to. It is only on one of these coins (of Edward IV.) that the crowns are in a shield, and are there *two and one.* The augmentation granted by Richard II. to Robert de Vere, Earl of Oxford, whom he had created Duke of Ireland, has been adduced in favour of three crowns being the armorial ensign for Ireland; but in the grant nothing is said about that augmentation having allusion to that kingdom. *Azure, a harp or, stringed argent,* are given in a MS. in the Herald's College, in the time of Henry VII. or Henry VIII., as the arms of Ireland; and they were, on the accession of James I., so incorporated with the arms of England and Scotland in the royal shield.

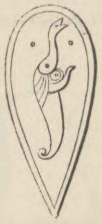
The Arms of the Principality of Wales.—On the seals of Edward, son of King Edward IV., and Arthur, son of Henry VII., as princes of Wales, were *three lions passant regardant, with their tails between their legs, and reflexed over their backs;* the field being *argent,* with the lions *gules,* as they appear in several MSS. Other arms, however, are ascribed to the three provinces of Wales—viz., those of North Wales, *quarterly gules and or, four lions rampant, counterchanged;* South Wales, *gules, three cheveronels argent, in chief two lions combatant or;* and Powisland, *or, a lion rampant, gules.* None of these arms ever appeared upon any of the royal seals used by the sovereigns of England.

Arms of Communities.—Under this class of ensigns armorial may be comprehended those of ecclesiastical and lay corporations. The former, being those of Bishops' sees, abbeys, monasteries, and other religious houses, were principally derived from the arms of founders, or composed of figures having allusion to the church; the latter those of municipal corporations, cities, and towns, trading companies, and other corporate bodies, had greater variety of origin. The arms of towns were probably derived from some powerful neighbouring family, as in the case of Chester, which bore those of the ancient Earls of Chester, dimidiated with the royal coat of England. The town of Yarmouth and the Cinque Ports, as well as other towns, bore arms having allusion to the principal occupations of the inhabitants, or in reference to their locality. The arms of Yarmouth and the Cinque Ports were dimidiated with those of England, probably as early as Edward I.'s time, and are so borne at the present day. The arms of London, as the principal city of England, are those of the patron saint St George, with the sword of St Paul in the dexter canton of the shield. The arms of trading companies, and other inferior corporations, usually display the instruments of the "craft and mistery," or some other design connected with the object and nature of such incorporations. There are instances of very early grants of arms to such bodies.

Arms of Persons and Families.—It has been already stated how and at what time arms became the distinguishing marks of personal honour. They were frequently granted by the sovereign, or by some one authorized by him. The assumption of arms by private persons was restrained by Henry V.; who, by proclamation in the fifth year of his reign, declared that no man, unless he had borne arms at the battle of Agincourt, should assume arms except by right of inheritance, or under grant by competent authority. For the observance of this regulation, and further to restrain the voluntary assumption of arms, the heralds visitations were instituted, the earliest date of which was in 1528, and the last commission for that purpose was issued in the reign of James II. The crown still retains the power of granting arms, notwithstanding the patents which have been granted to the kings of arms from very early times to the present, and reserves to itself the granting of supporters to commoners, and of permitting persons to use the arms of other families, whose property they may inherit, or whose memory they wish to preserve.

I. OF THE SHIELD.

Shields containing arms varied at different periods in their form. The following are some examples:—



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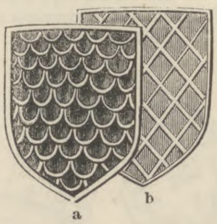
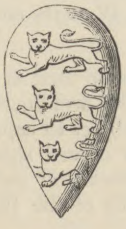


3.

No. 1. From the Bayeux tapestry, and introduced by the Normans, *c.* 1066.

No. 2. A similar shield from a font in Wansford Church, Northamptonshire, about the time of Rufus, *c.* 1087.

No. 3. Two shields (a) representing rustred armour, and (b) mascled armour, *anno* 1100.



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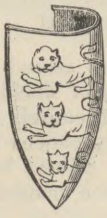

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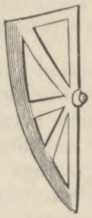

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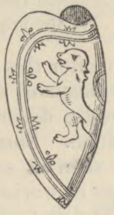

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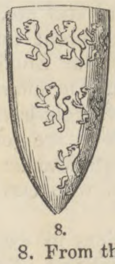
No. 4. Kite-shaped; in the reign of Henry II. Armorial bearings are first found on shields in his reign.

No. 5. From the seal of Richard I.

No. 6. From the seal of Adam de Herford, *anno* 1220, but of the time of Richard I.

No. 7. From the seal of Alexander II. king of Scotland, *c.* 1214.



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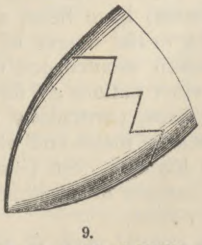

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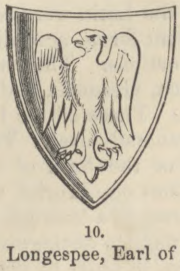
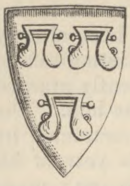


10.

No. 8. From the monument of William Longespee, Earl of Salisbury, who died in 1224.

No. 9. Shield of Eudo de Arsic, who died in the latter part of the reign of Henry III.

No. 10. Peter, Earl of Richmond, *anno* 1248.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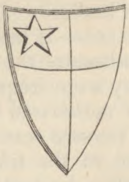
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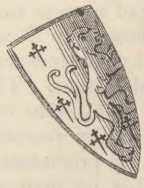
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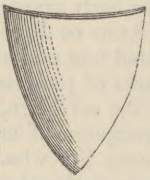
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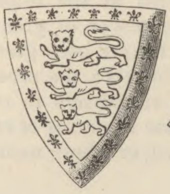
No. 11. From the monumental effigy in the Temple Church, *c. temp.* Edw. I. De Roos.

No. 12. Robert de Vere, Earl of Oxford, who died in 1221.

No. 13. From the effigy of a knight of the Montford family, 1286.

No. 14. A knight's shield, *anno* 1295.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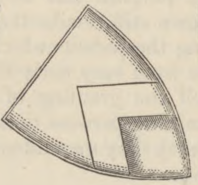
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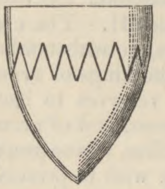
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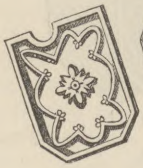
No. 15. From the monument of John of Eltham, Earl of Cornwall, in Westminster Abbey. He died in 1329.

No. 16. From the brass of Sir John D'Abernon, at Stoke D'Abernon in Surrey, who died in 1327.

No. 17. From the monument of Sir John Harsick at South Acre, in Norfolk, 1384.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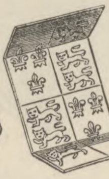
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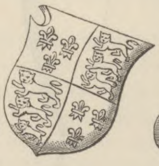
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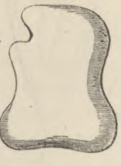
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No. 18. From the seats in the choir of Worcester Cathedral in the time of Henry IV.

No. 19. From the screen to the monument of Henry V. in Westminster Abbey.

No. 20. A shield of the time of Edward V.

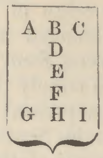
No. 21. A shield from about the time of Edward IV. to the middle of the reign of King Henry VII.

Soon after this period shields ceased to be used as defensive weapons, and the forms of shields for architectural or domestic decoration became entirely subject to caprice and fashion. Some very fine specimens of carved shields may be seen in engravings of private houses and public buildings in works illustrating the topography of the times of the Tudors and Stuarts.

The *shield* or *escutcheon* is the field or ground on which are represented the figures that make up a coat of arms; and wherever these figures may be fixed, they are represented on a plane or superficies, the form of which resembles a shield.

Shields (in heraldry called *escutcheons* or *scutcheons*, from the Latin word *scutum*) have been, and still are, of different forms, according to the usages of different times and nations. The modern escutcheons of the English, French, Germans, and other nations are formed in different ways. Those of the Italians, particularly of ecclesiastics, are generally oval. Those of maids and widows are generally of the form of a lozenge. Sir George Mackenzie mentions one Muriel, Countess of Strathern. who carried her arms in a lozenge, in 1284.

Armorists distinguish several parts or points in escutcheons, in order to determine exactly the position of the bearings they are charged with. Thus, in the annexed outline of an escutcheon,—



A is the dexter chief, B the precise middle chief, C the sinister chief, D the honour point, E the fess point, F the nombril point, G the dexter base, H the middle precise base, and I the sinister base.

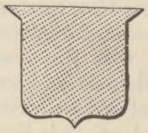
The knowledge of these points is of great importance, and ought to be well observed, for they are frequently occupied with things of different kinds. It is necessary to observe, that the dexter side of the escutcheon is opposite to the left hand, and the sinister side to the right hand, of the person who looks thereon.

II.—OF TINCTURES, FURS, LINES, AND DIFFERENCES.

1. *Of Tinctures.*

By *tinctures* is meant the colours of shields and their bearings. According to the French Heralds, there are but seven tinctures in armoury, of which two are metals. The metals are gold, termed *or*; and silver, termed *argent*. The colours are blue, termed *azure;* red, *gules;* green, *vert;* purple, *purpure;* and black, *sable*. When natural objects are introduced into arms, they retain their natural colour, which is expressed by the word *proper*. Besides the five colours above mentioned, the English writers on heraldry admit two others, namely, orange, termed *tenny;* and blood-colour, termed *sanguine*. But these two are rarely, if at all, to be found in British bearings.

These tinctures are represented in engravings and drawings by dots and lines, which are the invention of the ingenious Silvester de Petra Sancta, an Italian author of the seventeenth century. Thus, 1, *or* is expressed by dots; *argent* needs no mark, and is therefore plain; 2, *azure*, by horizontal lines; 3, *gules*, by perpendicular lines; 4, *vert*, by diagonal lines from the dexter chief to the sinister base points; 5, *purpure*, by diagonal lines from the sinister chief to the dexter base points; 6, *sable*, by perpendicular and horizontal lines crossing each other; 7, *tenny*, by diagonal lines from the sinister chief to the dexter base points, traversed by horizontal lines; 8, *sanguine*, by lines crossing each other diagonally from dexter to sinister, and from sinister to dexter.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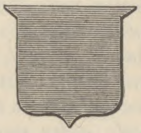
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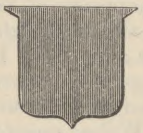
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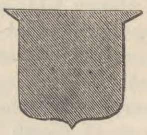
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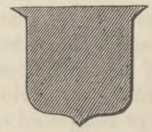
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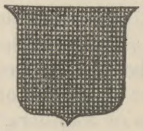
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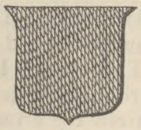
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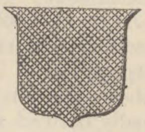
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This mode of expressing the colours of heraldry was as early as the time of Charles II., as appears by engravings at that time, but was not adopted upon seals till about the reign of Queen Anne; and not in architectural decorations till our own times, when the fashion of imitating styles of the middle ages has become prevalent. It is amusing to the heraldic eye to discern that, amidst all the care taken to copy the details of the *Gothic* style in church-building, the heraldic shield is disfigured by adopting the lines used to denote heraldic tinctures, at once proclaiming a barbarous anachronism, if no other incongruity existed.

Some fantastic heralds have blazoned not only by the ordinary colours and metals, but by flowers, days of the week, and parts of the human body, and have been condemned for it by the heralds of all nations. Others lay it down as a rule that the coats of sovereigns should be blazoned by the planets, and those of noblemen by precious stones. According to this rule, which some think judicious, and others reprobate as absurd, the relative blazonry would stand thus:—

Or	Topaz	Sol.
Argent	Pearl	Luna.
Sable	Diamond	Saturn.
Gules	Ruby	Mars.
Azure	Sapphire	Jupiter.
Vert	Emerald	Venus.
Purpure	Amethyst	Mercury.
Tenny	Jacinth	Dragon's-head.
Sanguine	Sardonix	Dragon's-tail.

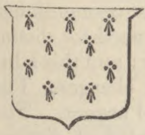
But in no instance does there occur throughout the official MSS. in the Herald's College this fanciful mode of blazoning arms. The heraldic terms of blazon are derived peculiarly from the French; and necessarily so, as in the twelfth century, when heraldry originated, Norman-French was the language in all proceedings connected with the government and jurisprudence of this country.

Metal should never be upon metal; nor colour upon colour. This rule, however, does not apply if a charge lies over any field composed of metal and colour. The English heralds give different names to roundels, according to their colours. Thus, if they be or, they are called *bezants;* if argent, *plates;* if azure, *hurts;* if gules, *torteaux;* if vert, *pomeis;* if purpure, *golpes;* if sable, *pellets;* if tenny, *oranges;* and if sanguine, *guzes.* The French, and all other nations, do not admit such a multiplicity of names for this figure, but call them *torteaux*, expressing the tincture.

Bezants were so called from coins struck at Constantinople, the Byzantium of the ancients. *Gules bezanté* or, was the armorial bearing of Alcyn la Zouche, *temp.* Hen. III. Torteaux were borne as early as the time of Henry III. *Or, two bars gules, in chief three torteaux;*—Hugh Wake.

2. *Of Furs.*

There are three different kinds in general use, namely, *Ermine*, which is a field argent, powdered with black spots,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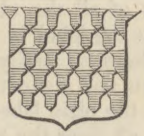
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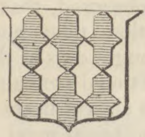
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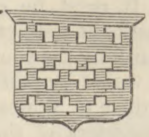
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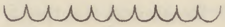
the tails of which terminate in three hairs (No. 1); *Ermines*, where the field is sable, and the powdering white; *Erminois*, where the field is or, and the powdering sable; *Pean*, where the field is sable, and the powdering or; *Erminites*, the same as ermine, with the addition of a red hair on each side of the black. *Vair* (No. 2), which is expressed by blue and white skins, cut into the forms of little bells, ranged in rows opposite to each other, the base of the white ones being always next to that of the blue ones. *Vair* usually consists of six rows; if there be more or fewer, the number ought to be expressed; and if the colours be different from those above mentioned, they should likewise be expressed. *Counter-vair*, when the bells of the same tincture are placed base against base, and point against point (No. 3). *Potent-counter-potent*, anciently called *vairy-cuppy*, as when the field is filled with crutches or potents counterplaced (No. 4). *Ermine* only, was the armorial bearing of the ancient earls of Brittany and Richmond in the twelfth century. *Ermines.*—Gules, a fess engrailed ermines, surmounted by a pale engrailed ermine.—Dyrwyn in some of the early rolls. Bruges, who was the first Garter, *temp.* Hen. V., bore ermine, a cross quarter-pierced ermines. *Erminois.*—Stringer, of Overthorpe in Yorkshire, bore three eagles displayed erminois in 1612. *Vair* only, was borne by Robert de Beauchamp, *temp.* Henry III.

3. *Of the Lines used in Arms.*

The field is sometimes parted by lines either straight or crooked. Straight lines are carried evenly through the escutcheon, and are of four different kinds,—viz., a perpendicular line |; a horizontal —; a diagonal dexter, ╲; a diagonal sinister, ╱. Crooked lines are those which are carried unevenly through the escutcheon.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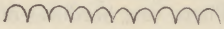
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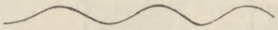
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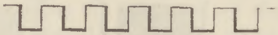
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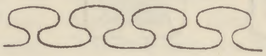
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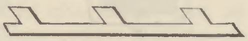
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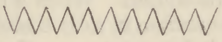
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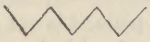
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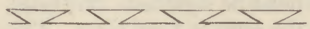
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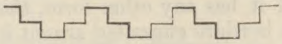
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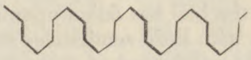
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1, The engrailed; 2, the invected; 3, the wavy; 4, the embattled, or crenelle; 5, the nebule; 6, the regule; 7, the indented; 8, the dancette; 9, the dove-tail; 10, the battled embattled; and 11, the champaine.

These lines not only vary the disposition of colours in the field, but are also generally used to alter the character of the principal ordinaries; and were adopted in the earliest times of heraldry.

The principal reason why lines are thus used in heraldry, is to distinguish bearings which would otherwise be the same; for an escutcheon charged with a chief engrailed, differs from one charged with a chief wavy, as much as if the one bore a cross and the other a saltier.

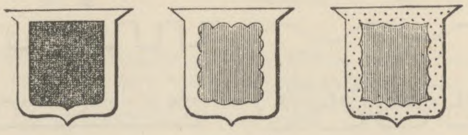
As the lines above mentioned serve to divide the field, it must be observed, that if the division consist of two equal parts formed by the perpendicular line, it is called *parted per pale;* by the horizontal line, *parted per fess;* by the diagonal dexter, *parted per bend;* and by the diagonal sinister, *parted per bend sinister.* If a field be divided into four equal parts by any of these lines, it is said to be *quartered.* Parted *per saltier* is made by two diagonal lines, dexter and sinister, crossing one another in the centre of the field, and likewise dividing it into four equal parts.

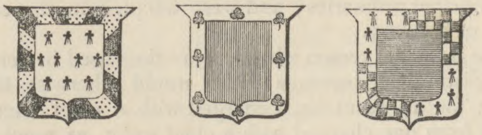
The escutcheon is sometimes divided into a greater number of parts, in order to place it in the arms of the several families to which the bearer is allied. These divisions may consist of several quarters, as these divisions are termed; an extraordinary instance of which was exhibited at the funeral of the Viscountess Townshend, whose corpse was brought from Dublin Castle to Raynham-Hall in Norfolk; when one of the principal tenants on horseback carried before the hearse a banner, containing the quarterings, to the amount of upwards of 160. But Sir William Dugdale justly objects to so many arms being clustered together in one shield or banner, on account of the difficulty of knowing and distinguishing one coat from another.

4. *Of the differences of Coats of Arms.*

There are also various differences or characteristic marks, by which bearers of the same arms may be distinguished from one another, and their nearness to the principal bearer demonstrated; and these differences are to be considered as either ancient or modern.

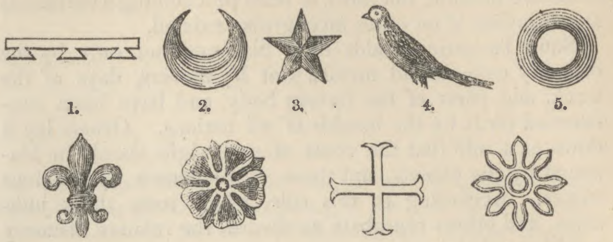
Of Ancient Differences.—Those which are called *ancient differences* consist in *bordures*,[1] which is a bearing that goes all round, and parallel to the boundary of the escutcheon. Bordures were used in ancient times also for noting a diversity between particular persons descended of one family and from the same parents. This distinction, however, was not expressly signified by invariable marks; nor were bordures always appropriated to denote the different degrees of consanguinity.





There are bordures of different forms and tinctures, as, for example,—1. Sable, a bordure argent. When a bordure is plain, it is not necessary to mention it, as it is always so understood in heraldry, though it be not expressed; but if it has any other form, this must be signified. 2. Gules, a bordure engrailed argent in the arms of Lord Gray. This is called *engrailed*, from the French word *engrêlé*, which signifies a thing the hail has fallen upon and broken off the edges, leaving it with little semicircles struck out of it. In a bordure or ordinary formed of these lines, the points are represented on all sides towards the field, and the semicircles are turned towards the bordure or ordinary. 3. Gules, a bordure invected or. This is quite contrary to the last, which turns its points into the bordure from the field. The word *indented* requires little explanation, the signification being obvious, from its figure, which is composed of tracks resembling teeth, called in Latin *dentes*. 4. Ermine, a bordure compony, or gobony, or and sable. This is so termed from its being composed of equal pieces of one row. Counter-compony is composed of two rows, and no more. Checky has a great resemblance to the last bordure, having three rows. Before blazoning, therefore, care must be taken to number them, so as to avoid taking the one for the other. 5. Gules, a bordure argent, charged with eight trefoils slipped proper, that is, vert. 6. Azure, a bordure quarterly ermine and checky argent and azure.

Of Modern Differences.—The modern differences which the English have adopted, not only for distinguishing sons issued out of one family but also for denoting the difference and subordinate degrees in each house from the original ancestors, are nine,—viz., for the heir or first son, the label; second son, the crescent; third son, the mullet; fourth son, the martlet; fifth son, the annulet; sixth son, the fleur-de-lys; seventh son, the rose; eighth son, the cross-moline; ninth son, the double quatre-foil. By the first six differences the sons of Thomas Beauchamp, the fifteenth Earl of Warwick, who died in the thirty-fourth year of the reign of Edward III., are distinguished in an old window of the church of St Mary at Warwick; so that although they are called *modern differences*, their usage among the English is ancient.



As to the distinction to be made in the arms of the offspring belonging to each of the above-mentioned brothers, it is expressed by certain figures. For instance, the heir or first son of the second house bears a crescent charged with a label during his father's lifetime only; the second son of the second house, a crescent charged with another crescent; the third son of the second house, a crescent charged with a mullet; the fourth son of the second house, a crescent charged with a martlet; the fifth son of the second house, a crescent charged with an annulet; the sixth son of the second house, a crescent charged with a fleur-de-lys; and so on of the other sons, taking care to have them of a different tincture.

It would be quite impossible to carry out this system in all the ramifications of a family of many generations from any common ancestor. At best, they can only be used for contemporary members of any branch from the original stock. When Dugdale, in his visitations, found a good house descending from a common parent stock, he used to distinguish the junior line by some significant mark, such as a cantor or other bearing.

The present marks of cadency are not earlier than the time of Henry VI. In the first stages of heraldry the distinctions between sons of the same family were of a more definite character; such as an entirely different coat, or the original one differenced by change of tincture, or by the addition of some other charges.

It must be observed, that of all the above-mentioned marks of distinction, none but the label is used for distinguishing the younger sons of the royal family; and this label is varied by additional pendants and distinct charges. The Prince of Wales always bears the plain label argent. The daughters of the blood royal all bear the label of distinction the same. The theory of this practice of differencing the arms of the royal children is, that none of the children of the sovereign is entitled to arms by descent, as the arms of their father are those of the state. When the sons and daughters of the reigning monarch receive permission to use the royal arms, they are assigned to them differenced by a label, charged with some distinguishing mark. This rule was observed in very early times under the Plantagenets, whose arms, so distinguished, are frequently to be found in churches and upon their seals.

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[1] Bordures are still introduced into English coats of arms, but for particular reasons, which heralds can best explain. The bordure wavy is now the general bordure used to denote illegitimacy. Bordures are, by the French, frequently taken for principal figures, and numbered amongst the rest of the ordinaries.

III.—OF THE CHARGES.

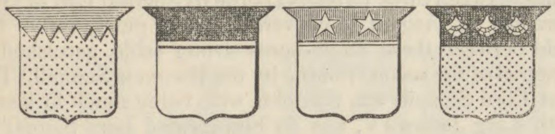
A charge is whatsoever is contained in the field, whether it occupy the whole or only a part thereof. All charges are distinguished by the names of *honourable ordinaries*, *subordinaries*, and *common charges.*

Honourable ordinaries, the principal charges in heraldry, are made of lines only, which, according to their disposition and form, receive different names. Sub-ordinaries are ancient heraldic figures, frequently used in coats of arms, and distinguished by terms appropriate to each. Common charges are composed of natural, artificial, and even chimerical objects or figures.

1. *Of Honourable Ordinaries.*

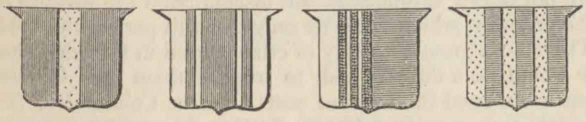
These are the chief, the pale, the bend, the bend sinister, the fess, the bar, the cheveron, the cross, and the saltier.

Of the Chief.—The chief is an ordinary determined by an horizontal line, which, if it be of any other form than straight, must be expressed. It is placed in the upper part of the escutcheon, and contains in depth the third part of the field. Its diminutive is a fillet, the content of which is not to exceed one fourth of the chief, and it stands in the lowest part of the chief. This ordinary is subject to be charged with variety of figures; and may be of any of the crooked lines.

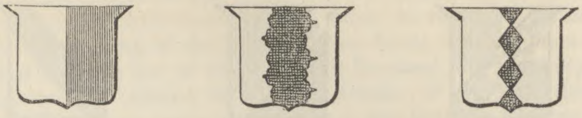


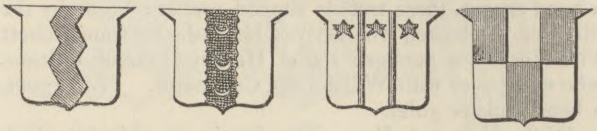
Examples:—1. Or, a chief intented azure; borne by Viscount Mountgarret. The family of the Butlers is descended from the ancient Counts of Brion in Normandy; but since Henry II. conferred the office of chief butler of Ireland upon one of the family, he and his successors have assumed the name of Butler. 2. Argent, a chief sable; in the lower part thereof a fillet of the field. 3. Argent, on a chief gules, two mullets or; borne by Lord St John of Bletshoe. This ancient family derive their surname from a place called St John in Normandy. 4. Or, on a chief sable, three escalops of the field, for the name of Graham; and borne quartered in the arms of the Duke of Montrose.

Of the Pale.—The pale is an ordinary, consisting of two perpendicular lines drawn from the top to the base of the escutcheon, and contains the third middle part of the field. Its diminutive is the pallet. This ordinary may receive any charge. The pale is sometimes cotised, or accompanied by its diminutives, to which some have given the term of *endorse.*

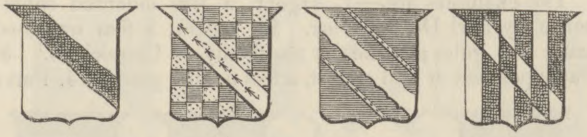


The following are examples:—1. Gules, a pale or. 2. Argent, a pale between two endorses, gules. 3. Party per pale.—1*st*, paly of six argent and sable; 2*d*, azure; borne by the name of Trenchard. 4. Pale of six or and azure. 5. Party per pale, argent and gules; borne by Earl Waldegrave. 6. Argent, a pale flory counter-flory sable. 7. Argent, a pale lozengy sable. 8. Argent, a pale dancette vert. 9. Argent, on a pale engrailed sable, three crescents or. 10. Argent, two endorses gules, in chief three mullets sable. 11. Party per fess gules and argent, a pale counterchanged.

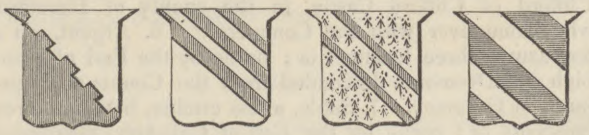




Of the Bend and Bend Sinister.—The bend is an ordinary formed by two diagonal lines, drawn from the dexter chief to the sinister base, and contains the fifth part of the field in breadth. Its diminutives are—the bendlet, which is the half of a bend; the cost or cotise, when two of them accompany a bend, which is the fourth part of a bend. There is also the bend sinister, which is of the same breadth as the bend, but drawn the contrary way. This is subdivided into a scarpe, which is the half of the bend, and into a baton, which is the fourth part of the bend, but does not extend itself to the extremities of the field, there being part of it seen at both ends.



The examples are,—1. Argent, a bend wavy sable; borne by Wallop Earl of Portsmouth, descended from a Saxon family, who were possessed of lands to a considerable value in Hampshire at the time of the Conquest. 2. Checky or, and azure, a bend ermine; borne by Lord Ward. 3. Azure, a bend engrailed argent, between two cotises or; borne by Earl Fortescue.[1] 4. Paly of six or and sable, a bend counterchanged. 5. Party per bend crenelle argent and gules; borne by the Earl of Cork and Orrery, in Ireland. 6. Argent, three bendlets, enhanced gules (as the English express it, though the phrase enhanced is used by no other nation); borne by Lord Byron.[2] 7. Ermine, a bend voided gules;—Ireton. 8. Bendy of six pieces argent and azure. When the shield is filled with an equal number of bendlets of metal and colour, it is called



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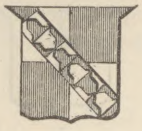
[1] The family of Fortescue is descended from Sir Richard le Forte, a person of extraordinary strength and courage, who accompanied William Duke of Normandy in his invasion of England; and bearing a strong shield before the duke, at the battle of Hastings, had three horses killed under him, and from that signal event the name and motto of the family were assumed; for the Latin word *scutum*, or the old French word *escue*, a shield, being added to *forte*, strong, composes their name; and their motto is, *Forte scutum salus ducum.*

[2] From Doomsday Book it appears that this family was possessed of numerous manors and lands in the reign of the Conqueror; and that Sir John Byron attended King Edward III. in his wars in France.

bendy; but if the number of them be unequal, they are to be blazoned by the name *bendlets*, and their number specified. 9. Quarterly, or and gules, a bend over all vair; was borne by the Dukes of Dorset (now extinct). 10. Gules on a bend argent, three trefoils slipped proper; borne by the Marquis of Bristol, who derives his pedigree from Robert Fitz-Hervey, a younger son of Hervey Duke of Orleans, who came over with William the Conqueror. 11. Argent, a bend sinister gules.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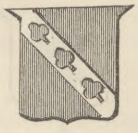
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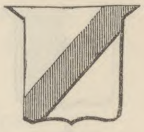
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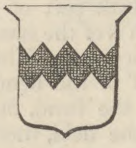
Of the Fess and Bar.—The fess is an ordinary which is produced by two parallel lines drawn horizontally across the centre of the field, and contains in breadth the third part thereof. The bar is formed of two lines, and contains only the fifth part of the field; but this is not the only respect in which it differs from the fess; for there may be more than one in an escutcheon, placed in different parts of it, whereas the fess is limited to the centre point. When the shield contains a number of bars of metal and colour alternate, of even number, that is called *barry* of so many pieces, expressing their number.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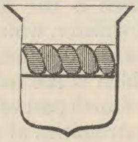
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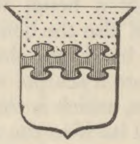
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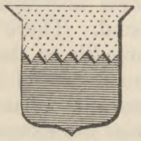
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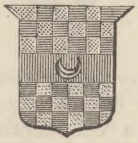
The examples are,—1. Argent, a fess indented sable; borne by Earl De La Warr. 2. Argent, a fess wreathed azure and gules; borne by the family of Carmichael.[1] 3. Party per fess or and argent, a fess nebule gules. 4. Party per fess indented or and azure. 5. Checky or and azure on a fess gules, a crescent argent for difference; borne by Lord Clifford of Chudleigh, descended from Walter de Clifford of Clifford Castle, in the county of Hereford, who came over with the Conqueror.[2] 6. Argent, on a fess azure, three lozenges or; borne by the Earl of Denbigh and Desmond, descended from the Counts of Hapsburg, in Germany. 7. Sable, a fess ermine, between three crescents or; borne by the Earl of Coventry, descended from John Coventry, a native of the city of Coventry, and afterwards mercer and Lord Mayor of London in the reign of Henry V. 8. Or, two bars azure, a chief quarterly of the second and gules, the first and fourth charged with two fleurs-de-lys of France, the second and third with a lion of England; borne by the Duke of Rutland. 9. Barry of ten pieces argent and azure, over all six escutcheons 3, 2, 1, sable, each charged with a lion rampant of the first, armed, and langued gules; borne by the Marquis of Salisbury, descended from the famous William Cecil Lord Burghley, who left two sons, Thomas and Robert, both of whom were made Earls in one day; Robert, the younger, being created Earl of Salisbury in the morning; and Thomas, the elder, Earl of Exeter in the afternoon. 10. Ermine, two bars gules; borne by the Marquis of Westmeath. 11. Argent, two bars indented sable; formerly borne by the Earls of Athlone (now extinct).[3] 12. Argent, three bars gemelles gules; formerly borne by the Earls of Barrymore (now extinct).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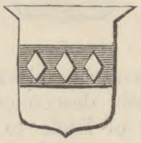
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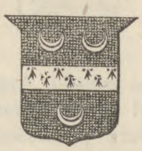
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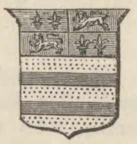
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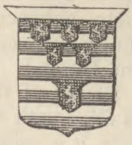
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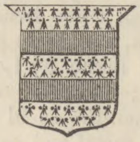
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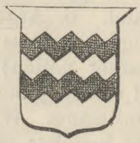
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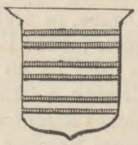
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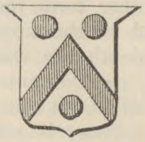
Of the Cheveron.—The cheveron, which represents two rafters of a house well joined together, or a pair of compasses half open, occupies the fifth part of a field. Its diminutive, the cheveronel, contains the half of a cheveron.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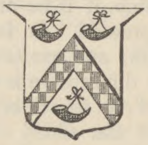
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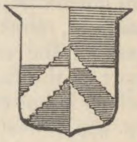
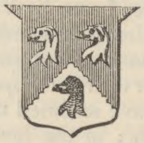

3.

The examples of cheverons are,—1. Argent, a cheveron gules between three torteaux; borne by Sherard Earl of Harborough. 2. Argent, a cheveron checky gules, and of the field between three bugle-horns strung sable, garnished or stringed of the second; borne by the Baroness Sempill. The first Lord Sempill was Sir John, who, being much in favour with King James IV. was by him created Lord Sempill in 1489. 3. Quarterly argent and azure, a cheveron engrailed counter-changed. 4. Party per cheveron engrailed gules and argent, three talbots' heads erased counter-changed; borne by Lord Feversham, descended from the Duncombes of Ivinghoe in Buckinghamshire. 5. Or, two cheveronels gules; borne by Lord Monson, descended from John Monson, who flourished in the reign of King Edward III. 6. Or, on a fess, between two cheveronels sable, three cross-croslets of the first; borne by the Earl of Orford. This family took their name from Walpole in Norfolk, where they resided before the Conquest.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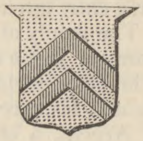
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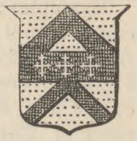
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Of the Cross.—The *cross* is an ordinary formed by the meeting of two perpendicular with two horizontal lines in the fess-point, where they make four right angles; the lines are not drawn throughout, but discontinued the breadth of the ordinary, which takes up only the fifth part of the field. There is so great a variety of crosses used in heraldry, that it would be a difficult task to treat of them all. Guillim has mentioned 39 different sorts; De la Columbière, 72; Leigh, forty-six; and Upton declares he cannot ascertain all the various crosses borne in arms, as they are almost innumerable. As their different forms cannot be given here, we shall, therefore, only take notice of such as are most commonly seen at present in coats-of-arms.

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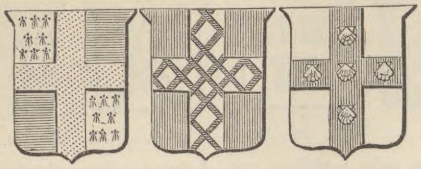
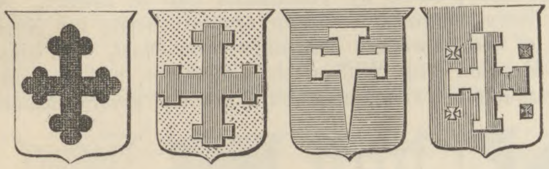
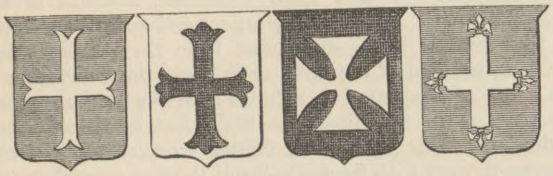
[1] Of this ancient family, see an interesting account, vol. i., p. 752 of Douglas's *Peerage*, 2d ed., 1813.

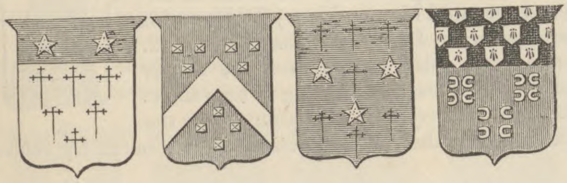
[2] Fair Rosamond, mistress to Henry II., was of this family.

[3] Godart, the first earl, was descended of an ancient family in the United Provinces of Holland, where he was Baron de Reede de Ginkel. In 1691, he was a lieutenant-general of King William's forces in Ireland, where, in June the same year, he took Ballymore for the English, and, in July following, the town of Athlone.



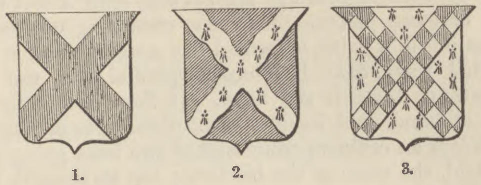


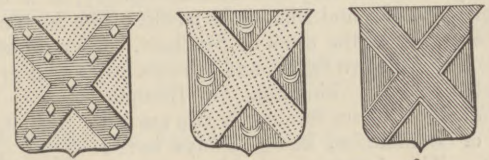


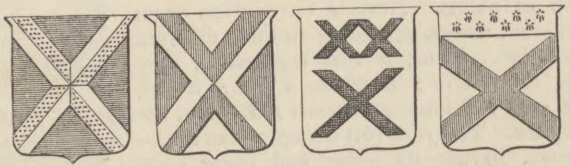


The first is quarterly, ermine and azure, a cross or; borne by the Duke of Leeds. 2. Gules, a cross argent fretty azure; borne by Viscount Taaffe of Corran, in Ireland. 3. Argent, on a cross gules, five escalops or; borne by the Earl of Jersey, descended from the family of Villiers in Normandy, some of whom came over to England with the Conoueror 4. Argent, a cross bottony sable. 5. Or, a cross croslet gules. 6. Azure, a cross potent fitchy argent. This ensign is said to have been borne by Ethelred, king of the West Saxons. 7. Party per pale, gules and argent; a cross potent quadrate in the centre, between four crosses patée, all counter-changed; the arms of the episcopal see of Lichfield and Coventry. 8. Azure, a cross moline argent; borne by Bentinck Duke of Portland, descended from a family in the United Provinces of Holland, of which was William Bentinck, who in his youth was page of honour to the Prince of Orange, afterwards William III. king of Great Britain, and, on the accession of William and his consort, was made groom of the stole, lieutenant-general of his majesty's army, and created Baron of Cirencester, Viscount Woodstock, and Earl of Portland, in 1689. 9. Argent, a cross patonce sable. 10. Sable, a cross patée argent. 11. Azure, a cross flory argent. This is said to have also been the arms of Edwin, the first Christian king of Northumberland. 12. Argent, six cross-croslets fitchée, 3, 2, 1, sable, on a chief azure two mullets or; borne by Clinton Duke of Newcastle. 13. Gules, a cheveron between ten crosses patée, six in chief and four in base, argent; borne by the Earl of Berkeley, descended from Robert Fitz-Hardinge, who obtained from Henry II. a grant of Berkeley Castle in Gloucestershire, which the family still inherits, and whence they obtained the surname of Berkeley. 14. Azure, three mullets or, accompanied with seven cross-croslets fitchée, argent, three in chief, one in fess, two in flanks, and the last in base; borne by Lord Somerville. 15. Gules, three crosses recercelée, voided or, a chief vairy ermine and contre ermine; borne by Baron Willoughby de Broke.

Of the Saltier.—The saltier, which is formed by the bend and bend sinister crossing each other in right angles, as the intersecting of the pale and fess forms the cross, contains the fifth part of the field. In Scotland, this ordinary is frequently called a St Andrew's Cross. It may, like the others, be borne engrailed, wavy, &c., also between charges, or charged with any thing.



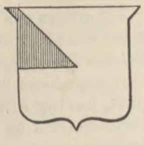




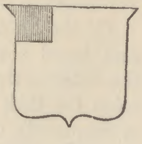
The examples are,—1. Argent, a saltier gules; borne by the Duke of Leinster, descended from Otho, or Other, a powerful lord in the time of King Alfred. 2. Purpure, a saltier, wavy ermine. 3. Ermine, a saltier, counter-compony argent and gules. 4. Or, on a saltier azure, nine lozenges of the first; the paternal arms of Dalrymple Earl of Stair. 5. Gules, a saltier between four crescents or; borne as the second and third quarters in the coat-of-arms of Lord Kinnaird. 6. Gules, a saltier vert fimbriated or. 7. Azure, a saltier quarterly quartered or and argent; the arms of the episcopal see of Bath and Wells. 8. Party per saltier argent and gules, a saltier counter-changed; borne by Sir Claude Scott. 9. Argent, three saltiers couped sable. 10. Argent, a saltier gules, and a chief ermine; quartered by Fitz-Maurice Marquis of Lansdowne, &c. This family is a branch of that of Leinster.

2. *Of Sub-Ordinaries.*

Besides the honourable ordinaries and the diminutions already mentioned, there are other heraldic figures, called *sub-ordinaries*, which, by reason of their ancient use in arms, are of worthy bearing; namely, the gyron, quarter, canton, fret, pile, orle, inescutcheon, tressure, annulet, flanches, billet, lozenge, guttes, fusil, rustre, mascle, papillone, and diaper.



The *gyron* (1.), is a triangular figure formed by two lines, one drawn diagonally from one of the four angles to the centre of the shield, and the other is drawn either horizontal or perpendicular, from one of the sides of the shield, meeting the other line at the centre of the field. *Gyronny* is said, when the field is covered with six, eight, ten, or twelve gyrons in a coat-of-arms; but a French author contends that the true gyronny consists of eight pieces only. The *quarter* is a square figure, which occupies the upper dexter quarter of the shield, but is rarely carried as a charge. The *canton* (2.) is a square part of the escutcheon, somewhat less than the quarter, but without any fixed proportion, and possesses the dexter-chief point of the shield; but should it possess the sinister corner, which seldom occurs, it must be blazoned a canton sinister. The *fret* is a figure representing a saltier, with a mascle in the centre interlaced. *Fretty* is said when the field or bearings are covered with a fret of six, eight, or more pieces. The *pile*, consisting of two lines terminating in a point, is formed like a wedge, and is borne engrailed, wavy, &c. It issues in general from the chief, and extends towards the base; yet there are some piles borne in bend, and issuing from other parts of the field. The *orle* is an ordinary composed of two lines going round the shield, the same as the bordure; but its breadth is but one-half of the latter, and at some distance from the edge of the shield. The *inescutcheon* is a little escutcheon borne within the shield. The *tressure* is an ordinary commonly supposed to be the half of the breadth of an orle, and is generally borne flowery and counter-flowery, as it is also very often double, and sometimes treble. The double tressure forms part of the arms of Scotland. The *annulet*, or ring, is a well-known figure, and is frequently found in arms throughout every kingdom of Europe. The *flanches* (3.) are formed by two curved lines, or semicircles, being always borne double. The *billet* is an oblong square figure, twice as long as broad. The *lozenge* (4.) is an ordinary of four equal and parallel sides, but not rectangular; the upper and lower angles being acute, and the other two obtuse. *Guttes*, or drops, are round at bottom, waved on the sides, and terminate at the top in points. Heralds have given them different names, according to their different tinctures. Thus, if they are yellow, they are called *d'or;* if white, *d'eau;* if red, *de sang;* if blue, *de larmes;* if green, *de vert;* if black, *de poix.* The *fusil* (5.) is longer than the lozenge, having its upper and lower parts more acute than the other two collateral middle parts, which acuteness is occasioned by the short distance of the space between the two collateral angles; and this space, if the fusil be rightly made, is always shorter than any of the four equal geometrical lines of which it is composed. The *rustre* (6.) is a lozenge pierced round in the middle. The *mascle* (7.) is pretty much like a lozenge, but voided or perforated throughout its whole extent, showing a narrow border.[1] *Papillone* is an expression used for a field or charge that is covered with figures like the scales of a fish. *Diapering* is said of a field or charge shadowed with flourishings or foliage, with a colour a little darker than that on which it is wrought. The Germans frequently use it; but it does not enter into the blazoning or description of arms, and only serves to embellish the coat.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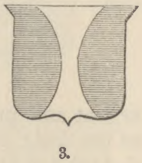
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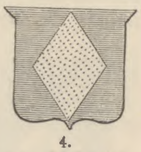
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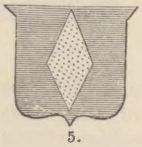
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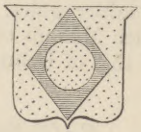
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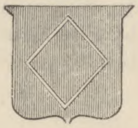
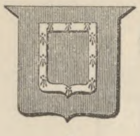

7.

The following are examples of sub-ordinaries,—viz., 1 Gules, an orle ermine. 2. Argent, three inescutcheons gules; borne as the second and third quarters in the coat of Hay, Earl of Kinnoul. The first of the name of Hay who bore these arms obtained them because he and his two sons, after having defeated a party of the Danes at the battle of Loncarty in the year 942, were brought to the king with their shields all stained with blood. 3. Argent, a fret sable; borne by Tollemache Earl of Dysart. 4. Or, fretty of gules, a canton ermine; borne by Noel, Earl of Gainsborough, descended from Noel, who came into England with William the Conqueror, and, in consideration of services, obtained a grant of several manors and lands. 5. Gironny of eight pieces or and sable; the first and fourth quarters of the coat-of-arms of Campbell, Marquis of Breadalbane, descended in regular succession from Duncan, the first Lord Campbell, ancestor of the Dukes of Argyll. 6. Lozengy argent and gules; quartered by Earl Fitz-William, descended from Sir William Fitz-William, marshal of the army of William the Conqueror at the battle of Hastings. 7. Sable, a mascle within a tressure flowery argent. 8. Gules, three mullets or, within a bordure of the latter, charged with a double tressure flowery, and counter-flowery with fleurs-de-lys of the first; quartered by the Duke of Sutherland, &c. This family is amongst the oldest in Britain, if not in Europe; the title of earl having been conferred on one of their ancestors in 1067. 9. Azure, a pile ermine. 10. Or, on a pile engrailed azure, three cross-croslets fitchy of the first. 11. Or, on a pile gules, between six fleurs-de-lys azure, three lions of England; the first and fourth quarters of the Duke of Somerset, granted him by Henry VIII. on his marriage with Lady Jane Seymour. 12. Ermine, two piles issuing from the dexter and sinister sides, and meeting in base sable. 13. Argent, three piles, one issuing from the chief between the others reversed, sable; borne by Hulse.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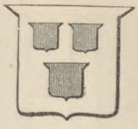
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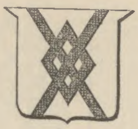
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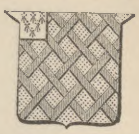
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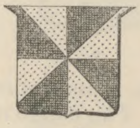
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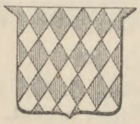
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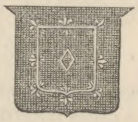
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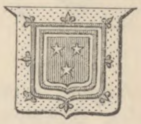
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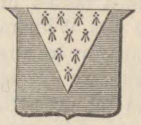
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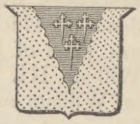
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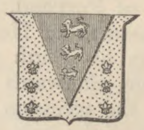
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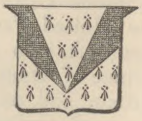
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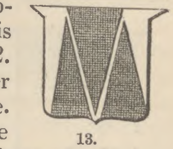
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3. *Of Common Charges borne in Arms.*

In all ages men have made use of the representation of living creatures, and other symbolical signs, to distinguish themselves in war; and these marks, which were promiscuously used as hieroglyphics, emblems, and personal devices, were soon received into heraldry. But nothing shows the extent of human ingenuity more than the great variety of these marks of distinction, since they are composed of all sorts of figures, some natural, others artificial, and many chimerical.

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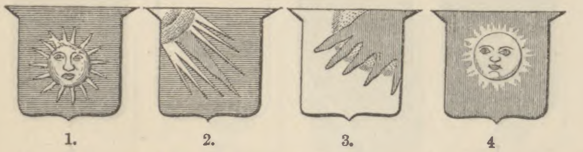
[1] Authors are divided about the resemblance of a mascle, some taking it for the mash of a net, and others for the spots of certain flints found about Rohan; and as no writer has given a clearer account in support of this last opinion than Colombier, author of *La Science Héraldique*, we shall transcribe it for the satisfaction of the curious. "Rohan," says he, "bears gules, nine mascles, or, 3, 3, 3. Opinions have varied very much about the origin of the mascles or mashes, as being somewhat like the meshes of nets; but for my own part, having often observed that those things which are remarkable and singular in some countries, have sometimes occasioned the lords thereof to represent them in their escutcheons, and to take them for their arms, I am of opinion, that the lords of Rohan, who, I believe, are the first that bore those figures in their arms, though descended from the ancient kings and princes of Bretagne, took them, because in the most ancient viscounty of Rohan, afterwards erected into a duchy, there are abundance of small flints, which being cut in two, this figure appears on the inside of them; as also the carps, which are in the fish-ponds of that duchy, have the same mark upon their scales; which, being very extraordinary, and peculiar to that country, the ancient lords of the same had good reason,

Thus, the family of Rabett bears three rabbits heads; that of Lucy, three luces or pikes, in Latin *tres lucios pisces;* that of Starkey, a stork; and that of Shuttleworth, three weavers' shuttles.

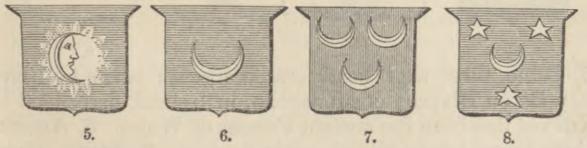
Besides these natural and artificial figures, there are chimerical or imaginary ones used in heraldry, the result of fancy and caprice; such as centaurs, hydras, phœnixes, griffons, hippogriffs, and dragons. This great variety of figures shows the impossibility of comprehending all common charges in a work of this nature; such only shall be treated of as are therefore most frequently borne.

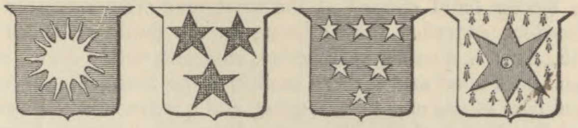
Art. 1.—*Of Natural Figures borne in Arms.*

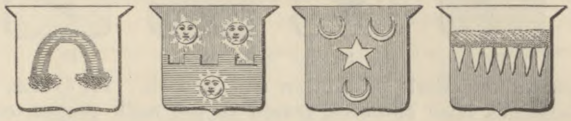
Amongst the multitude of natural things which are used in coats of arms, those most usually borne are, for the sake of brevity as well as perspicuity, distributed into the following classes:—viz., *Celestial figures*, as the sun, moon, stars, &c., and their parts; *effigies* of men, women, &c., and their parts; *beasts*, as lions, stags, foxes, boars, &c., and their parts; *birds*, as eagles, swans, storks, pelicans, &c., and their parts; *fishes*, as dolphins, whales, sturgeons, trouts, &c., and their parts; *reptiles* and *insects*, as tortoises, serpents, grasshoppers, &c., and their parts; *vegetables*, as trees, plants, flowers, herbs, &c., and their parts; *stones*, as diamonds, rubies, pebbles, rocks, and the like. These charges have, as well as ordinaries, various attributes or epithets, which express their qualities, positions, and dispositions. Thus the sun is said to be *in his glory*, *eclipsed*, and the moon *in her complement*, *increscent;* animals are said to be *rampant*, *passant;* birds have also their denominations, such as *close*, *displayed;* and fishes are described to be *hauriant*, *naiant*, and so forth.



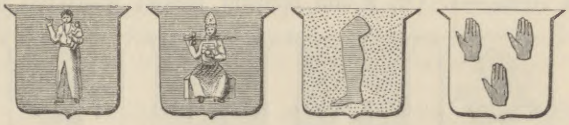
1*st.* *Examples of Celestial Figures.*—1. Azure, a sun in his glory; born in the first and fourth quarters of the coat of arms of the Marquis of Lothian. 2. Azure, one ray of the sun bendways gules, between six beams of that luminary argent. 3. Argent, five rays of the sun issuing out of the sinister corner gules. 4. Gules, the moon in her complement, illustrated with all her light proper. This is sufficient without naming the colour, which is argent. 5. Azure, a moon decrescent proper. 6. Azure, a crescent argent. This bearing is also used as a difference, being assigned to the second son, as before mentioned. 7. Gules, three crescents argent; borne by the family of Oliphant. 8. Azure, a crescent between three mullets argent; borne by Arbuthnott, Viscount and Baron Arbuthnott. 9. Azure, a star of sixteen points argent. 10. Argent, three mullets sable; borne by the name of Wollaston. 11. Azure, six mullets, 3, 2, 1, or; borne by the name of Welch. 12. Ermine, a mullet of six points pierced gules. 13. Argent, a rainbow with a cloud at each end proper. This is part of the crest to the Earl of Hopetoun's coat of arms. The whole of it is a globe split on the top, and above it is the rainbow and clouds. 14. Party per fess crenelle gules and azure, three suns proper. 15. Gules, a mullet between three crescents argent. 16. Gules, a chief argent, on the lower part thereof a cloud, the sun's resplendent rays issuing throughout proper; borne by Leeson Earl of Miltown.

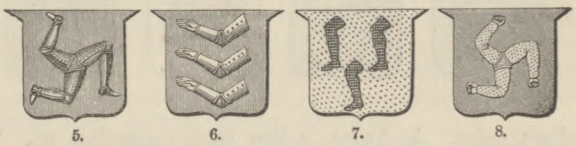


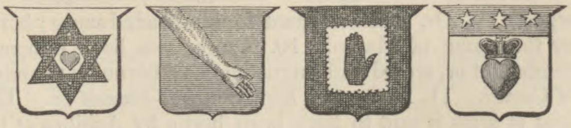




2*d. Examples of Effigies of Men, &c., and their Parts.*—1. Azure, the Virgin Mary crowned, with her babe in her right arm and a sceptre in her left, all or, the coat of arms of the bishopric of Salisbury. 2. Azure, a presbyter sitting on a tombstone, in his left hand a mound, his right hand extended, all or, with a linen mitre on his head, and a sword in his mouth, all proper; the coat of arms of the bishopric of Chichester. 3. Or, a man's leg couped at the midst of the thigh azure. 4. Argent, three sinister hands couped at the wrist, and erect gules. 5. Gules, three legs armed proper, conjoined in the fess point at the upper part of the thighs, flexed in triangles, garnished and spurred, or. This is the coat of arms of the Isle of Man; and is quartered by the Dukes of Atholl, formerly titular lords or kings of that island. 6. Gules, three dexter arms vambraced fessways, in pale proper; borne by several branches of the Armstrong family. 7. Or, three legs couped above the knee sable. 8. Vert, three dexter arms conjoined at the shoulders in the fess point, and flexed in triangle or, with fists clenched argent; borne by the family of Tremayne. 9. Argent, a man's heart gules, with two equilateral triangles interlaced sable. 10. Azure, a sinister arm, issuing out of the dexter-chief,







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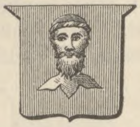
upon observing that wonder, to take those figures for their arms, and to transmit them to their posterity, giving them the name of *macles*, from the Latin word *macula*, signifying a spot; whence some of that house have taken for their motto, *Sine macula macla*, that is, a mascle without a spot."

and extended towards the sinister base argent. 11. Argent, a dexter hand couped at the wrist, and erected, within a bordure engrailed sable; borne by the family of Manley. 12. Argent, a man's heart gules, ensigned with a crown or, and on a chief azure, three mullets of the first. The paternal coat of the name of Douglas, and quartered in the arms of the Duke of Hamilton, the Marquis of Queensberry, and of the Earls of Morton and Selkirk. 13. Gules, a Saracen's head affrontée, erased at the neck proper, environed about the temples with a wreath of the argent and sable; borne by Mostyn Lord Mostyn. 14. Argent, three blackamoors' heads couped proper, banded about the head, argent and gules. 15. Gules, three bezants, each charged with a man's face affrontée proper. 16. Or, a blackamoor's head couped proper, banded about the head argent.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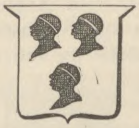
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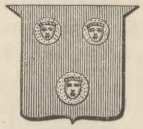
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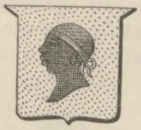
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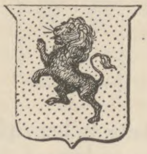
When half of the face, or little more, of human figures, is seen in a field, it is then said to be *in profile;* and when the head of a man, woman, or other animal, is represented with a full face, it is termed *affrontée.*

3*d. Examples of the different Positions of Lions, &c., in Arms.*—1. Or, a lion rampant azure; quartered by Percy Duke of Northumberland. 2. Azure, a lion rampant-guardant or. 3. Gules, a lion rampant-reguardant or; quartered by Cadogan Earl Cadogan. 4. Argent, a lion saliant gules. 5. Azure, a lion statant-guardant or. 6. Azure, a lion passant or, between three fleurs-de-lys argent. 7. Argent, a lion passant guardant gules crowned or; quartered by Ogilvie Earl of Seafield. 8. Gules, a lion sejant argent. 9. Or, a lion rampant double-headed azure; borne by the name of Mason. 10. Azure, two lions rampant-combatant or, armed and langued gules; borne by the name of Carter. 11. Azure, two lions rampant-adossés or. This coat of arms is said to have been borne by Achilles at the siege of Troy. 12. Sable, two lioncels counter-passant argent, the uppermost towards the sinister side of the escutcheon, both collared gules; borne by the name of Glegg.[1] 13. Argent, a demi-lion rampant sable. 14. Gules, a lion couchant between six cross-croslets, three in chief, and as many in base, argent; for the name of Tynte. 15. Azure, a lion dormant or. 16. Or, out of the midst of a fess sable, a lion rampant naissant gules.[2] 17. Azure, three lions rampant or; borne by Fiennes Baron Saye and Sele. 18. Gules, a tri-corporated lion issuing from three parts of the escutcheon, all meeting under one head in the fess point or, langued and armed azure. 19. Gules, a bezant between three demi-lions rampant argent; borne by Bennet Earl of Tankerville.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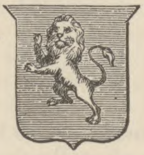
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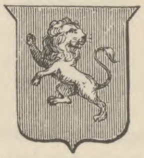
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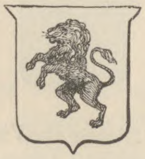
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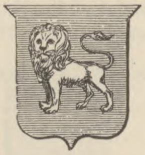
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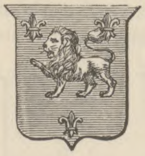
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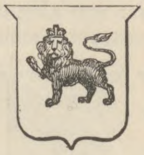
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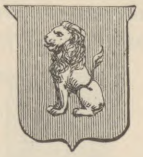
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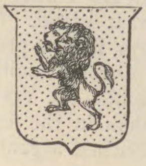
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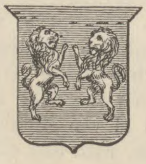
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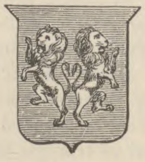
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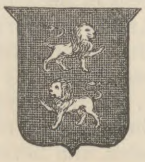
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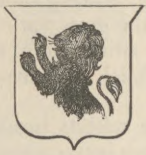
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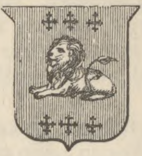
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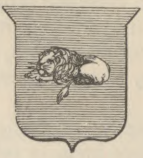
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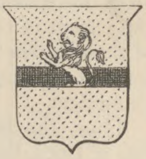
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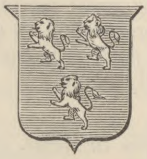
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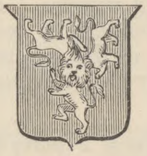
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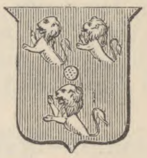
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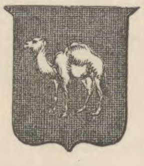
It is to be observed that, if a lion, or any other beast, be represented with its limbs and body separated, so that they remain upon the field at a small distance from their natural places, it is then termed *Dehaché*, or *couped in all its parts;* of which remarkable bearing there is an instance in armory, namely, or, a lion rampant gules, dehaché, or couped in all its parts, within a double tressure flowery and counter-flowery of the second; borne by the name of Maitland.

4*th. Examples of other Quadrupeds and their parts, borne in Coats of Arms.*—1. Sable, a camel statant argent. 2. Gules, an elephant statant argent, tusked or. 3. Argent a boar statant gules, armed or. 4. Sable, a bull passant or. 5. Sable, three nags' heads erased argent; borne by Blayney Baron Blayney of Monaghan, in Ireland, descended in a direct line from the ancient Princes of Wales. 6. Argent, three boars' heads erased, erect proper. 7. Argent, three bulls' heads erased, sable, armed or; quartered by Skeffington Viscount Massareene. 8. Argent, two foxes counter-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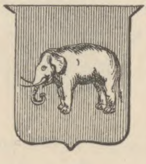
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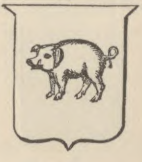
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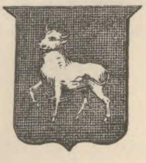
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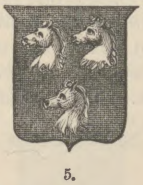
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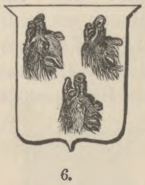
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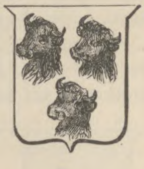
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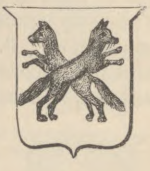
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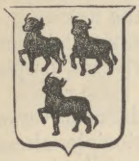
[1] Some fanciful heralds say it is the natural disposition of the lion not to bear a rival in the field; therefore two lions cannot be borne in one coat of arms, but must be supposed to be lions' whelps, called *lioncels;* except when they are parted by an ordinary, or so disposed that they seem to be distinctly separated from each other. In the two preceding examples they are called *lions*, because in the 10th they seem to be striving for the sovereignty of the field, which they would not do unless they were of full growth; and in the 11th they are supposed to represent two valiant men, whose dispute being accommodated by the prince, are leaving the field, their pride not suffering them to go both one way.

[2] This form of blazon is peculiar to all living things which are found issuing out of the midst of some ordinary or other charge.

saliant, the dexter surmounted of the sinister gules; for the name of Kadrod Hardd, an ancient British family, from which are descended the Williams-Wynns, who bear these quartered, second and third, for Williams. 9. Argent, three bulls passant sable, armed and ungulled or; for Ashley, and quartered by Ashley Cooper Earl of Shaftesbury, descended from Richard Cooper, who flourished in the reign of Henry VIII. 10. Gules, three lions gambs erased argent; for the name of Newdegate. 11. Azure, a buck's head cabossed argent; borne by Legge Earl of Dartmouth. 12. Argent, two squirrels sejant adossée gules. 13. Gules, a goat passant argent. 14. Sable, a stag standing at gaze argent. 15. Azure, three holy lambs or.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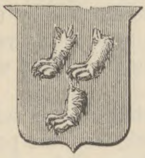
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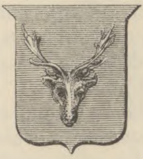
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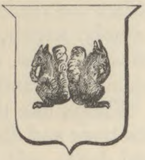
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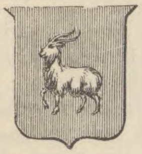
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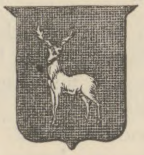
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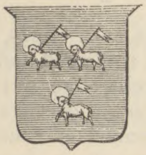
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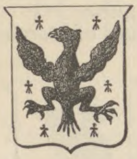
5th. Examples of Birds, Fishes, Reptiles, &c.—1. Ermine, an eagle displayed gules; borne by Sir Henry Bedingfield. 2. Gules, a swan close proper. 3. Gules, a pelican in her nest with wings elevated, feeding her young ones or, vulned proper; borne by the name of Carne. 4. Argent, three peacocks in their pride proper. 5. Or, a raven proper; borne by the name of Corbet. 6. Argent, three cocks gules, crested and jow-lopped sable, a crescent surmounted of a crescent for difference; formerly borne by the Cockaynes Viscounts Cullen, of Donegal in Ireland (now extinct). 7. Sable, a dolphin naiant embowed or; borne by the name of Symonds. This animal was in former times borne by the eldest son of the French kings, as next heirs to the crown, no other subject in that kingdom being permitted to bear it. 8. Argent, three whales' heads erect and erased sable; borne by the name of Whalley. 9. Gules, three escalops argent; borne by Keppel Earl of Albemarle, descended from Arnold Joost van Keppel, lord of Voorst, Holland, who came into England in 1688, with the Prince of Orange, to whom he was then a page of honour, and was by him created a peer of England, by the title of Earl of Albemarle, from a town of that name in Normandy, 10th February 1696. 10. Azure, three bees, two and one, volant, argent. 11. Vert, a tortoise passant argent. 12. Gules, an adder nowed or.[1] 13. Ermine, a rose gules barbed and seeded proper; borne by Boscawen Viscount Falmouth, whose family have possessed the lands of Boscawen Rose, in the county of Cornwall, since the time of King John. 14. Azure, three laurel leaves slipped or; borne by the name of Leveson, and quartered by Granville-Sutherland-Leveson Gower, Duke of Sutherland, &c. 15. Azure, three garbs or; borne by the ancient Earls of Chester. 16. Gules, three cinquefoils argent; borne by Lambart Earl of Cavan, in Ireland. This ancient family is of French extraction.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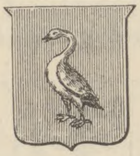
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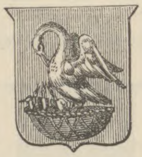
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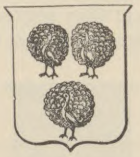
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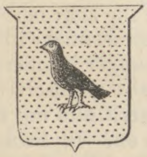
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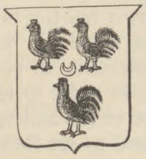
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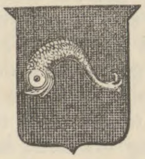
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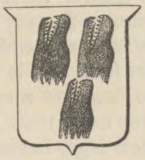
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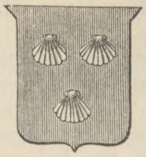
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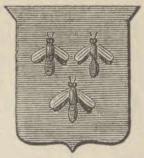
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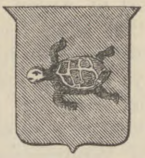
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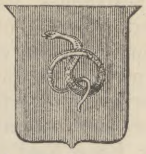
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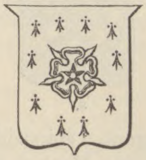
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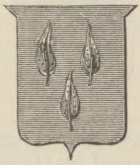
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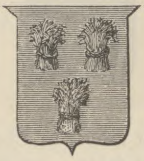
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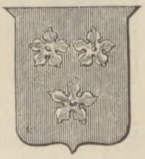
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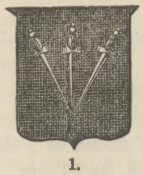
It is to be observed, that trees and plants are sometimes said to be trunked, eradicated, fructuated, and raguled, according as they are represented in arms.

Art. 2.—*Of Artificial Figures borne in Arms.*

After the various productions of nature, artificial figures, the objects of art and mechanism, claim the next rank. They may be distributed into the following classes,—viz., *Warlike instruments*, as swords, arrows, battering-rams, gauntlets, helmets, spears, pole-axes; *ornaments* used in royal and religious ceremonies, as crowns, coronets, mitres, wreaths, crosiers; *architecture*, as towers, castles, arches, columns, plummets, battlements, churches, portcullises; *navigation*, as ships, anchors, rudders, pendants, sails, oars, masts, flags, galleys, lighters, and so on.

All these bearings have different epithets, serving to express their position, their disposition, or their form. Thus swords are said to be erect, pommeled, hilted; arrows, armed, feathered; towers, covered, embattled; and so of all others, as will more fully appear by the following examples:—1. Sable, three swords, their points meeting in the base argent, pommeled and hilted or; borne by Paulet Marquis of Winchester, descended from Hercules, Lord of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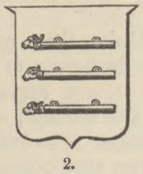
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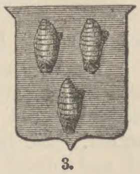
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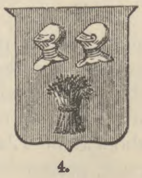
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[1] Adders, snakes, and serpents, are said to represent many things, which being according to the fancy of the ancients, and a few modern authors who have adopted their opinions, it is needless to enlarge upon. It is certain they often occur in armory; but the noblest is that of the duchy of Milan, viz., "argent, a serpent gliding in pale azure, crowned or, vorant an infant issuing gules." The occasion of this bearing was as follows:—Otho, first Viscount of Milan, on his way to the Holy Land with Godfrey of Bouillon, defeated and slew in single combat the great giant Volux, a man of extraordinary stature and strength, who had challenged the bravest of the Christian army. The viscount having killed him, took his armour, and amongst it his helmet, the crest of which was a serpent swallowing an infant, worn by him to strike terror into those who should be so bold as to engage him.

Tournon in Picardy, who came to England with Jeffrey Plantagenet, Earl of Anjou, third son of King Henry II., and amongst other lands had the lordship of Paulet in Somersetshire conferred on him. 2. Argent, three battering-rams barways in pale, headed, azure and hooped or, borne by Bertie, Earl of Abingdon. 3. Azure, three left-hand gauntlets with their backs affrontée or; borne by Fane Earl of Westmoreland. 4. Gules, two helmets in chief proper, garnished or, in a base of a garb of the third; borne by Cholmondeley Marquis of Cholmondeley, an ancient family in Cheshire. 5. Argent, a ship with its sails furled up sable; quartered by Hamilton Marquis of Abercorn. The descent of this family is from that of the Duke of Hamilton. 6. Sable, three spears' heads erect argent, embrued gules, on a chief or, as many pole-axes reversed, azure; borne by King Earl of Lovelace. 7. Argent, a maunch sable; borne by Hastings Earl of Huntingdon, of a very ancient and noble family, of which was Walter de Hastings, steward to King Henry I. 8. Azure, a circular wreath argent and sable, with four hawks' bells joined thereto in quadrature or; borne by Jocelyn Earl of Roden. 9. Gules, two keys in saltier argent, in chief a royal crown proper; the arms of the archbishopric of York. 10. Gules, two swords in saltier argent, pommeled and hilted or; the arms of the bishopric of London. 11. Sable, a key in bend, surmounted by a crosier in bend sinister, both or; the arms of the bishopric of St Asaph. 12. Gules, two keys adossée in bend, the uppermost argent, the other or, a sword interposed between them in bend sinister of the second, pommeled, and hilted of the third; the arms of the bishopric of Winchester. 13. Gules, three mitres with their pendants or; the arms of the bishopric of Chester. 14. Sable, two crosiers, in saltier or, and argent; on a chief azure three mitres labelled of the second; the arms of the bishopric of Llandaff. 15. Gules, a sword erect in pale argent, pommeled and hilted or, surmounted by two keys in saltier of the last; the arms of the bishopric of Exeter. 16. Gules, three ducal coronets or; the arms of the bishopric of Ely.

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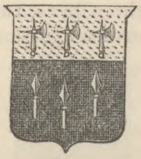
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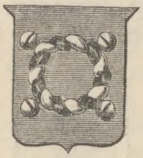
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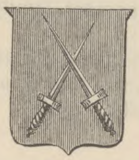
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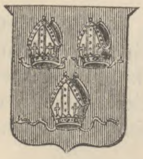
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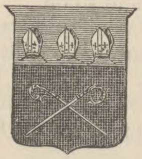
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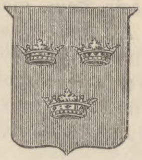
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ART. 3.—*Of Chimerical Figures.*

Are such as have no real existence, but are mere fabulous and fantastical inventions. These charges, griffons, martlets, and unicorns excepted, are so uncommon in British coats, that in order to make up the same number of examples hitherto contained in each collection, several foreign bearings are introduced; which, however, as they are conformable to the laws of heraldry, may also contribute to instruct the reader. Those most in use are the following,—namely, angels, cherubims, tritons, centaurs, martlets, griffons, unicorns, dragons, mermaids, satyrs, wiverns, harpies, cockatrices, and phœnixes.

These, like the foregoing charges, are subject to various positions and dispositions, which, from the principles already laid down, will be easily understood by the following examples:—1. Gules, an angel standing affrontée, with his hands conjoined and elevated upon his breast, habited in a long robe close girt argent, his wings displayed or; borne by Brangor de Cerevisia, a foreign prelate, who assisted at the council of Constance in 1412. 2. Sable, a cheveron between three cherubim or; borne by the name of Chaloner of Yorkshire. 3. Gules, a cherub having three pair of wings, the uppermost and lowermost counter-crossed saltierways, and the middlemost displayed argent; borne by the name of Buocasoco, a foreign prelate. This example is copied from Menestrier's *Méthod du Blason.* 4. Azure, a griffon segreant or, armed and langued gules, between three crescents argent; quartered by Bligh, Earl of Darnley. 5. Azure, three mullets argent within a double tressure counter-flowery or, in the centre a martlet of the last; borne by Murray Lord Elibank. The martlet is represented without feet, and is given for a difference to younger brothers, no doubt to remind them that, in order to raise themselves, they must trust to the wings of virtue and merit, and not to their legs, having but little land to set foot on. 6. Sable, a cockatrice displayed argent, crested, membered, and jowlopped gules. 7. Argent, a mermaid gules, crined or, holding in her right hand a mirror, and in her left a comb, both proper; borne by the Merioneth family of Ellis. 8. Argent a wivern, his wings elevated, and his tail nowed below him gules; borne by the family of Drake. 9. Or, a dragon passant vert. 10. Gules, a centaur or sagittary in full speed reguardant proper. This is said by some to have been the arms of Stephen of Blois, son of Adela, daughter of William the Conqueror, and of Stephen, Earl of Blois; who, grounding his pretension to the crown of England on this descent, was proclaimed king in 1135, and reigned till the 25th of October 1154. 11. Argent, an unicorn sejant sable, unguled and horned or. 12. Argent, a dragon's head erased

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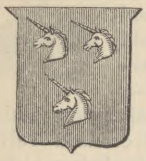
vert, holding in his mouth a sinister hand couped at the wrist gules. 13. Gules, three unicorns' heads couped or. 14. Azure, a bull saliant and winged or, borne by the name of *Cadenet*, a family of distinction in Provence. 15. Argent, a wivern with a human face affrontée hooded, and winged vert; borne by the Buseraghi, an ancient and noble family of Lucca. 16. Azure, a harpy displayed, armed, crined, and crowned or. These are the arms of the city of Nuremberg in Germany.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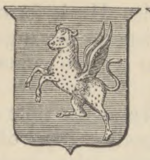
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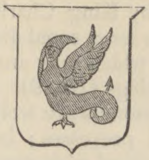
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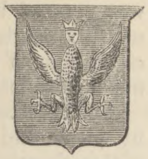
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To the above-mentioned figures may be added the montegre, an imaginary creature, supposed to have the body of a tiger with the head and horns of a satyr; also those which have a real existence, but are said to be endowed with extravagant and imaginary qualities, as the salamander, beaver, cameleon, and others.

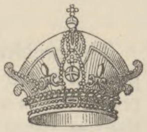
IV.—OF THE EXTERNAL ORNAMENTS OF ESCUTCHEONS.

Ornaments which accompany or surround escutcheons denote the dignity or office of the persons to whom the arms appertained, both amongst the laity and the clergy, consisting of crowns, coronets, mitres, helmets, mantlings, and supporters. Wreaths, crests, and scrolls, are common to all classes.

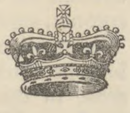
1. *Of Crowns.*

The first crowns were only diadems, bands, or fillets; but afterwards they were composed of branches of various trees, and then flowers were added to them. Amongst the Greeks, the crowns given to those who carried off the prize at the Isthmian games were of pine; at the Olympic, of laurel; and at the Nemean, of smallage. The Romans also had various crowns to reward martial exploits and extraordinary services done to the republic. Constantine the Great first used a diadem of pearls and precious stones over a gold helm, somewhat like the close crown of later times, which seems to have been the example which the sovereigns of Europe afterwards followed.

The imperial crowns of Austria and Russia consist of a circle of gold, adorned with precious stones and pearls, heightened with fleurs-de-lys, bordered and seeded with pearls, and raised in the form of a cap voided at the top like a crescent. From the middle of this cap rises an arched fillet enriched with pearls, and surmounted with a mound on which is a cross of pearls.



The crown of the kings of Great Britain, which is a circle of gold, enriched with pearls and precious stones, having four crosses patée and four fleurs-de-lys alternately; from these rise four arched diadems adorned with pearls, which close under a mound, surmounted with a cross like those at the bottom; within is a velvet cap trimmed with ermine.

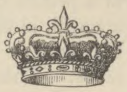


The crowns of the kings of England have at various times assumed different forms; generally consisting in early reigns of a fillet of gold, ornamented upon its upper circle by leaves, fleurs-de-lys, and crosses patée placed alternately with fleurs-de-lys. Edward IV. has first upon his coins the open crown with crosses and fleurs-de-lys; and presents the first instance of an arched or closed crown with leaves only upon the Great Seal. Richard III. is the first who placed on the Great Seal the arched crown with the crosses and fleurs-de-lys. Henry VII., however, still continued the open crown with fleurs-de-lys and pearls on his first money; afterwards with leaves and pearls with a single arch. The crown on his Great Seal has crosses patée and fleurs-de-lys, and arched, surmounted by the orb and cross. This crown, with some variations in the number of arches, continued to be used by succeeding sovereigns.

The crown of the kings of Scotland is remarkable for its elegance and beauty; composed of a circle heightened with ten crosses flory and ten fleurs-de-lys alternately; from whence arise four arches surmounted by a globe or mound ensigned with a cross patée. The cap is of velvet, lined with ermine, and adorned with four plates of gold, each enriched with a large pearl.

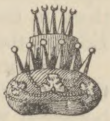
The crown of the kingdom of Hanover, as settled in 1816, to be placed over the inescutcheon of the royal arms of George III., being substituted for the electoral bonnet, consisted of a circle of gold, adorned on the upper rim with strawberry leaves, and a cross patée in the centre. From the circle arose eight arches, closing at the top, supporting a mound and cross.

The crown of the kings in France, was a circle enamelled, adorned with precious stones, and heightened by eight arched diadems, rising from as many fleurs-de-lys, which conjoined at the top under a double fleur-de-lys, all of gold.

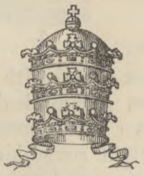


The crowns of Spain, Portugal, and Poland, are all three of the same form, and are described by Colonel Parsons in his *Genealogical Tables of Europe*. A coronet of strawberry leaves, heightened by eight arched diadems, which support a mound, ensigned with a plain cross. Those of Denmark and Sweden are both of the same form, and consist of eight arched diadems, rising from a coronet like that of an English marquis, which conjoin at the top under a mound ensigned with a cross-bottony. The crowns of other kings are similar.

The Grand Seignior bears over his arms a turban, enriched with pearls and diamonds, under two coronets, the first of which is made of pyramidical points heightened up with large pearls, whilst the uppermost is surmounted with crescents.

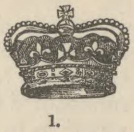


The Pope, or Bishop of Rome, appropriates to himself a tiara or long cap of golden cloth, from which hang two pendants embroidered and fringed at the ends, *semée* with crosses of gold. This cap is enclosed by three coronets like those of the degree of marquis in England; and has on its top a mound of gold, on which is a cross of the same, sometimes represented by engravers and painters pometted, recrossed, flowery, or plain. It is a difficult matter to ascertain the time when the popes assumed the three coronets above mentioned. A succession of the supreme pontiffs, engraved and published by order of Clement XIII. for the edification of his subjects in Great Britain and Ireland, represents Marcellus, who was chosen Bishop of Rome in the year 310, and all his successors, adorned with such a cap; but it appears from good authority, that Boniface VIII., who was elected to the see of Rome in the year 1295, first compassed his cap with a coronet; whilst Benedict XII. in 1335, added to it a second, and John XXIII. in 1411, a third, with a view to indicate that the Pope is the sovereign priest, the supreme judge, and the sole legislator, amongst Christians.



2. *Of Coronets.*

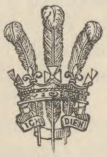
The coronet of the Prince of Wales was anciently a circle of gold set round with four crosses patée, and as many fleurs-de-lys alternately; but since the Restoration it has been closed with one arch only, adorned with pearls, surmounted by a mound and cross, and having a cap trimmed with ermine like the king's (No. 1).


1.

The following is an extract from the royal warrant of 13th Car. II.—

"That the sonne and heire apparent of the crowne for the tyme being shall use and beare his coronett composed of crosses and flower-de-lizes with one arch, and in the midst a ball and cross as hath our royal diadem. And that our most deare and most entirely beloved brother James, Duke of Yorke, and soe all the imediate sonnes of ourselfe and the imediate sonns and brothers of our successors kinges of England shall beare and use his and their coronetts composed of crosses and flower-de-lizes only, but that all their sonns respectively haveing the title of dukes shall beare and use their coronetts composed of crosses and flowers or leaves such as are used in the composure of the coronetts of dukes not being of our royal family."

Besides this coronet, the Prince of Wales has another distinguishing mark of honour, peculiar to himself, namely, a plume of three ostrich-feathers, with an ancient coronet of a prince of Wales (No. 2). Under this, in a scroll, is the motto, *Ich Dien*, which in the German or old Saxon language signifies *I serve.* This device was first assumed by Edward Prince of Wales, commonly called the *Black Prince*, after the famous battle of Cressy, in 1346, where, having with his own hand killed John King of Bohemia, he took from his head such a plume as that here described, and put it on his own. This, however, was doubted by the late Sir Harris Nicolas, who says that the badge of the three ostrich feathers was derived from the house of Hainault. But from a contemporary account which Sir Harris Nicolas subsequently discovered he thought the tradition was somewhat confirmed. (*Vide* Sir Harris Nicolas's account in *Archæologia*, vols. xxxi. and xxxii., for some very interesting notices on the origin and history of the badge and mottoes of Edward the Black Prince.)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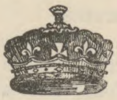
The coronet of all the intermediate sons and brothers of the kings of Great Britain is a circle of gold bordered with ermine, heightened with four fleurs-de-lys and as many crosses patée alternately, as has been already shown (No. 3). The coronet of the princesses of Great Britain is a circle of gold bordered with ermine, and heightened with crosses-patée, fleurs-de-lys, and strawberry leaves alternately (No. 4).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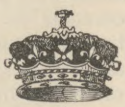
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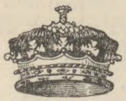
A duke's coronet is a circle of gold bordered with ermine, enriched with precious stones and pearls, and set round with eight large strawberry leaves (No. 5). A marquis's coronet is a circle of gold set round with four strawberry leaves and as many pearls on pyramidical points of equal height alternate (No. 6). An earl's coronet is a circle of gold heightened up with eight pyramidical points or rays, on the tops of which are as many large pearls, which are placed alternately with as many strawberry leaves, but the pearls much higher than the leaves (No. 7). A viscount's coronet differs from the preceding ones as being only a circle of gold, with large pearls set close together on the rim, without any limited number (No. 8). A baron's coronet, which was granted by King Charles II., is formed with six pearls set at equal distances on a gold circle, four of which only are seen in engravings and paintings (No. 9).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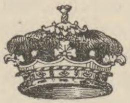
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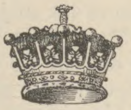
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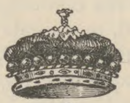
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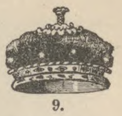
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All these coronets are worn at the time of the coronation by peers and peeresses; having caps of crimson velvet within them edged with ermine, the ermine being visible below the circle of the coronet. It is difficult to determine at what period the coronet became the distinguishing symbol of peerage for the four superior degrees. In an essay, by Mr King, York herald, on the Stall Plates of the Knights of the Garter, in the *Archæologia*, vol. xxxi., it appears that, if those plates are evidence of the use of coronets, the period of their first introduction is comparatively late, as few coronets appear during the reign of Henry VIII. upon the garter plates of the knights of that order; nor did the custom of placing these marks of dignity prevail till about the beginning of the reign of Queen Elizabeth. The first coronet having a cap with ermine, which is exhibited on the garter plate, is that of Lord Godolphin, who was installed in 1704. He was the first baron who became a Knight of the Garter after the coronet was assigned to barons.

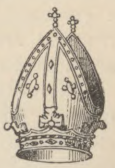
By a royal warrant dated at Whitehall, 2d June 1665, a patent was directed to pass the Great Seal ordaining barons of Scotland to wear a velvet cap with a gold circle, decorated with six pearls; and it is said a similar warrant was issued at the same time for barons of Ireland.

The eldest sons of peers above the degree of a viscount are entitled by the courtesy of England to use their father's second title; but they are not entitled to use a coronet, or the supporters annexed to the dignity. Peers of parliament and their wives only can use coronets and supporters.[1] Peeresses in their own right are also entitled to coronets and supporters.

For an account of the coronets of foreign nobility, *vide Selden's Titles of Honor*. Coronets are not worn in France or other continental states, but merely depicted with other heraldic insignia to which the bearer may be entitled.

The chapeau is a species of cap, usually crimson, turned up with ermine, and is said to be applicable to the ducal dignity only; but there is no instance in English heraldry of its bearing that qualification. It is frequently used to set a crest upon. By the regulations of the present day the Earl-Marshal prohibits the painting of crests issuing from ducal coronets or from chapeaux.

3. *Of Mitres.*



The archbishops and bishops of England and Ireland place a mitre over the shields of their arms, in lieu of a crest. It is a round cap pointed and cleft at the top, rising from a circle of gold from which are two labels or pendants, fringed at the ends. The Bishops of Durham and Meath only are entitled to use the mitre rising from a ducal coronet, signifying their palatinate jurisdiction. The practice of pourtraying the mitres of archbishops issuing from ducal coronets is an innovation which arose in the early part of the last century without any authority. Mitres were worn at the coronation of Queen Elizabeth; since which period they have only been used heraldically as episcopal insignia. The ancient Bishops of Durham also wore three feathers in addition to the princely or ducal coronet which so signally graced their mitres. This ornament, with other vestments, is still worn by the archbishops and bishops of the Church of Rome, whenever they officiate with solemnity; but it is never used in England, otherwise than over the coats of arms.

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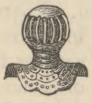
[1] The very recent case of Baron Wensleydale, who has been created for life only, must be considered as an exception; his lordship has all the privileges of peerage except sitting in Parliament, the House of Lords having declared that neither his patent, nor the writ under the patent, entitles him to sit.

4. *Of Helmets.*

The helmet was formerly worn as a defensive weapon to cover the bearer's head, and is now placed over the arms as a mark of gentility.

The helmets of sovereigns were of burnished gold; those of princes and lords, of silver figured with gold; those of knights, of steel adorned with silver; and those of private gentlemen, of polished steel. As to their form, those of the king and the royal family of Great Britain, are open-faced, with bars (No. 1). The barred helmet in profile is common to all degrees of peerage (No. 2). The helmet standing direct without bars, and a little open, denotes baronets and knights (No. 3); the side-standing helmet, with the beaver close, is the manner of wearing it peculiar to esquires and gentlemen (No. 4).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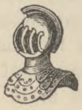
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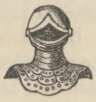
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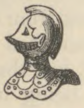
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Such are now the established rules respecting the use of helmets as marks of distinction in the full heraldic achievement; but the origin of these, like many other matters connected with this subject, is involved in some obscurity. It is clear that helmets in heraldry were *not* always distinguishing insignia, at least, as respects nobility and gentry. The evidence afforded by the garter plates at Windsor, shows that the helmets of knights-subjects on all the stall plates of the Knights of the Garter, till towards the close of the reign of Elizabeth, are in profile, having the visors *close* like those now used to designate the esquire of the present day. The *barred* helmet in profile first appears on the garter plate of Henry Radcliffe, Earl of Sussex, who was installed in 1589. And it is remarkable that during the following reign there are two instances of the *close* helmet being used for peers notwithstanding; so that it appears to have been a matter of indifference whether the *close* helmet or the *barred* helmet was adopted for peers at that time. After 1603 the barred helmet became constantly borne on these plates for the nobility above the degree of barons. The first instance of the barred helmet for a baron was in the case of Lord Knolles in 1615. The helmets on the plates of Sir Robert Walpole, who was installed a Knight of the Garter in 1726, and of Sir Robert Stewart (commonly called Viscount Castlereagh, as eldest son of the Marquis of Londonderry) who was installed in 1814, are respectively the *open helmet affrontée.* It is not improbable that, about the time of the restoration of King Charles II., the full-faced open helmet became a distinguishing one for baronets and knights. In engravings of the arms of baronets and knights in the seventeenth century, the side-standing close helmet is frequently used.

5. *Of Mantlings.*

The mantling or lambrequin, attached to the helmet, had its origin from the *Cointoise,* a sort of ornamental streamer or scarf which passed round the body, and over the shoulder. This superb ornament was introduced in the reign of Henry III. It afterwards became an embellishment of the helmet; and, referring to the seals of the barons of 1300, it may be seen upon them passing from beneath the crest, and elegantly flying in graceful folds beyond the helmet. The monument of Sir John Harsic, in the time of Edward III., exhibits his tilting helmet, and is the earliest occurrence of the wreath, which took place of the cointoise as a personal ornament, from which time it assumed more prominently what was afterwards called the lambrequin. In a grant of arms, A.D. 1334, the cointoise with tassels, has a cloak-like appearance, and is there called a *mantell.* The helmet of William, Lord Hastings, on his seal attached to a deed, A.D. 1469, has a scroll instead of a cointoise. And it has been conjectured that the scroll or lambrequin was an imitation of the cointoise after it had been torn in battle. The mantling, when it became an heraldic ornament, was usually *gules* lined, or "*doubled*" argent; but in Elizabeth's time, as now, it assumes the colours of the wreath, being the two first of the coat-armorial, the metal being for the lining or doubling. In many of the old grants of arms this was not, however, always so; and until a late period the mantling was fully blazoned or described. It was sometimes charged with heraldic bearings or other figures. The royal mantling of the present day is gold doubled ermine; and like those of the nobility and gentry forms a species of scroll-work flowing from the helmet, and ornamenting both sides of the shield.

6. *Of the Wreath.*

The wreath or torse was formed of two pieces of silk of the two first colours of the armorial bearings, twisted together by the lady who chose the favoured individual for her knight. It took place of the cointoise about the time of Edward III. It surrounded the upper part of the helmet as a fillet, and appeared (as a coronet did in some instances) to bind the lambrequin close to the helmet. From the centre of the wreath, or coronet, issued the crest (vide *Crest,* and *Mantling*). In blazoning a crest, it is usually said to be upon or within "a wreath of the colours," by which colours are meant the two first of the arms; but sometimes the wreath has been composed of all the colours of the arms when more than two. An example occurs in the grant of a crest to the city of Exeter, A.D. 1580, where the wreath is or, gules, and azure; those colours being in the arms. The liveries of servants should follow the colours of the wreath.

7. *Of Crests.*

The crest is the highest part of the ornaments of a coat of arms. It is called *crest,* from the Latin word *crista.*

Crests were formerly great marks of honour, because they were only worn by heroes of great valour, or by such as were advanced to some superior military command, in order that they might be the better distinguished in an engagement.

Crests appear to be nearly coeval with the introduction of armorial ensigns upon shields, as there are instances as early as the reign of Henry III. Richard I. is represented with something upon his helmet which may have been the prototype of the heraldic crest, somewhat in the form of a fan charged with a lion rampant or passant upon it. By the Close Rolls (54 Hen. III.), armour was provided for the knights going into the Holy Land, in which, amongst other articles, are mentioned two crests. On the seals, previously quoted from those attached to the Barons Letter to the Pope, A.D. 1300, there are examples of crests.

The first English monarch who introduced his crest upon his Great Seal was Edward III., which he wears on his helmet. Crests were soon assumed by private families. Edward III., in 1333, granted a crest to William Montacute, Earl of Salisbury, and by a further grant made it hereditary; and in 1334, Guyen, king of arms, granted a crest to Thomas Andrews. Crests were also called *cognizances,* a very obvious term when considering their use—that the bearers *might be known* by them.

Crests, therefore, are as equally significant of the lineage of persons entitled to use them as arms are; and, as such, are inseparably annexed to individual families. The popular notion that crests are assumptive at pleasure, has no foundation in the nature or practice of heraldry; nor that the crest of a maternal ancestor may be borne. Heiresses do not convey the crests of their families to their descendants who are entitled to quarter their arms.

The crest was placed upon the helmet, *within* the wreath, not *upon* the wreath, as described in modern times; or might be issuant from a ducal or other coronet, or placed on a chapeau; and, although governed by the same laws as paternal arms with respect to hereditary masculine descent, it does not necessarily have any allusion to, or derivation from the bearings upon the shield. The crest represented without the armorial shield is usually placed on a wreath, or from a coronet, as the case may be, without the helmet or lambrequin.

The "*Cognizance*" is also a term used synonymously with "*Badge*;" not to be understood as a crest, but as a *badge*. They are, at least, coeval with armorial bearings, if not of a prior date. Henry II. adopted certain distinctive figures which had reference to his name. This was the *planta genista*. Badges were confined to royalty till about the time of Richard II., when they were adopted by the nobility. They were not substituted for armorial devices in the field, except on banners, and that only during the wars between the houses of York and Lancaster. The kings of England bore a variety of badges, in different reigns, as did also the several members of the royal family during the middle ages. Of the royal badges of sovereigns which have descended to modern times, is the well-known rose, the thistle for Scotland, and the trefoil for Ireland. But the trefoil was not formerly a royal badge. The Prince of Wales's plume is the peculiar badge belonging to the eldest son of the sovereign.

Badges used by the ancient nobility served rather to denote the servants or retainers, and were distinct from armorial bearings, and embroidered upon the liveries. These badges were defined in their character; and the use of them in the present day is very limited. They never appear as a crest; and are consequently without the wreath, or any other bearing which characterizes crests. Badges were frequently displayed upon the funereal banners of sovereigns and nobles, accompanied by their motto and other devices.

8. *Of the Scroll.*

The scroll is the ornament placed below the shield, containing a motto or short sentence alluding thereto, or to the bearings, or to the bearer's name. Thus, the motto of the Marquis of Cholmondeley is *Cassis tutissima virtus*—"Virtue is the safest helmet," on account of the helmet in the coat of arms; and the motto of Earl Fortescue is *Forte scutum salus ducum*, "A strong shield is the safety of the commanders," alluding to the name of that ancient family. Sometimes, however, the motto has reference to neither, but expresses something divine or heroic; as that of the Earl of Scarborough, *Murus æreus conscienta sana*, "A good conscience is a wall of brass." Others are enigmatical, as that of the royal achievement, which is *Dieu et mon droit*, "God and my right," introduced in 1340 by Edward III., when he assumed the arms and title of king of France, and began to prosecute his claim, which occasioned long and bloody wars, fatal by turns to both kingdoms; or that of the Prince of Wales, *Ich dien*, "I serve," the origin of which has already been explained.

9. *Of Supporters.*

Supporters are figures standing on the scroll, and placed at the side of the escutcheon; they are so called because they seem to support the shield. The rise of supporters is, by Menestrier, traced to ancient tournaments, in which the knights caused their shields to be carried by servants or pages under the disguise of lions, bears, griffins, blackamoors, and the like, who also held and guarded the escutcheons, which the knights were obliged to expose to public view for some time before the lists were opened. But Sir George Mackenzie dissents from this opinion, and contends (*Treatise on the Science of Heraldry*, chap xxxi., p. 93) that "the first origin and use of them was from the custom, which ever was and is, of leading such as are invested with any great honour to the prince who confers it."

The origin of supporters is still, however, involved in mystery. Like many other points connected with heraldry, they derived their origin at no ascertained time, and grew up into use from causes at present unknown. Theories have been attempted to be formed for their introduction into heraldry, but the most probable is that of various figures or animals being introduced upon seals as ornaments to fill up the open spaces which occur in a circular seal with the triangular or heater shield exhibiting the arms. Instances of this character occur very early, as may be seen upon the seals attached to the Barons' Letter to the Pope in 1300. After that period these figures or animals assumed a more decided character upon seals, and are found supporting the helmet as early as the time of Richard II. On the beautiful seals of the period from the reign of Henry IV. to that of Henry VI., the shields containing the arms are frequently placed so low as to cover part of the legend, while the helmets and crests are supported by various animals, natural and chimerical. The recognition of supporters, in the sense in which they are now understood, as regards the use of them by private families, may be dated about the time of Henry VII.; and there are a few private families who continue to bear them at this day, and whose title to use them has been allowed by the heralds at various times. When supporters first became the distinguishing mark of nobility, or were exclusively considered properly to appertain to the peerage or to the Knights of the Garter and Bath, is not quite clear. It appears that the first stall plate of a Knight of the Garter bearing supporters was that of John Beaufort, who was elected into that order 20th Henry VI.; but it is doubted whether the plate is of so early a date. But the first plate of this kind, which may with certainty be considered as contemporaneous with the installation, is that of John Dynham, Lord Dynham, who was elected a Knight of the Garter 1st Henry VII.; upon this plate the supporters, which are two stags, support the helmet and crest only. In the case of Henry Earl of Northumberland, who was elected in the same reign, the supporters are placed outside the garter which encircles the shield. Supporters were not even general at this time, as several plates intervening between that period and 29th Henry VIII. are devoid of them. Subsequently to the later period, however, supporters occur on all the succeeding plates of knights (vide *Archæologia*, vol. xxxi.).

There is, however, some reason to imagine that the jousts and tournaments were influential in the introduction and use of supporters. In an illuminated MS. remaining in the Herald's College, said to have been written and emblazoned for the use of Prince Arthur, the eldest son of Henry VII., are depicted a series of banners of arms of the ancient kings, nobles, and knights, each of which is held by some armorial or heraldic figure; being in each case the same, or at least one of those which are to be found on their seals, or in other evidences, as supporters.

The supporters which are attributed to the kings of England have varied from time to time, previously to their final settlement by James I. Edward III. used a lion and eagle; Richard II., the lion and white hart; Henry IV., the heraldic antelope and swan; Henry V. and Henry VI., the lion and heraldic antelope; Edward IV., the lion and black bull; Richard III., the lion and white boar; Henry VII., the lion and red dragon, which were continued to be used till the end of the reign of Elizabeth. These do not, however, appear on any of their great seals, upon which the use of supporters does not occur. On the great seal of James I. a lion is holding the banner of St George, and an unicorn that of St Andrew. The ancient supporters of Scotland were two unicorns, one of which James I. retained to support the royal arms of England on his accession to the English crown. Supporters (sometimes supporting the crest and helmet only) were used on the seals of the royal family from the time of Henry V.

Supporters are borne by corporations and trading companies; one of the earliest grants was made to the Leather Sellers Company, 22d Henry VIII.

V.—OF THE RULES OR LAWS OF HERALDRY.

I. The *first* and most general rule is, to express one's meaning in proper terms, so as not to omit any thing which ought to be specified, and at the same time to be clear and concise without tautology.[1]

II. The tincture of the field must first be mentioned, and then proceed to the principal charges which possess the most honourable place in the shield, such as fess, cheveron, &c., always naming that charge first which lies next to and immediately upon the field.

III. After naming the tincture of the field, the honourable ordinaries, or other principal figures, their attributes, and afterwards their metal or colour, must be specified.

IV. When an honourable ordinary, or some one figure, is placed upon another, whether it be a fess, cheveron, cross, &c., it is always to be named after the ordinary or figure over which it is placed, with the expression *surtout* or *over all.*

V. In blazoning such ordinaries as are plain, the bare mention of them is sufficient; but if an ordinary should be made of any of the crooked lines, its form must be specified; that is, whether it be engrailed, wavy, &c.

VI. When a principal figure possesses the centre of the field, its position is not to be expressed.

VII. The number of the points of mullets or stars must be specified when more than five; and also if a mullet or any other charge be pierced, it must be mentioned.

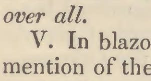
VIII. When a ray of the sun, or other single figure, is borne in any other part of the escutcheon than the centre, the point it issues from must be named.

IX. The natural colour of trees, plants, fruits, birds, and the like, is by the word *proper.* unless they differ from their natural colour

X. When three figures are in a field, and their position is not mentioned in the blazoning, they are always understood to be placed, two above, and one below.

XI. When there are many figures of the same species borne in a coat of arms, their number must be observed as they stand, and distinctly expressed.

But, for the better elucidation of this last rule, we have inserted examples of the *different dispositions of figures,* in which they are properly represented. Thus, *two* may be ranged in pale, in fess, &c. (Nos. 1, 2). *Three* may be 2 and 1, as also in bend, &c. (Nos. 3, 4). *Four* are placed 2 and 2, sometimes called cantoned (No. 5). *Five*, 1, 3, 1, in cross; or 2, 1, 2, in saltier (Nos. 6, 7). *Six*, 3, 2, 1, in pile; or 2, 2, 2, paleways (Nos. 8, 9). *Eight*, in orle, or on a bordure (No. 10). *Nine*, 3, 3, 3, barways; or 3, 3, 2, 1, in pile (Nos. 11, 12). *Ten*, 4, 3, 2, 1, in pile; or else 4, 2, 4, barways (Nos. 13, 14). *Twelve* are placed 4, 4, 4, barways (No. 15).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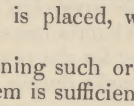
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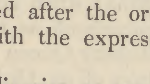
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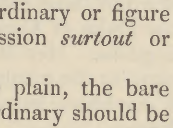
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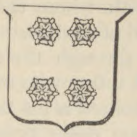
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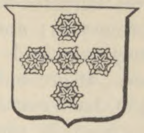
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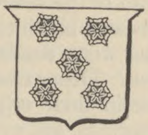
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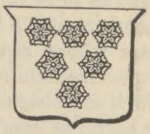
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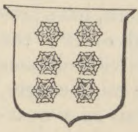
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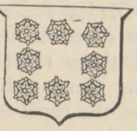
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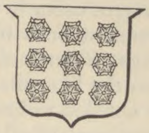
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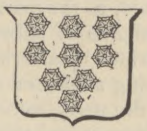
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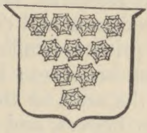
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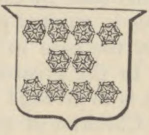
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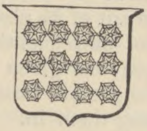
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When the field is strewed with the same figures, this is expressed by the word *semée;* but, according to the opinion of a French armorist, if the figures strewed on the field are whole ones, it must be denoted by the words *sans nombre;* whereas, if part of them be cut off at the extremities of the escutcheon, the word *semée* must then be used.

VI.—OF MARSHALLING ARMS.

This is understood to be the art of disposing several coats of arms in one escutcheon, and of arranging the contingent exterior ornaments. Originally, only one coat was exhibited in the shield; but afterwards, to denote descent or marriage, the arms of other families were borne on seals in separate escutcheons; sometimes without any variation as to the size of the escutcheons; but at other times the principal shield was surrounded by smaller ones. Marriages were, at length, shown by the arms of the wife being *dimidiated* with those of the husband, *dimidiation* representing only one-half of each coat parted by a per pale line. This course, however, from the inconvenience of dividing some coats, whereby their characteristic bearings became lost, was supplanted by the practice of *impaling* the arms of the wife with those of her husband, thus preserving the man's arms entire on the dexter, and the lady's on the sinister. Sometimes one coat only was dimidiated. Nothing in the early times denoted marriages with heiresses unless the arms of the heiress had a prominent place on the seal, or were impaled on the *dexter* side of her husband's. The practice, alluded to by some heralds, of placing the arms of more than one wife with those of the husband is not now followed, though Leigh has given some directions upon the point. The shield or escutcheon of pretence, to show the arms of the wife as the heiress of her family, is not of very early introduction.

But the principal occasion of a multiplicity of arms in one shield, is that of quartering the arms of heiresses, a system which first commenced about 1348, when the Earl of Pembroke quartered the arms of Valence. The first quarter contains the paternal arms of the family; the remaining ones those of the several heiresses with whom the ancestors of the bearer had intermarried; and of such heiresses whose arms were similarly acquired through their respective families. Other causes, at present unknown, or which are obscure in their origin, have occasioned arms to be borne as quarterings, but which are in some cases presumed to be feudal or territorial.

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[1] In Kent's *Grammar of Heraldry*, published in 1716, p. xi., tautology is condemned in these very strong terms: "You must use no repetition of words;" "but especially not of the words *of, or, and, with,* for the repetition of these is reckoned *an unpardonable crime.*"

In arranging a shield for quarterings, the shield is divided by perpendicular and horizontal lines into as many squares as may be required. The arms of the most ancient heiresses, as the marriages occur in the lineal descent, have precedence of subsequent ones in chronological order; the various quarterings (if any) of those respective heiresses being subjected to the like rule. During the middle ages, if the party were entitled to bear the royal arms as a quartering, it had precedence of all others—this was the melancholy case of the Duke of Buckingham in the time of Henry VIII. The royal arms of Brotherton, at this day, is borne next the paternal coat by the Howards, although it is there out of its place in point of pedigree and descent. It was not unfrequently the case in private families that precedence was given to the greatest heiresses; but the rule at the present time is to arrange the arms as the marriages bring them in. Children of an heiress, and all the descendants of an heiress, also descending from her through heiresses, are entitled to quarter the arms of such heiresses.[1]

Archbishops and bishops, and some deans of cathedral churches, bear the arms of their respective sees and offices impaled on the dexter side with their own paternal arms. This practice commenced about the time of the Reformation. Archbishops and bishops use neither crests nor mottoes. The Lord-Lyon, and the kings of arms in England and Ireland, bear the arms of their offices in the same way as bishops, and ensign their shields with their crowns.

Unmarried ladies bear their arms and quarterings (if any) in a lozenge; as also do widows, impaled with those of their deceased husbands.

Commoners marrying peeresses in their own right bear their arms in the usual way, with the family arms of the peeress impaled; but if she is an heiress, then with her arms in an escutcheon of pretence ensigned with a coronet of her dignity, the whole set on the dexter side of her family arms, which are borne separately in a lozenge ensigned with her coronet, and supported by her supporters.

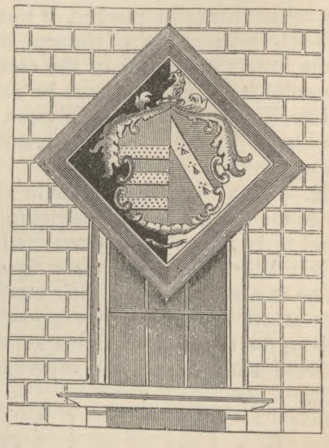
In cases of peers their coronets are placed immediately on the shield; and upon the coronet is placed the helmet, with its lambrequin, wreath, and crest. But the crown of the sovereign, and the coronets of the royal family, are placed upon the helmet.

Baronets of England and Ireland are entitled to place the badge of their dignity—*argent a sinister hand couped gules*—in an escutcheon of pretence, or in a canton in their arms. The baronets of Scotland have a similar privilege, their arms being, *argent a saltire azure, on a shield of pretence, the royal arms of Scotland ensigned with the royal crown.* The baronets of Scotland also suspend the badge of their order by an orange-coloured ribband from the shield; the badge is then within a circle, having the motto, "*Fax mentis honestæ gloria.*"

Knights of the several British Orders of knighthood surround their shields of arms with the respective ensigns of the Order; in which case their arms, with those of their wives are, in a separate shield, placed on the sinister side.

The Order of the Garter was instituted between the 24th June and 6th August 1348 (as discovered by the late Sir Harris Nicolas (*vide Archæologia*, vol. xxxi., p. 130), consisting of the sovereign and twenty-five knights. Since that period it has undergone no material alteration in its constitution, except that foreign princes and members of the royal family, descendants of King George I. together with the Prince of Wales, who was in 1805 declared a constituent part of the original institution, are not now included in the original number of twenty-five knights. The Order of the Thistle in Scotland is said to have a very remote antiquity. The recital in Queen Anne's Letters Patent of Restoration, give it a date as early as the ninth century. It consisted of the sovereign and twelve knights, and has undergone but very little change in its constitution. The origin of the Order of the Bath is attributed to the beginning of the reign of Henry IV., as a distinct Order, and was frequently conferred on occasions of coronations; but after that of Charles II. it was suffered to fall into disuse. In 1725 George I. revived the Order; in 1815 it was enlarged, and divided into three classes; and further amplified in 1848 by her present Majesty. The Order of St Patrick was instituted by George III. in 1783 for Ireland, to consist of the sovereign, a grand master, and fifteen knights. The number of knights was augmented by King William IV. in 1833. The Order of St Michael and St George was instituted after the general peace of 1814, the sovereignty of the Island of Malta being then ceded to the king of Great Britain. It consists of three classes; and, with some modifications, continues to be conferred upon natives of the Ionian Islands and Malta. The Royal Hanoverian Guelphic Order was established in 1815, consisting of three classes, and was conferred upon British and Hanoverian subjects. This Order ceased to be a British Order upon the accession of her present Majesty to the crown of these realms; when Hanover devolved upon the late Duke of Cumberland, as the sovereign of the latter kingdom. Her Majesty Queen Victoria has signalized her reign by the creation of an Order for the reward of many of our brave heroes who have fought during the Crimean War.

VII.—OF FUNERAL ESCUTCHEONS.



The *hatchment* represents the armorial ensigns affixed to the fronts of houses when any of the nobility and gentry die, the arms therein being those of a private gentleman and his wife parted per pale, with mantling, helmet, crest, and motto; the dexter side, for the husband, having the ground without the escutcheon black, denotes the man to be dead; and the ground on the sinister side being white, signifies that the wife is living.[2]

When a married gentlewoman dies first, the arms on the sinister side have the ground without the escutcheon black, whereas those on the dexter side, for her surviving husband, are upon a white ground, but without any crest, helmet, lambrequin, or motto.

When a bachelor dies, his arms may be depicted single or quartered, with a crest, helmet, lambrequin, and motto, but arms not impaled as the two first are, and all the ground without the escutcheon is also black.

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[1] A lady is an heiress if she has no brothers who leave issue; if she has sisters they become co-heiresses with her.

[2] The exterior ornaments are omitted in the engraving merely for the sake of simplifying it, the object being to show the funereal accidents.

When a maid dies, her arms, which are placed in a lozenge, may be single or quartered, like those of a bachelor; all the ground without the escutcheon is also black, and devoid of the exterior ornaments.

When a widower dies, his arms are impaled with those of his deceased wife, having a helmet, mantling, and crest, and all the ground without the escutcheon black.

When a widow dies, her arms are impaled with those of her deceased husband, but inclosed in a lozenge, and without the exterior ornaments; all the ground without the escutcheon being also black.

By these rules may be known, upon the sight of any hatchment, what branch of the family is dead; and by the helmet or coronet, the title and degree of the person deceased.

In Scotland, a funeral escutcheon not only shows the arms and condition of the defunct, but is also a proof of the gentility of his descent; and such persons for whom this species of escutcheon can be made out are legally entitled to the character of gentlemen of blood, which is the highest species of gentility. The English hatchment exhibits no more than a right to a coat of arms, and the status of the deceased person.

The funeral escutcheon, as exhibited in Scotland, France, and Germany, is in the form of a lozenge, above six feet square of black cloth; in the centre of which is painted, in proper colours, the complete achievement of the defunct, with all its exterior ornaments and additional marks or badges of honour; and round the sides are placed the sixteen arms of the families from which he derives his descent, as far back as the grandfather's grandfather, as the proofs of his gentility. They exhibit the armorial bearings of his father and mother, his two grandmothers, his four great-grandmothers, and his eight great-grandmothers' mothers; and if all these families have acquired a legal right to bear arms, then the gentility of the deceased person must be accounted complete, but not otherwise. On the four corners are placed mort-heads, and the initials of his name and titles or designation; and the black interstices are powdered with tears.

Funerals of the nobility and gentry during the middle ages were the means of displaying heraldry in all its pomp and magnificence; and perhaps nothing contributed more to such an exhibition of real heraldry than those occasions. Funerals in those times, as regards the heraldic attributes, and the marshalling the solemnities observed at them, were exclusively within the province of heralds, who attended them, and took an official and prominent part in the ceremonies. The mourning costume and its decorations were subjected to certain laws and regulations as affected rank in the persons of the mourners. The number and dimensions of the funereal banners and pennons were likewise subjected to express rules scrupulously maintained. The nature and construction of the hearse (which was the large timber erection in the church for the reception of the corpse and the assembling of the principal mourners) also depended upon the rank and condition of the defunct in its extent, and in the number of escutcheons and lights with which it was adorned. The heralds bore the shield and tabard of arms of the deceased, his helmet[1] and crest, and his sword and spurs in solemn procession, which, with the banners and pennons, were afterwards hung up over the grave, and may still be seen remaining in many of our churches. At the funeral obsequies of princes and nobles a wax effigy of the deceased was arrayed in the robes and other insignia of dignity, and laid on the top of the coffin. Some of these figures are still preserved in the Abbey at Westminster. This custom has the appearance of having been derived from the *jus imaginum* of the Romans. Great numbers of relations and friends attended these solemnities, which, from their extent, and the length of time they occupied (often several days), must have occasioned no inconsiderable labour and expense. Expensive entertainments were also given on these occasions; and there are some curious remarks respecting the feasting and degree of hospitality which took place, in the records made by the heralds on these occasions. Some idea of the magnificence of these funerals may be formed even from the few relics which are still preserved by some of the companies of London, who have in their possession rich palls of cloth of gold magnificently embroidered with curious devices and arms, which were used at the funerals of the citizens.

Besides the attendance of the heralds upon these ceremonies, it also formed part of their official duty to record the genealogical account of the family of the deceased, together with their arms. These records form a very important class of evidence of descent, and are deposited in the Heralds' College. Most of them are richly emblazoned and engrossed upon vellum, and are technically called "Funeral Certificates." They afford minute evidence of the births, marriages, and issue of the children and family of the deceased, and are invaluable as possessing the nature and character of *legal* evidence. Soon after the Revolution of 1688-9 the heralds ceased to attend the funerals of the nobility and gentry, and their office in these respects is now confined to the state funerals of the royal family, or of those illustrious heroes whose funerals are conducted at the public expense.

Nearly all that is reserved for modern times of the heraldic splendour of these funerals is the hatchment, descriptions of which have been given in this article. It is, however, only the compendium of the heraldic honours paid to the memory of the deceased in former times; and, like its predecessors, finds a place over the tomb which covers his remains.

Thus, by archæological researches, we have been enabled to present a concise view of practical heraldry. If, in the sixteenth century, the labours which were bestowed in writing books, full of the purest inventions and the grossest absurdities, had been directed into the paths of truth, much more accessible then than now, heraldry would have disclosed a history of events, of persons, and of kingdoms, which is irretrievably lost. To the learning and study of modern archæologists we are indebted for some of the information, which should have been afforded us by men who lived in ages nearly approaching those when heraldry originated, and who could have thrown a lustre instead of a mist upon many incidents in the practice and science of heraldry. In this article we have touched the principal points of the subject, and have to confess our obligations to Meyrick's *Critical Enquiry into Armour;* Laing's *Ancient Scottish Seals;* Nicolas's *Orders of Knighthood*, and his valuable contributions to the Society of Antiquaries; Boutell's *Monumental Brasses;* Gough's *Sepulchral Monuments;* and the publications of various Archæological Societies. The illustration of many facts and dates has also been supplied from records of the College of Arms in London.

(T. W. K.)

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[1] The plume of feathers usually carried at funerals at the present day is said to have succeeded to the carrying of the helmet in former times.

HERAT or HERAUT (anciently *Arid* or *Artacoana*), capital of Shah Mahmood's state on the W. frontier of Afghanistan, 2700 feet above the sea level, 3 miles N. of the Hury River, in a beautiful and fertile valley; N. Lat. 34. 22., E. Long. 62. 9.; 360 miles W. of Cabool. It is entirely surrounded by an earthen mound 50 feet high, by two trenches, and a ditch. From the mound rises a wall 25 feet high, and upwards of 100 bastions of unburnt brick. At the N. end of the town is a strong citadel defended by a ditch and massive towers. To the N. of the town are the huge mound raised by Nadir Shah, and a little farther the gorgeous ruins of the Moosullah of Imaum Reza. As there is no drainage the town is extremely filthy, although in the fifteenth and sixteenth centuries it was one of the finest cities in the world.

Commercially, the position of Herat is important. It receives shawls, indigo, sugar, spices, chintzes, muslins, brocades, scarfs, leather, and hides from Afghanistan; tea, sugar, porcelain, glass, silk, cotton, cloth, woollens, carpets, and hardware from Persia, Russia, and Turkey. The Herat carpets are famous. The annual revenue of Herat is estimated at perhaps L.100,000. It was unsuccessfully besieged by the Persians in 1838. Pop. less than 45,000.

HERAULT, a department in the S. of France, bounded on the N.E. by Gard, N.W. by Aveyron and Tarn, and S. by Aude and the Gulf of Lyons. It formed part of the old province of Languedoc, and has an area of 2444 square miles; between N. Lat. 43. 10. and 44., E. Long. 2. 30. and 4. 10. Its greatest length is 84 miles, breadth 50. About a third of the department consists of moorland, heath, and common; a fourth of arable land; a sixth of vineyards; and an eighth of wood.

The S. prolongation of the Cevennes Mountains forms the N. boundary of the department, under the names of Garrigues, Orbe, Espinous, and the Black Mountains. The highest point is about 4250 feet above the sea-level. The ridge forms the watershed between the waters of the Atlantic and the Mediterranean, and from it there flow the Vidourle, Masson, Hérault, Livron, and Orbe. Of these the Hérault, 80 miles long, is the chief, and gives name to the department. The Orbe forms the boundary between the department and that of Gard.

The high mountains of the N. are partly barren, partly wooded. In the extensive plains of the centre the vine and olive flourish, and in the S. grain is produced. The soil of the N. is chalky clay, of the centre light gravel, and of the S. a strong rich loam. The "garrigues" are considerable portions of waste land, covered with heath, shrubs, &c. Mont St Loup, Couques, and St Thibérg, the first of which is 750 feet high, are extinct volcanic cones.

The greater part of the S. coast consists of a series of salt marshes, separated from the sea by a narrow strip of land. The Marsh of Thau, the largest, stretches from the mouth of the Hérault, and communicates, through the Marsh of Frontignan, with that of Mangino, on the E. frontier of the department. The Canal du Midi, after stretching about 30 miles into the department, terminates at Agde. From Cette the navigation is kept up through the marshes by the canals of Agde and Radelle to Aigues Mortes. The coast line of the department is 66 miles long. Besides the canal navigation the department has seven national roads, one of which is the main route between Paris and Spain; also a railroad joins Cette, Montpellier, and Nîsmes.

The climate generally is warm, dry, and healthy, except near the marshes which cause agues and fevers. The prevailing winds are N.E. and S.E.

Fish abound in the salt marshes. The vegetable productions comprise aromatic and dyeing plants; the Ilex oak prevails in the forest. The mineral wealth of the department is considerable. Mines of lignite, coal, iron, copper, and lead are wrought. It produces magnificent blocks of marble; also alabaster, gypsum, granite, sandstone, potters' clay, alum; and the marshes supply France with salt.

Wine and oil constitute the chief agricultural wealth of the department. The red wines of St Georges, Viragues, St Christol, and the white wines of Frontignan and Lunel, are held in high estimation. The annual quantity of wine produced in Hérault is more than 45,000,000 gallons. Of this a fifth is consumed by the department, a fifth is exported as wine, and the remainder converted into spirits for commerce. Considerable quantities of wheat and oats are grown; also mulberries, pomegranates, figs, raisins and other dried fruits, and olives, are prepared for exportation. The department rears 10,000 horses, and upwards of half a million of sheep.

Woollen, cotton, and silk factories are established in the department. There are also paper-mills, distilleries, and factories for verdigris and other chemical substances.

Hérault is divided into 4 arrondissements, 36 cantons, and 326 communes, as follows:—

Arrondissements.	Cantons.	Communes.	Pop. in 1837.
1. Montpellier	14	113	148,649
2. Bézier	12	97	134,605
3. Lodère	5	72	56,700
4. St Pons	5	44	49,332
	36	326	389,286

The capital is Montpellier.

HERBELOT, BARTHELEMI D', a celebrated French Orientalist, was born at Paris in 1625. At a very early age he gave himself up to the study of the Eastern tongues; and, to perfect his acquaintance with them, travelled into Italy, where he enjoyed the friendship of the cardinals Barberini and Grimaldi. On returning to Paris he obtained, through the munificence of Fouquet, a pension, of which he was afterwards deprived on the fall of that minister. He was compensated, however, with the office of Oriental interpreter to the king. After some years he again visited Italy, and was received with especial honour by Frederick II. of Tuscany, who presented him with a large number of valuable Oriental MSS., and tried to attach him to his court. D'Herbelot, however, returned to France at the urgent solicitation of Colbert, who, on the death of Pierre Auvergne, made him Syriac professor in the Collège-Royal. D'Herbelot died, after a short illness, at Paris, December 8, 1695.

The great work by which D'Herbelot's fame is still preserved is his *Bibliothèque Orientale*, Paris, 1697. This work, which was published two years after the author's death by Galland, occupied D'Herbelot during the greater part of his life. It is based on the immense Arabic dictionary of Hadjy Khalfa, of which, in fact, it is an abridged translation; but it also comprises the substance of a vast number of other Turkish and Arabic Encyclopædias. The erudition it displays is boundless, but the field embraced is far too vast for the labours of a single man, and many errors have consequently crept into the work. With all his learning D'Herbelot seems to have been deficient in critical sagacity. He died, too, before seeing his work through the press, and there is consequently a want of minute accuracy in many of its details, and of harmony between the various parts of the work. Besides the *Bibliothèque Orientale*, D'Herbelot wrote several works, such as an Anthology, and an Arabic, Persian, and Turkish Lexicon, none of which, however, have been published. The *Bibliothèque* has been twice reprinted, first at Maestricht, fol., 1776; and again at the Hague, in 4 vols. 4to, 1777–99. The latter of these two editions is enriched with the contributions of Schultens and Reiske. A German translation of it appeared at Halle, in 4 vols. 8vo, 1785-90; and an abridgement by Désessarts, at Paris, in 1782.

HERBERT, EDWARD, Lord Herbert of Cherbury, born at Montgomery Castle in 1581, was educated at Oxford:

He was presented to Queen Elizabeth in 1600, and was made Knight of the Bath on the accession of James I. In 1608 he visited France, where his high sense of honour, along with his courage in a duelling age, opened up to him a ready means of distinguishing himself. In 1610 he served under Maurice, Prince of Orange, at the siege of Juliers, where he displayed a courage bordering on rashness. In 1614 he set out again to fight under the same leader against the Spaniards. Thereafter he went to Italy, and returning, was entrusted by the Duke of Savoy with the project of conducting 4000 Languedoc Protestants into Piedmont. This having been forbidden by Marie de Medicis, Herbert was arrested, but immediately set at liberty. Whilst preparing himself for new exploits he was appointed in 1616 ambassador extraordinary to France by James I., for the purpose of renewing the alliance between England and France. He provoked the determined hostility of the Duke de Luynes, Constable of France, who sent his brother to the English court to complain of Herbert. He was recalled in consequence; but on the death of De Luynes he was re-appointed and invested with still greater powers. In 1625 he was created peer of Ireland, under the title of Baron of Castle-Island. In 1631 he was created baron of England, under the title of Lord Herbert of Cherbury. His castle was destroyed during the civil wars of Charles I. He died in London on the 20th August 1648, aged sixty-seven.

Besides being a brave soldier and an accomplished gentleman, Herbert is to be ranked as an acute and original thinker. While at Paris in 1624 he published his treatise, *De Veritate prout distinguitur a revelatione, a verisimili, a possibili, et a falso.* Professing to have studied carefully the writings of many authors, sacred and profane, he declares himself unable to arrive at a complete notion of *truth.* He accordingly turns to the examination of *self.* Against absolute dogmatism he holds it as a matter of fact that we do not know all things, while against absolute scepticism he holds that we do know some things. Between these extremes truth is to be found. Still farther, we are endowed with certain faculties which enable us to undertake the search after truth. These faculties, then, must be carefully examined as to their laws and their relation with objects. After this must come the work of separating the true from the probable, the probable from the possible, and the possible from the false. Above all, credulity is to be guarded against. Like Des Cartes he starts from consciousness. As the result of his investigation, he considers the mind not a *tabula rasa*, but a book closed; and the action of the external world becomes the occasion of the opening of the book. Hence material objects, as only the *occasion*, are not the *cause* of true knowledge. Herein his system is substantially the same as Kant's. Starting with seven common notions or maxims which he considers will be admitted by all who seek truth, he proceeds to make a fourfold division of truth:—1*st*, Truth in the agreement of a thing with itself; 2*d*, Truth in the agreement between the appearance of a thing and the thing itself; 3*d*, Truth in the agreement between the conception of our faculties and the objects; and 4*th*, Truth in the necessary agreement between these different kinds of conformity. Of these four the most important is the last, or truth of intelligence, which is independent of the senses. When sound, both bodily and mentally, these truths impress us as if they came clear from heaven to enable our minds to decide regarding what passes before us in the external world.

Herbert divides the faculties of knowing into four,—the natural instinct of reason, internal sense, external sense, and reasoning. The instinct of the reason is that faculty by which we seize "common notions." Internal sense is twofold,—it informs us what is passing within ourselves, as well as what are our relations to the world. External sense makes us cognizant of the form, position, and constitution of external objects. By the reasoning or discursive faculty we seize the points of difference or agreement, of opposition or harmony of concepts. Defective as this fourfold division is, Herbert frequently confounds the instinct of the reason, the internal sense, and the discursive faculty.

In turning to revelation, Herbert lays down five maxims or common notions, which form the foundation of all true religion:—1*st*, There is a Supreme Being; 2*d*, Man should worship this Being; 3*d*, Virtue is the principal part of this worship; 4*th*, Repentance expiates faults; 5*th*, There must be a future state in which virtue is rewarded and vice punished. What is false does not exist *per se.* Truth is the basis not only of truth, but even of error. Error is truth incomplete, obscured, mutilated. His *Tractatus de Veritate*, &c., was republished in 1645, along with a new one, *De religione Gentilium errorumque apud eos causis.* He wrote also an account of the reign of Henry VIII. His *Autobiography* was not published till 1764. Some posthumous poems of no great merit were also published.

His views, both in philosophy and religion, encountered very great opposition during his life. Hobbes, Locke, and Gassendi attacked the one; and as to the other, the theologians of the period condemned him as the leader of the Freethinkers. However, he professed great respect for religion, and regarded Christianity as the most beautiful of religions. It is not a little remarkable, that notwithstanding his objections to a partial revelation he professes most seriously to have had his doubts settled as to the publication of his treatise *De Veritate*, &c., by praying for a divine intimation, which he declares was granted him.

HERBERT, *George*, to whose name the epithet of "Holy" is always attached, as "judicious" to that of Hooker, and "moral" to that of Gower, was a younger brother of Lord Herbert of Cherbury, and was born at the castle of Montgomery, in Wales, April 3, 1593. After leaving Westminster, where his public education began, he went to Trinity College, Cambridge. In course of time he became a fellow of his college, and in 1619 public orator to the University. Donne and Wotton were his intimate friends; and Lord Bacon is said to have attached so much importance to his literary judgment, that he never published anything which had not first been approved by him. With these high connections he looked forward to court preferment, and indeed obtained from King James a sinecure of L.120 a-year, that had once been held by Sir Philip Sidney. "With this," says his biographer, Izaak Walton, "and his annuity, and the advantages of his college and of his oratorship, he enjoyed his genteel humour for clothes and court-like company, and seldom looked towards Cambridge unless the king were there, but then he never failed." But Herbert's hopes were dashed by the death of the king, and to maintain himself he entered the church. In 1626 he was made first prebend of Leighton Bromswold, or Layton Ecclesia, and four years later rector of Bemerton, in Wiltshire, where he spent the remainder of his life. Before entering on the duties of his parish, he married, and with his wife made a solemn renunciation of the frivolities of the gay world for which, even after taking orders, he seems to have always retained a hankering. Once fairly installed, he became the model of a country clergyman, and laboured with a truly apostolical zeal and self-devotion. His prose work, the *Country Parson*, is a faithful picture of what he regarded as his ministerial duties, and the best way of performing them. But his constitution soon broke down under the combined influences of over-work and a quotidian ague, which afflicted him during the later years of his life. He died in 1632, before he had reached his fortieth year.

Herbert's principal work is entitled *The Temple; Sacred Poems and Private Ejaculations*, which was not published till after his death. In the course of a few years after his death, according to Walton, it was six or seven times reprinted; and by the time that the old angler came to write Herbert's *Life*, in the reign of Charles II., twenty thousand copies of it had been sold. It is generally ranked in that school of poetry known as the "Metaphysical," of which Herbert's contemporaries, Donne and Quarles, were in that age the most noted examples. The odes, hymns, and meditations of which it is composed, though often dashed by the quaint conceits, far-fetched analogies, and ridiculous imagery of that school, yet breathe a spirit of melting pathos, and saintly devotion, set off by so many gems of the finest fancy, that their author still holds his ground among the best religious poets of England. A stanza or two from the ode on "Virtue," will afford an illustration of Herbert's best manner:—

> "Sweet day, so cool, so calm, so bright,
> The bridal of the earth and sky,
> The dews shall weep thy fall to-night;
> For thou must die.
>
> "Sweet rose! whose hue, angry and brave
> Bids the rash gazer wipe his eye;
> Thy root is ever in its grave,
> For thou must die."

Herbert has been likened to Keble, the author of the *Christian Year*. The comparison is a just one. Both breathe a common spirit of saintly piety, and both love to present the belief and offices of their church in their most alluring and amiable aspect. The quality of the genius displayed in both is very similar, but in the matter of taste the older poet compares but ill with his modern anti-type. Herbert's chief prose work bears the title of *The Priest to the Temple*. Its purport is quite similar to that of the *Country Parson*.

There have been many editions of Herbert's poetical works. One of the most splendid is that of Nisbet, London, 1856.

Herbert, *Sir Thomas*, an English traveller of the seventeenth century, was a scion of the house of Pembroke, and was born at York about 1606. He was educated at Jesus College, Oxford, and afterwards at Trinity College, Cambridge. On quitting the university in 1621, he was attached, through the influence of the head of his family, to the English embassy which Charles I. was at that time sending to the Shah of Persia. Arriving at Ormus he travelled overland to the Caspian Sea, where the Shah happened to be. Though at first cordially received, he soon found it necessary to retrace his steps. Leaving Casbin with the survivors of the party, he returned to Ispahan, reached Bagdad, sailed down the Tigris, and then coasted along the Indian shores to Surat. Thence he set out for the Eastern Archipelago, visiting Java, the Moluccas, &c., and returned to England after an absence of four years. On his arrival he found his old patron dead, and as his hopes of preferment through his means were at an end, he set off to the continent, and on again returning home, married and applied himself to study. When the Civil War broke out he sided with the Parliament; and when Charles was delivered up to his own subjects by the Scots, Herbert was one of those whom he selected to be always near his person. For two years he waited with the most devoted tenderness on the royal prisoner, and at last attended him to the scaffold. In his *Threnodia Carolina*, published in 1678, Herbert has given a minute history of the life of the king during that period; and Charles II. showed his sense of Herbert's conduct by making him a baronet, "to requite," say the letters patent, "the good and loyal services rendered by him to the king our father during the last years of his life." Herbert died in his native city, March 1, 1682.

By far his most important work is that which he published on his return from the East, under the title of *Some Yeares Travels into Africa, and Asia the Great, especially in the Possessions of the Persian Monarchy*, &c., London, 1634. Herbert was a man of learning, and well versed in the histories of the countries he describes; but he overlays his narrative with a useless display of irrelevant knowledge, and with digressions upon countries which he never visited. These faults are peculiarly observable in the later editions of the book, and, it is suspected, may be the work of an editor. Herbert's own share in the work has an air of great truthfulness, and contains much valuable matter not readily accessible elsewhere. Till the appearance of Sir John Chardin's *Travels*, it was regarded as the best authority on everything connected with Persia. It was translated into Dutch by Jeremiah Van Vliet, Dordrecht, 1658; and from the Dutch into French by Wicquefort, who complains, and with good reason, of the stupid mistakes and mutilations perpetrated by the Dutchman.

HERCULANEUM, in *Ancient Geography*, a city on the sea coast of Campania, at the foot of Mount Vesuvius, about five miles S.E. of Naples. Its name recalls the tradition that ascribes its foundation to Hercules, which, though of course fabulous, yet indicates a very ancient origin for the town. It is most likely that Herculaneum was founded by the Pelasgi, and that at the time when it fell under the Samnite dominion, its inhabitants were a mixed Pelasgic and Oscan race, with a considerable infusion of Greek blood from the neighbouring Greek colonies of Naples and Cumæ. Under the Romans it never became a place of any great importance, and plays almost no part in history. It sided with the allies during the Social War, but was easily reduced. Its healthy situation, and the beauty of its environs, attracted many rich Romans to its neighbourhood; but even at the moment of the terrible catastrophe which has invested it with such a tragic interest, it appears to have been only a second-rate municipal town. The eruption of Vesuvius, which destroyed Herculaneum and Pompeii, took place A.D. 79; but 16 years before that date, both cities had been nearly destroyed by an earthquake so terrible as to have attracted special attention from the historians of Rome. In the great eruption, Herculaneum, being at the very foot of the mountain, seems to have been the first sufferer; and though the destruction of Pompeii was complete, yet that of its fellow-sufferer was undoubtedly more overwhelming. The depth of scoriæ and ashes under which Pompeii is buried is nowhere more than 12 or 14 feet, whereas Herculaneum lies at the depth of from 70 to 100 feet beneath the actual surface of the ground. The enveloping crust of the latter town seems to have been subjected to the action of water as it fell in molten showers on the place; for it is a hard well-compacted mass, very difficult to penetrate, and quite different from the loose scoriæ and ashes that form the grave of Pompeii. An accident led to the discovery of Herculaneum in modern times. In 1706, a peasant, in digging a well for the Prince d'Elbœuf, who had a villa in the neighbourhood, came upon some remains of antiquity, and prosecuting his researches, was rewarded with still greater success. But the matter reached the ears of the Neapolitan government, and all further excavation was prohibited. Matters remained in this state till 1738, when the search was recommenced by Don Carlos of Spain, who had succeeded to the throne of the Two Sicilies. The work was entrusted to a Spanish engineer, who carried it on with the ignorant recklessness of a Vandal, and allowed the destruction of many priceless monuments of ancient art. Since his day, however, considerable progress has been made, though the process of excavation has often been stopped from time to time from the ruin which it threatens to the towns of Portici and Resina, which stand immediately above the ruins of the buried city. Yet the whole extent of the explored parts is calculated to amount to no more than six hundred yards in length, and three hundred in breadth; but as we have al-

Herculaneum.

ready stated, many of the excavations have been again filled up with the rubbish from other parts, which could not be removed to the surface of the earth without great labour and expense.

Of the buildings as yet laid bare, the most interesting is the theatre, which seems to have possessed accommodation for 8000 spectators. It seems to have had two principal entrances, from twenty to thirty long rows of seats, and seven passages called *vomitoria*, for the entrance and exit of the people. The whole building was embellished with the varied ornaments of architecture. The flooring and pillars were of fine marble of different hues. The walls were adorned with paintings; within the precincts of the theatre were found many statues; and over the main entrance stood a triumphal car of gilt bronze with horses attached to it.

Near the theatre stood a splendid basilica, from the inner walls of which were taken the largest pieces of painting, engraved in the first volume of the *Antichità d'Ercolano*, published by order of his Sicilian Majesty. It was erected, according to an inscription, at the expense of the same Nonius Balbus who rebuilt the walls and gates of the town.

Besides this basilica, another temple has been discovered, and also the forum, some public buildings, and a number of private dwelling-houses. The forum had a colonnade, and the walls were partly cased in marble and partly painted. The private houses were small, irregular, for the most part built of brick, and one storey high. Their walls were generally covered with paintings, many of which have been cut out and removed to the royal museum at Naples. The streets that have been cleared were straight and paved with lava, like the streets of Naples at the present day. One of these was above thirty feet in width, with raised foot-paths on each side, on which were found broken columns which had evidently formed part of a colonnade. In another part of the excavations the workmen came to a vault with niches, in each of which was found a vase containing ashes, and over every niche, the name of some person coarsely painted in red letters. The vault, which was twelve feet by nine, was destitute of all decoration, and was probably the private burying-place of a family.

The treasures discovered at Herculaneum were originally deposited in the Royal Museum at Portici, but have been now removed to the Museo Borbonico of Naples. They comprise specimens of every department of art, domestic articles, and literary remains. The greatest interest, however, centred in a library containing nearly 2000 MSS., among which it was hoped might have been found some of the lost masterpieces of ancient genius. A careful scrutiny by the most eminent scientific men of the day, however, proved that it contained nothing of any material consequence. The process by which this unprofitable result was established is described in the following terms by Sir Humphrey Davy, who contributed to establish it:—

"The appearances of different rolls were extremely various. They were of all shades of colours, from a light chestnut-brown to a deep black; some externally were of a glossy black-like jet, which the superintendants called *varnished;* several contained the umbilicus, or rolling stick, in the middle, converted into dense charcoal. I saw two or three specimens of papyri which had the remains of characters on both sides, but in general one side only was written upon. In their texture they were as various as in their colours; the pale brown ones in general presented only a kind of skeleton of a leaf, in which the earthy matter was nearly in as large a proportion as the vegetable matter; and they were light, and the layers easily separated from each other. A number of darker brown ones, which, from a few characters discovered in opening them, appeared to be Latin manuscripts, were agglutinated, as it were, into one mass; and when they were opened by introducing a needle between the layers, spots or lines of charcoal appeared, where the folds had been, as if the letters had been washed out by water, and the matter of which they were composed deposited on the folds. Among the black manuscripts a very few fragments presented leaves which separated from each other with considerable facility, and such had been for the most part operated upon; but in general, the manuscripts of this class were hard, heavy, and coherent, and contained fine volcanic dust within their folds. Some few of the black and darker brown manuscripts, which were loose in their texture, were almost entirely decayed, and exhibited on their surface a quantity of brown powder." These venerable volumes were of a cylindrical shape, more or less perfect,—generally about a foot long,—and made up of the thin leaves of the papyrus plant, which were gummed together at the ends, and when thus joined formed one continuous sheet, which extended sometimes to a length of forty feet and upwards. These leaves seem to have been rarely inscribed on more than one side. The manuscript was written in a succession of parallel columns of from two to four inches in breadth, and at a distance of about an inch from each other. When completed, the entire sheet or volume was generally attached to an umbilicus or wooden cylinder, round which it was rolled.

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Having got possession of this literary treasure, the next inquiry was how it was to be unsealed and opened up so as to be accessible to the learned. This was found to be a work of the greatest delicacy and difficulty; and the earlier attempts were attended with no success, but issued only in the injury or entire destruction of a considerable number of manuscripts. Among other methods tried was one suggested by Mazzocchi, an Italian of great learning, who was afterwards employed in endeavouring to supply the defects found in these recovered volumes, and in preparing them for publication. He proposed that the papyri should be placed under a glass bell, and exposed to the sun, in the hope that when the moisture which they still contained was dissipated by the solar heat, they would open up of themselves. But the experiment was a failure. The heat of the sun did indeed extract the moisture, but at the same time it either obliterated the writing, or caused the ink to spread so much that the letters became quite illegible. When thus perplexed with difficulties which they knew not how to vanquish, the work was next entrusted to Antonio Piaggi, a man of experience in the handling of ancient manuscripts, and a very skilful copyist, who was employed at the Vatican, and under his superintendence and direction the experiments were carried on with much success.

With the greatest ingenuity, and the most laudable patience and perseverance, Piaggi applied himself to the task assigned him; and as he knew of no existing apparatus that would serve his purpose, he constructed a suitable machine for himself, which was found well adapted for the end in view, and enabled him to unfold many of the papyri.

The difficulties encountered in carrying on this work were immense; and the progress made was so slow, that one is astonished that it was not soon given up in despair. Some of the manuscripts were so brittle, that they fell to pieces in the hands of the operator. The leaves of others adhered so tenaciously, that in separating the upper coil of the roll from that beneath it, so many breaks were often made in the disengaged leaf that it had the appearance of a tattered rag full of holes, and was so much destroyed, that after much care and labour had been expended, it was considered useless to proceed with it. And even when all succeeded well, the unrolling of a small portion of a manuscript was often the work of days. Yet amid these and other difficulties Piaggi persevered with admirable patience and skill, till he had succeeded in opening up a large number of the manuscripts. And as each successive part was unrolled, he took a copy of it most accurately and beautifully, with all its lacunæ and defects just as he found them, and these facsimiles were sent to Mazzocchi and his learned associates, that they might restore them as nearly as they could to their original completeness, and present them to the public. But the zeal of Piaggi was not met by a corresponding zeal on the part of his coadjutors and the Neapolitan government. His part of the work was soon accomplished; but it was not till after a wearisome delay of forty years that a specimen of these Herculanean manuscripts was published at Naples in 1793. And the work when received was little fitted to reward the patience and satisfy the expectations of the learned. It was a dull treatise on music, by Philodemus, an epicurean, in which he endeavours to show that music exercises an injurious influence on a nation, and ought therefore to be discouraged.

Soon after the publication of this volume, proposals were made by King George IV., then Prince of Wales, to bear the expense of opening and publishing some of the manuscripts. For this end he gave large sums from his private purse, procured grants from Parliament, and made all the arrangements that seemed to him most fitted to promote the success of this literary enterprise. In 1800, the Rev. John Hayter, the chaplain of the prince, was appointed to proceed to Naples, and devote himself to this work; and from the beginning of 1802 till the French invasion in 1806, when he withdrew to Sicily, it was diligently and successfully carried on. Before Mr Hayter's arrival only eighteen manuscripts had been unrolled, but in the Report which he makes to his Royal Highness of the progress made by him before leaving Naples, he says—"More than two hundred papyri had been opened wholly or in part during my stay at Naples. The experience of every day had added infinite facility and skill, with accurate and secure but rapid dexterity, to each unfolder and copyist. Hence, with these increasing advantages, every one of the remaining fifteen hundred, or as many of them as could be opened would be opened and copied, it was reasonably and universally calculated, within the space of six years at the most." Of the manuscripts that were unfolded, facsimile copies of ninety-four were sent to the Prince of Wales, who presented them to the University of Oxford. They are both in Greek and Latin, but many of them consist only of two or three pages, and are by unknown authors. Even when they are of greater extent, they are treatises of little value, and by authors of no distinction. In 1824–25, two volumes of these issued from the Clarendon Press at Oxford. They contain parts of several works by Philodemus, *On Vices, On Poems, On Rhetoric, and on Vices and their Opposite Virtues;* a work of Demetrius *On Poems,* and another *On Anger* without the author's name. These are all Greek manuscripts, and are printed exactly as they appeared when they were unrolled, with all their imperfections, and without note or comment.

Other gentlemen besides Mr Hayter were employed under the prince's patronage in experimenting on the Herculaneum papyri, and among these Dr Sickler of Hildburghausen. This individual pretended to be skilful in opening them, and without sufficient inquiry into his qualifications, he and his family were brought to London, and this delicate task was intrusted to one who proved himself totally unfit for it. The experiments were an entire failure, and resulted in the loss of several hundred pounds and the complete destruction of some finely-preserved papyri which his royal highness had procured and put into his hands. But the prince was not easily discouraged; and it is much to his honour that for so long a series of years, in the face of many difficulties, and at great personal expense, he prosecuted this undertaking with unflagging zeal. At length he succeeded in securing the active co-operation of a gentleman who was very zealous in the cause, and at the same time of great eminence both in regard to talent and scientific attainments. In 1818 Sir Humphrey Davy was commissioned by the Prince to go to Naples, and try what his knowledge of science could accomplish in devising new and more successful methods of unfolding and bringing to light the literary remains of the Herculanean library. Previous to his departure from England on this mission, Sir Humphrey had examined such portions of the papyri as he could obtain, and after subjecting them to a variety of chemical experiments and tests, was led to form a judgment regarding them quite different from what had been hitherto generally entertained. The usual opinion was, that the charred appearance of the papyri was to be ascribed to the action of fire. From this view Sir Humphrey dissented on scientific grounds. But as the supply of papyri in England was insufficient to allow him to carry on his investigations to a satisfactory extent, he readily acceded to the proposal now made to him by the Prince of Wales to proceed to Naples, and complete his experiments on this more ample field.

In the report which, on his return, was read to the Royal Society of London, and published in the *Philosophical Transactions* for 1821, Sir Humphrey gives a narrative of what he saw and did at Naples in carrying out the purpose of his mission. "The persons," he says, "who have the care of the manuscripts found at Herculaneum state that their original number was 1696, and that 431 have been operated upon, or presented to foreign governments, so that 1265 ought to remain; but amongst these, by far the larger proportion are small fragments, or specimens so injured and mutilated that there is not the least chance of recovering any portion of their contents; and when I first examined the rolls in detail in January 1819, it did not appear to me that more than from 80 to 120 offered proper subjects for experiments; and this estimate, as my researches proceeded, appeared much too high. These manuscripts had been objects of interest for seventy years; the best had long ago been operated upon, and those remaining had not only undergone injuries from time, but likewise from other causes, such as transport, rude examination, and mutilations, for the purpose of determining if they contained characters."

As the result of his experiments, he gives his opinion that the idea that attributes these different appearances of the MSS. to the action of fire, more or less intense, is entirely erroneous, that part of Herculaneum being under a bed of tufa formed of sand, volcanic ashes, stones, and dust, cemented by the operation of water, probably in a boiling state. "And there is great reason to conclude," he says, "that the different states of the manuscripts depend upon a gradual process of decomposition; the loose chestnut ones probably not having been wetted, but merely changed by the reaction of their elements, assisted by the operation of a small quantity of air; the black ones, which easily unroll, probably remained in a moist state without any percolation of water; and the dense ones, containing earthy matter, had probably been acted on by warm water, which not only carried into the folds earthy matter suspended in it, but likewise dissolved the starch and gluten used in preparing the papyrus, and the glue of the ink, and distributed them through the substance of the manuscripts; and some of these rolls had probably been strongly compressed when moist in different positions.

"The operation of fire is not at all necessary for producing such an imperfect carbonization of vegetable matter as that displayed by the manuscripts: thus, at Pompeii, which was covered by a shower of ashes that must have been cold, as they fell at a distance of seven or eight miles from the crater of Vesuvius, the wood of the houses is uniformly found converted into charcoal; yet the colours on the walls, most of which would have been destroyed or altered by heat, are perfectly fresh; and where papyri have been found in these houses, they have appeared in the form of white ashes, as of burnt paper; an effect produced by the slow action of the air penetrating through the loose ashes, and which has been impeded or prevented in Herculaneum by the tufa, which, as it were, has hermetically sealed up the town and prevented any decay, except such as occurs in the spontaneous decomposition of vegetable substances, exposed to the limited operation of water and air, for instance, peat and Bovey coal. The results of the action of heat upon the different specimens of the papyri, proved likewise that they had never before been exposed to any considerable degree of temperature." The opinion of Sir Humphrey Davy has not been universally acquiesced in. While he maintains that the papyri of Herculaneum are not carbonized, others maintain with equal confidence that they are now complete charcoal, such as is formed by heat only, and tell us that a fragment of their substance burns readily, like common charcoal, with a creeping combustion, without flame and with a slight vegetable smell, whereas Bovey coal exhibits a considerable flame.

During the two months that he was actively employed in experiments on the papyri at Naples, he succeeded in partially unrolling 23 manuscripts, from which fragments of writing were obtained, and in examining about 120 others, which, however, were too imperfect to afford hope of success.

From time to time volumes have appeared, giving to the world such relics of ancient philosophy and literature as were recovered from Herculaneum, but they were either so mutilated and fragmentary, or possessed of so little intrinsic merit, that their acquisition has afforded little satisfaction. In addition to the manuscripts published at Oxford, there have been printed some parts of a Latin poem, supposed to be by Rabirius; two books, the second and the eleventh of Epicurus, on Nature; some writings by Polystratus and Matradorus; and several other works of the same Philodemus, whose treatise on music was the first Herculanean manuscript that was published.

These manuscripts, which, with the exception of the Latin poem just mentioned, are all in Greek, are contained in eight splendid folio volumes, that have issued from the Royal Press of Naples at irregular intervals, between the years 1793 and 1844. These volumes contain not only carefully executed fac-similes of the unrolled manuscripts, but also give the conjectural readings of the *lacunæ*, with a translation and copious notes. As a specimen of the Roman characters, we take the following from Paderni:—

N·ALTERIVS·DVLC
DEM·CVRIS·CRVDE

The following from the last column of the Essay on Music, by Philodemus, will serve as a specimen of the Greek manuscripts:—

ΦΙΛΟΔΗΜΟΥ

ΠΕΡΙΜΟΥCΙΚΗ

Δ

ΦΑΙΝΟΝΤΑC ΤΟCΑΥΤΑΤΟΙ
ΝΥΝΕΙΡΗΚΩCΠΡΟCΑΤΙΝ·
ΕΓΚΕΧΕΙΡΗΚΑCΙΔΙΑΤΕΙΝΑΙ
ΜΗΝΑΝΔΕΟΝΤΩCΟ· ΧΑΡΙΝ
ΜΕΝΠΙΘΑΝΟΤ ΤΟCΑΥΤΩΝ

Besides these volumes devoted to the elucidation of the MSS., there is another series descriptive of the antiquities. They are entitled *Le Antichita d'Ercolano,* and, besides descriptive letterpress, give beautiful representations of the paintings, statues, busts, vases, and other works of art found within the buried city. Complete sets of these valuable works may now be found in the principal public libraries of Great Britain.

HERCULES, the Latinized form of Heracles, one of the most famous heroes of the Greek mythology. He was

Hercules || Herder.

the son of Jupiter and the Theban Alcmena, the granddaughter of Perseus; but his reputed father was Amphitryon of Mycenæ, who having accidently killed Electryon, king of that city, was obliged to fly for refuge to Thebes. There Hercules was born and brought up, and there he performed the renowned exploits of his infancy and youth, such as the strangling of the snakes, and the slaughter of the lion of Mount Cithæron. A trick of the goddess Juno condemned the young hero to the service of his kinsman Eurystheus, who, at once jealous and afraid of him, tried to procure his death, by appointing him a series of almost impossible exploits to perform. These, known as the twelve labours of Hercules, need only be recapitulated:—the slaughter of the Nemean lion, the conquest of the Lernæan hydra, the capture of the golden-horned stag of Ceryneia, the combat with the Erymanthian boar, the cleaning of the stables of Augeas, the destruction of the Stymphalian birds, the capture of the Cretan bull, the capture of the carnivorous mares of the Thracian Diomede, the successful theft of the girdle of Hippolyte, queen of the Amazons, the slaughter of Geryon and the capture of his oxen, the finding of the golden apples of the Hesperides, and the fetching up of Cerberus from the lower world. The other numerous exploits of Hercules it is hardly necessary to recapitulate—such as his expedition against Troy, and afterwards against Lacedæmon, his slaughter of the centaur Nessus, and his co-operation with the gods against the giants—or to do more than allude to his self-sought death on the funeral pyre of Mount Œta. The myth of Hercules is regarded by scholars as of purely Greek origin and development; though some of the deeds attributed to the hero have evidently been engrafted on the original story from some Oriental religion. The idea of Hercules, essentially the same in the Roman mythology as in the Greek, is that of force—that physical and mental power which enables men and communities to crush under foot all the obstacles and difficulties which nature and fate throw in their way, as they struggle onwards and upwards to a higher state of existence. (The best accounts of the myth of Hercules are given by Müller in his *Dorians*, and by Buttmann, in his *Mythologus*.)

HERCULES, *Pillars of*. See GIBRALTAR.

HERCYNIA SILVA. See HARZ.

HERDER, JOHANN GOTTFRIED VON, was born in Mohrungen, East Prussia, on the 25th of August 1744. His father, Gottfried Herder, kept in that town a female school, and performed some of the more servile duties connected with public worship in the Polish church. He was an earnest man, with a strong sense of duty, and so relied on for soundness of judgment, that his neighbours were accustomed to repair to him in matters of difficulty and dispute.

Johann received his early education in the town school, which was conducted by a teacher proverbial for his austerity. In school and out of school he was the most diligent of pupils—carrying his books with him wherever he went, and laying them aside with reluctance even at meals. If, in passing through the town, he noticed a book lying in a window, he forthwith borrowed it. When fifteen years of age he was employed as amanuensis by the pastor of Mohrungen. Considering the narrow means of his parents the pastor at first dissuaded him from study. Having chanced, however, to enter Herder's bedroom one night, and finding that the youth had been in the habit of paying nocturnal visits to his library, and occupying himself with the spoils till dawn, he encouraged him in his studies, and gave him exemption from tasks which had been imposed with the view of changing the bent of his inclinations. In this situation Herder continued for several years; and some verses which he here composed drew at the time the attention, and subsequently the patronage of a publisher in Königsberg. In his eighteenth year the surgeon of a Russian regiment which had taken up winter quarters in Mohrungen met him at the pastor's house, and was so favourably impressed with his appearance that he offered to place him at a university, and train him to the medical profession. Herder was accordingly removed to Königsberg, but as a fit of fainting signalized his *début* in the anatomy class-room, the pursuit of medicine was relinquished in favour of the more congenial study of theology. This placed it beyond the power of his patron to render him further assistance; and, left to his own resources, Herder maintained himself during his university course. He devoted the greater part of his attention to classical literature and *belles lettres*, and was permitted by Kant to attend his lectures gratis. In 1763 he became a teacher in the Collegium Fredericianum, and at the close of 1764 removed to Riga, where he had received a call to assist in the cathedral school. He was at the same time licensed to preach, and shortly after (1767) commenced his career as author with the publication of *Fragments on German Literature*. This work attracted the notice of some of the leading minds of Germany. Winckelmann wrote from Rome to Heyne:—"What new Pindar is this that has arisen amongst us?" That same year he received and refused an invitation from Petersburg to the office of rector of the Peter's school there; and the council of Riga presented him to a ministerial charge which they had created on purpose to retain his services. He was ordained, June 10, 1767. He proved an excellent teacher, and was a great favourite with his pupils; and his eloquence and earnestness rendered him as acceptable in the pulpit as he was in the class-room. He left Riga in 1769, and after some time spent, first in travelling, chiefly in France, and then in the office of tutor to the prince of Holstein, accepted the office of court-chaplain in Bükeburg and member of the highest ecclesiastical court. During his residence here he was married. He complains that the Count of Bükeburg and he did not very well understand each other, and that his situation was more nominal than real; for he was a pastor without a flock, minister of education without schools, and head of the chief ecclesiastical court without a court over which to preside.

He received, in 1771, from the Academy of Berlin, the prize offered for the best paper on the *Origin of Language*, and another in 1774 from the same institute, for a paper on the *Causes which vitiate National Taste*. In 1776 he went to Weimar as general-superintendant (an ecclesiastical office), and continued in place there till his death. Enemies had spread reports detrimental to his reputation for eloquence; but his first sermon in Weimar took all hearers by surprise, and established his fame as a pulpit orator. That city was then the residence of Göethe, Wieland, and others of the leading literary men of the day, and afforded him ample opportunities for the prosecution of his plans. He entered with vigour on the duties of his situation, and was again and again invested with new offices, till at length he was at one and the same time chief chaplain in ordinary to the duke, general-superintendent, first minister of the town church, vice-president and virtual president of the highest ecclesiastical court, and ephorus of schools. In spite of obstacles he persevered in the work of reforming schools and improving the condition of schoolmasters, until he had raised the standard and status of education throughout the duke's dominions. Amongst the prizes which he received while here, from various scientific bodies, was a third one from the Academy of Berlin for a paper on the *Influence of Governments upon the Sciences*. He died at Weimar, 18th December 1803.

Herder's own poetical productions are not now rated so high as they were on their first appearance. He is not so much regarded as having added to the poetical literature of his country, as having effected a reformation in literary effort and taste, and in this respect his merits are of the highest order. He entered upon the scene just as that crisis in the history of German literature, known by the name of the "storm and stress," was at its height. For about a century and a half the main current of German poetry, and not a little of its prose, had consisted in bald and spiritless imitations, now of Italian and English, and now of French authorship, according as the one or the other was in the ascendant. The exposure of this state of matters made by the clear and acute criticisms of Lessing, and the thoroughly original and national poetry of Klopstock, conspired at the time to unsettle the minds of the numerous aspirants to poetical fame. They had accompanied Lessing when he showed where poetry was not; they had not patience to follow him as he pointed out where it was. They made a general and indiscriminate rejection of the claims of any existing poetry to respect, and broke loose from the maxims and rules which had been founded upon it. A universal return was to be made to the first starting-point of poetry, and this time she was to keep to the proper path. But as the reformers of poetry had each his own starting-point and his own maxims, the lavish expenditure of earnestness and effort which followed resulted only in a fertile crop of whims and absurdities. At this juncture Herder stepped forward. His fine, steady sense of the beautiful, not easily blunted or beguiled, his ready perception of the presence of genuine feeling, and the vast extent of his literary acquirements, guided him to a generally correct decision as to the true poets of different countries and different times. Though not himself possessed of the philosophic acuteness and comprehensiveness of mind requisite for generalizing the principles of criticism, he could understand and appreciate them when thought out for him; and the productions which approved themselves to his own taste, coincided for the most part with those which could stand the test of the criticism of Lessing. Thus doubly fortified in his views, he prepared for action. He brought in succession, and kept steadily before the eyes of his countrymen, Moses, Homer, Shakspeare, and the old popular singers of his own and other countries; he applied to the productions of these men the principles of criticism which Lessing had evolved; he did all this in a clear, elegant, flowing style, and there was no resisting the influence of such a concentration of light. Men were aroused to a careful and intelligent study of the great models of art, and Herder continued to hold the helm, until the appearance of Schiller's *Robbers* in 1781 announced that the "storm and stress" were fairly weathered.

Of a similar kind is the service which Herder has rendered to philosophy and history. In poetry he restored the old path; here he has opened a new one. The human race, from its commencement up to the present hour, has always been parcelled out into more or less distinctly defined communities, and these communities have varied in numbers, power, wealth, knowledge, and other particulars. It is the office of history to describe the communities which have arisen at different times, the variations or changes which have taken place in their respective conditions, and the leading agents or causes by whom these changes have been effected. History, as thus understood, is simply a record of the experience of the race, and, up to the time of Herder, upon this principle history was written. The new mode of treatment which he introduced consisted in inquiring whether there are any general principles upon which the mass of facts disclosed by history can be explained. Are these facts to be regarded as no more than a series of events connected together by what may be implied in succession in time, or are they the result of a closer, though, perhaps, of a more secret—of an *organic* connection? Herder adopted the latter of these views; he named the science which investigates and unfolds it the *Philosophy of History;* and his own labours in this department are contained in his *Contributions towards the Philosophy of the History of Mankind.*

These *Contributions* constitute the only service of note which Herder rendered to philosophy, but the service was one of great value. A somewhat similar idea seems to have crossed the mind of Vico, but Herder was the first to grasp it firmly and give it a place and rank among the departments of scientific inquiry. He was so much disposed, however, to speculate—to deduce conclusions from illegitimately postulated principles, and so little disposed rigidly to deduce principles from carefully sifted facts, that his own labours in this province are of no permanent value to science, and he has long been distanced by other workers in the field which he had the honour to open. He is, moreover, too frequently inaccurate in matters of detail to be safely relied on. But we do not go to Herder for details. These defects allowed for, the work is a master-piece. To read the impressions which facts, in the main correct, left upon Herder's mind is a brisk mental stimulant; and the book merits the praise implied in the advice of Cousin, "strong men are nourished by strong books; read Herder's *Ideen*."

In the province of theology proper, Herder accomplished nothing. He had made no systematic study of it. He approached Christianity just as he had approached Homer and Shakspeare, and was occupied not so much with the substance of Christian doctrines as with the esthetics of Christian morality. As he gives no evidence of having acquired a deep practical acquaintance with Christianity, or of having made a thorough investigation of its doctrines, he cannot be fairly assigned a place in any of the classes into which those who have done either may be divided. So far as his views went, however, they were substantially Socinian. This is especially true of his later productions. In his earlier writings there is much that is useful, with good feeling and many correct views. Of this kind are his *Oldest Records of the Human Race; Letters on the Study of Theology;* and *Remarks on the New Testament, from recently opened Oriental Sources.* His works on *The Redeemer*, and the *Resurrection of Christ*, contained scarcely anything inconsistent with a chronic Socinianism. His *Letters on Hebrew Poetry* are justly celebrated as an analysis of the æsthetics of the poetical parts of the Old Testament. Herder's works are edited by Julius G. Müller, in 40 vols. 12mo. (H. M. D.)

HEREFORD, the capital of the county of that name, is situated nearly in its centre, on the left bank of the River Wye, which is here crossed by a bridge of six arches. It is of very ancient origin, and was the seat of a bishop's see as early as the year 684, a proof that it had even at that period become a place of importance. Though the city is no longer "one of the largest, fairest, and strongest castles in England," as Leland says, yet the streets, still called after the ancient gates, are remarkable for their straightness, width, and neatness. The chief edifice is the cathedral, built in 1079; it is 325 feet long, by 110 broad. In 1786 a great portion of it fell down, and it is now being restored. The other buildings are the bishop's palace, the county-hall, the county gaol (built on Howard's plan), and the markets. There are five parish churches, but none of them is remarkable for beauty. A column 60 feet high, to the memory of Lord Nelson, stands on the Castlehill, the site of the ancient castle. The city contains some remains of its earlier days—a portion of the castle-keep, one of the six gates, and the walls of some old religious edifices. Owing to its position on the frontier of Wales, Hereford has taken an important part in history. The motto of the city, "Invictæ Fidelitatis Præmium," was given to it by Charles I. as a reward for the support he received from the citizens. Hereford has returned two members of parliament since the 23d of Edward I.; it was incorporated in 1189 by Richard I., and is now governed, under the Municipal Act, by a mayor, six aldermen, and eighteen councillors. Market-days, Wednesday and Saturday. Pop. in 1811, 7306; in 1831, 10,282; and in 1851, 12,108.

HEREFORDSHIRE, an inland county of England, on the borders of South Wales. It is bounded on the N. by Shropshire, N.E. by Worcestershire, N.W. by Radnorshire, W. by Brecknockshire, S. by Monmouthshire, and S.E. by Gloucestershire. The county is circular in shape, indented in some places by spurs of the adjoining counties; and it had several detached parts, but each of these was incorporated by the Act 7th and 8th Will IV. with the county in which it was situated. The greatest length of the county is, from near Ludlow to near Monmouth, 40 miles; and the greatest breadth, from the foot of the Malvern Hills to Clifford, 35 miles. The area of the county, according to the census commission, is 534,823 statute acres. It is divided into 11 hundreds, and 221 parishes; and it is a bishop's see.

The soil of the county is generally a mixture of marl and clay, but contains calcareous earth in various proportions in different parts. Towards the western part, the soil is tenacious, and retentive of water; the eastern side is principally a stiff clay, in some places of a red colour. In the south, some of the soil is a light sandy loam. The subsoil is almost universally limestone; in some parts the old red sandstone, and a species of marble, beautifully variegated with red and white veins, and capable of receiving a high polish. When the soil does not rest on limestone, as near the city of Hereford, it is sometimes a siliceous gravel, and occasionally fuller's earth and yellow ochres are found. The surface is highly picturesque. It may be described as a rich plain, undulating in long ridges, as if it had been rippled by a subterranean convulsion. Coppices of ash and oak clothe the sides of the hills, and fringe their crests; and the low lands are wooded by pear and apple trees, grouped in orchards, and scattered over the fields. Whether in May, when the fruit trees are white with blossom, or in September, when they are laden with yellow fruit, the county deserves its title of "The Garden of England."

The county is purely agricultural, and at the commencement of the century stood second amongst the agricultural counties of England. It produces wheat and barley of fine quality; indeed "Lemster bread" and "Weobly ale," were famous as early as the days of Camden. Hops and cider are among the staple products of the county. The hop vines, unlike the method practised in Kent, are planted in rows, and the soil is ploughed. The orchards are planted in every kind of soil, and without regard to aspect; but it has been ascertained that a western aspect is the least favourable, as the westerly winds, sweeping over the Welsh mountains, bring cold, fog, and what is termed "blue mist." The crops of apples, generally large, is enormous every fourth year, and very often the branches of the trees would break down under the weight of produce, if they were not propped up. As much as twenty hogsheads of cider have been made from a single acre of orchard, but the average yield is twelve hogsheads an acre. Much fine timber is grown in the county, and many a spreading oak which has sheltered and adorned these inland fields, aids in forming the sides of the noble war ships which bear the British flag throughout the world. A large quantity of bark is stripped annually.

Herefordshire is famous for its breed of cattle. The breed is athletic in form, and of a bright-red colour, with white, or mottled faces, and remarkably silky hair. The Hereford cattle produce the finest beef; yet they feed more cheaply than the Devon or Durham cattle. The county was at one time famous for a small white-faced breed of sheep without horns, known as the Rylands sheep, from the district in which they were chiefly bred. The characteristic of the breed was the silky pile and delicate texture of the fleece; but in crossing the Rylands sheep with the Liecesters, to make them more robust, the fleece has been deteriorated. Indeed, the original Ryland breed is nearly extinct, at least in the pure form; it has been succeeded in the upper part of the county by Shropshire downs, and in the lower, by the Cotswolds, with their various crossings. The horses used in the county are generally of a good stamp, especially in the northern part, where they are reared for the saddle and coaching in other parts of the kingdom.

Herefordshire has made great progress in farming during the last twenty years. Turnip and green crop husbandry, with the consequent improved rotation of crops, is now the general practice. The average yield of wheat may be safely estimated at from 28 to 30 bushels an acre, whilst in an important district, of which Ross may be considered the centre, and where the old red sandstone formation predominates, a yield of 40 bushels is by no means extraordinary, and in some instances even 50 bushels have been obtained. The stiff tenacious clay in other parts of the county resists improvement, and has disappointed the hopes of many enterprising agriculturists; but, nevertheless, even in those parts, there is a very marked difference in the results of farming at the present time as compared with those of a quarter of a century ago. Generally speaking, the farming of the county will bear comparison, not indeed with every county, but with England and Scotland as a whole. Many of the breeders of cattle in this county are famous throughout the kingdom for the number, size, and excellence of the animals with which they regularly supply the metropolitan and other markets. Two agricultural exhibitions, and several fairs are held in the year at Hereford, and at each of them the quantity of fine cattle driven in for show and sale, fills every street of the city, and excites the admiration of judges from all parts of the kingdom.

There are no manufactures, properly speaking, within the county. The excellence of the wool has stimulated attempts to make woollen goods at Hereford, but they have failed. Some coarse woollens are made at Leominster and Kington, but the quantity is very small.

The climate of the county is good, though variable. It is more rainy in this county than in the more eastern parts of England, and at times there are damp fogs, which moisten the earth, and may be one cause of its great verdure. We learn from the Registrar-General's report, that diseases of the respiratory organs are unknown in the county, and that it ranks high in point of longevity. Fuller says that in his time, "many aged folk, who in other counties are properties of the chimneys or confined to their beds, are here found active in the fields." An amusing instance of the salubrity of the climate, and the stamina of the people, was given by Sergeant Hoskins when King James I. visited the county; he assembled ten women of the united age of 1000 years, who danced the morrice dance for the entertainment of his Majesty.

The rivers of the county are the Ledden, the Lugg, the Arrow, the Frome, and the Wye. The Ledden rises at Hadlow and flows by Ledbury into the Severn near Gloucester. The Lugg rises in Radnorshire, enters the county on the N.W., and flows by Leominster and Hereford into the Wye near Mordiford. The Arrow also rises in Radnorshire and flows by Kington and Monkland into the Lugg. The Frome rises in the N.E. of the county, and also flows into the Lugg at Mordiford. The far-famed Wye—"thou wanderer through the woods"—enters the county near Clifford Castle, the birth-place of Fair Rosamond, flows by Hereford and Ross, and traverses in many a bold and silvery curl the whole breadth of the county. Though all the other streams, except the Ledden, are tributaries of the Wye, it is for all practical purposes an inconsiderable river. Its sinuosities have created sandbanks and rapids, and it is liable to sudden floods, owing to the large and mountainous surface which it drains. The Wye is navigated by barges within this county; these are towed by men whose efforts in the difficult parts of the stream are painfully laborious. Attempts have been made to substitute horses for men, but the latter have successfully resisted the innovation, content to labour as mere beasts of burthen. The Wye is famous for its salmon; and in former times, the fish were so abundant that the apprentices of Hereford were protected by a special clause in their indentures, from being compelled to eat salmon more than twice a-week. The clause is quite unnecessary now, Wye salmon, owing to its scarcity, having become a delicacy even at the tables of the rich. The Wye, as we have already stated, is imperfectly navigable; but when moderately swollen by rain, heavily laden barges are tracked up, or shoot down with the current. The Lugg is also navigated by barges between Mordiford and Lugwardine-bridge, a short distance. The remaining means of inland navigation consist of a canal from Hereford to the Severn near Gloucester; and another canal from Leominster to the Severn at Stourport. Hereford is the terminus of three lines of railway, one connecting it with Shrewsbury, Gloucester, and Newport, on the Bristol Channel; and another line to Worcester is projected.

The earliest known inhabitants of Herefordshire were the Silures. Under Caractacus, the Silures resisted the Romans so obstinately, that the Emperor Claudius commanded that a war of extermination should be made against them. The Silures were the last people of Britain who submitted to the Saxons. The Danes sailed up the Wye in the year 912, and seized the Bishop of St David's, who then resided at Archenfield; and King Edward paid L.40 (a great sum in those days) for the bishop's ransom. The Normans conquered the county without much difficulty, and colonized it in order to repel the incursions of the Welsh. For many centuries Herefordshire was separated from Wales by a tract of land called the Marches, a kind of debateable ground, alternately possessed by the English and Welsh, but at length incorporated with the county in the reign of Henry VIII. In the wars of the Roses, Herefordshire took up arms for the House of York; and an army of 25,000 men, raised in the county, totally defeated the forces of Edward VI. at Mortimer's Cross, near Leominster. During the battle three suns appeared in the sky, a rare phenomenon in this country, though common in the Alps and other mountains; and in consequence, Mortimer took a sun for his crest. In the Parliamentary struggle Hereford sided with the king, and was thrice besieged; twice it surrendered to the Parliamentarians, but it resisted the Scotch.

The antiquities of the county are numerous and highly interesting. A line of Roman and British entrenchments extends from the Malvern Hills to Conwall Knoll. A British earthwork of great strength is known as the Herefordshire beacon. Offa's Dyke, a great ditch 100 miles long, may still be traced in many parts of the county. It was cut by Offa the Saxon, to check the incursions of the Welsh, who had continually harassed the kingdom of Mercia, of which Herefordshire formed a part. The Roman road called Watling Street traverses the county from Leintwardine to Longtown, thence passing into Monmouthshire; a second Roman road enters the county from Gloucester at Ross; and a third enters the county from Worcester near Frome and terminates at Kenchester. Several of the baronial castles, with which the county was thickly studded in earlier times, still exist in a ruined state; chief amongst them are Bredwardine, Clifford, and Goodrich. There are also some remains of the stately ecclesiastical edifices which formerly adorned the county, but the work of destruction has been so thoroughly done, that their ruins exhibit few features of interest.

According to the religious census of 1851, there were in the county 426 places of worship, having in all 69,575 sittings. Of these places of worship, 243 were Church of England, 20 Independent, 16 Baptist, 120 Methodist, and 5 Roman Catholic. The educational census gives 489 public day-schools, with 41,295 scholars; and 794 private day-schools, with 14,923 scholars.

The population was, in 1821, 336,190; in 1831, 387,398; in 1841, 431,495; and in 1851, 458,805. This is a sparse population as compared with that of the adjoining counties.

Herefordshire is represented in parliament by seven members—three returned by the county, two by the city of Hereford, and two by the borough of Leominster.

The towns of the county are Hereford, Leominster, Ledbury, Ross, Bromyard, and Weobly. The towns in Herefordshire are generally worse built than in any other English county, and more nearly approach to those of their adjoining Welsh neighbours. In the villages the buildings are still worse. (F. C.)

HERENCIA, a town of Spain, province of La Mancha, is the centre of a prosperous and fertile district. The soap which is manufactured on an extensive scale in the town is highly celebrated, and is exported in great quantities to all parts of the world. Pop. 7150.

HERESY. It is not our intention under this head to discuss the character and tendency of heresy as an ecclesiastical question, nor to give an account of the several forms of belief which have from time to time been denounced as heresies. The more conspicuous and important of these will be found under the several titles which they bear in ecclesiastical history. The object of the present article is merely to give a brief notice of the civil effect which has generally been given to that departure from established modes of faith to which the term applies. It never included infidels or persons professing a different religion from the Christian, such as Jews or Mohammedans. These were dealt with by separate laws. True to its etymological origin (ἁιρεσίς, choice or selection), heresy was the offence of those who, professing to be Christians, used the right of private judgment, and chose their own form of Christianity, instead of conforming to the declared will of the Church. From the days of Constantine downwards, the imperial power treated any departure from the imperial established religion as a public nuisance which must be suppressed. The fifth title of the first book of the Justinian code contains a series of the laws so passed from time to time against heretics described as people who, at the instigation of conceit or waywardness, set up doctrines for themselves, and endeavour to break free from the control of the Catholic Church. The offence was punished by the secular arm as an interruption of the imperial policy, and a disturbance of the public peace. As the companion of catholic unity, the arrangement was one of perfect theoretical simplicity. The general councils established the doctrines of the Church, and those who preached or taught against them were guilty of a public offence, for which they were punished by death or some minor infliction, according to the severity or leniency of the criminal code of each country. But even during the professed continuance of catholic unity, this simplicity was more theoretical than practical. The early councils were enabled, it is true, to draw a broad line of demarcation between the belief of the church and the doctrines of certain heretical sects, because the condemnation of these sects was sometimes the chief business discussed by the council, and the triumphant majority clearly defined the opinions which they repudiated. But in later times when the voice of general councils was no longer so specifically announced, and the Catholic Church, spread over all Europe, was influenced by national habits and institutions, the opinions which constituted heresy fluctuated according to local conditions. Hence, independently of the conflicts connected with the great question of preserving the Catholic Church from the large innovations of the reformers, minor heresies sprung up according to local conditions and conventionalities, creating that long array of secondary persecutions with which the annals of Christendom are unfortunately crowded. In the countries which adopted the Reformation, even the name of a catholic unity from which it was a crime to secede, no longer existed. Yet if we except some imperfect glimmerings of the principle of toleration in Britain, Holland, and a part of Germany, it seems never to have been thought of, even by the reforming communities, that the state was no longer to punish as a crime all divergence from the mode of faith established by the preponderating power. In France, where after a long conflict, the edict of Nantes established Protestantism side by side with Catholicism, neither party acknowledged the principle of toleration, and the Huguenots were no less jealous than their opponents in preserving their ranks from the taint of heresy. The arrangement was in fact a treaty between two hostile powers occupying the same soil; and like two armies which agree to suspend warlike operations, each kept its own ranks in discipline, and punished desertion.

In looking on heresy as a sort of offence against the public peace, the continental states generally permitted the ecclesiastical judicatories acting under the canon law to fix its character, and even dictate its punishment. The feeling of the feudal princes on the subject is characteristically expressed in a constitution of the Emperor Frederick I., which decrees that, if the temporal lord, when duly admonished and warned by the Church, shall neglect to purge his territory of heretics, his feif shall be forfeited and pass into the hands of faithful followers of the Church, that they may free it from pollution. In England no effect was in the general case given to either the canon or the civil law in the shape of punishment; and heresy, like other offences, was the creature of statute. By an act of the 5th of Richard II., passed in 1382, commissions were issued for the apprehension and imprisonment of such as were certified by the prelates to be preachers of heresy, with their favourers, maintainers, and abettors. It is singular that Mr Hallam mentions this statute as one of those instances where the commons complain that a law was passed by the crown without their consent (*Mid. Ages*, pt. iii., chap. 8). The 2d of Henry IV., passed in 1400, is the earliest act which condemns heretics to be burned. It has been remarked, that it is drawn up in Latin, while the other acts of the same session are in French, and that it is a precise echo of a petition by the prelates and clergy;—hence it may be inferred, that while it was the practice in general for the crown to pass acts on the petition of parliament, this particular act was granted on the application of the Church. Notwithstanding the jealousy with which the English law protected the subject from penalties not authorized by parliament, it has always been maintained that the writ for burning a heretic, *de hæretico comburendo*, was issued, on application by the proper ecclesiastical authority, by the sole prerogative of the crown; and lawyers have been in use to observe apologetically, that the writ was not issued as of course, but required the special authority of the king in council (Blackstone, b. iv., chap. 4). There is, however, some reason to believe, that the writ is no older than the act of Henry IV., and thus has its origin in statute (see notes on the statute in Tomlyn's edition). Several other cruel acts against heresy were subsequently passed, but the climax both of severity and confusion was reached by the act 31st of Henry VIII., "for abolishing of diversity of opinion," which established the six articles of faith so well known in history, and appointed death by burning as the punishment of transgressing the first, and death in the ordinary penal form, as the punishment for transgressing any of the others. The celebrated first act of Elizabeth, abolishing the authority of the see of Rome in England, did not mitigate the punishment of heresy, but enacted, that no opinion should be punished as heresy, unless it had been "heretofore determined, ordered, and adjudged to be heresy by the authority of the canonical Scriptures," or was so determined by one of the four first general councils, or by parliament, with the consent of convocation. The law by which heretics were liable to be put to death by burning, was not abolished until the year 1676 (29th Car. II., c. 9).

Much interest has lately been created in England by the question, how far the Established Church can exclude clergymen, adjudged by ecclesiastical authority to be maintainers of heretical doctrines, from ecclesiastical rank and emoluments? In Scotland the right of the judicatories of the establishment to depose a minister for heresy or any other purely ecclesiastical offence is not doubted; and the courts of law have only interfered with proceedings of this nature, when it has been maintained that they were not founded on strictly ecclesiastical grounds, but were held for the purpose of accomplishing some ulterior object. In England the supremacy of the crown has enabled the temporal power to consider the ecclesiastical grounds on which any effort to affect the right to the temporalities of the Church has been based; and the discontinuance of the convocation, by withdrawing corporate action from the prevalent majority in the Church, has decidedly favoured this limitation of the powers of ecclesiastical judicatories. In the instance known as the Gorham case, decided in 1850, the Bishop of Exeter refused, on account of what he counted heretical opinions, to institute to the vicarage of Bramford-Speke, the Rev. G. C. Gorham, presented by the crown. The bishop's refusal was confirmed by the Dean of the Arches Court of Canterbury. Mr Gorham appealed to the Queen in council; and the judicial committee of the privy council entering into the whole question, whether the presentee's opinions justified the bishop's refusal to institute, decided as a court of law in favour of Mr Gorham. (J. H. B.)

HERETOCH (Saxon, *here*, an army, and *togen* to lead), a name applied in Saxon times to those who were elected by the folkmote, or "full assembly" of the people to conduct the armies of the kingdom.

HERFORD, or Hervorden, a walled town in Prussian Westphalia, capital of the circle of Minden, at the confluence of the Werra and Aa, 16 miles S.W. of Minden. It has six churches, a gymnasium, industrial school, arsenal, prison, and museum for Westphalian arts and antiquities. Its manufactures comprise cotton and cotton-yarn; also linen, leather, tobacco, and ale. Pop. (1849) 6756.

HERIOT, in *Law*, a customary tribute of goods and chattels payable to the lord of the fee on the decease of the owner of the land. See Copyhold.

HERISAU, a town in Switzerland, capital of Ausser-Rhoden, at the confluence of the Glatt and Brülhbach, 7 miles N.W. of Appenzell, 2334 feet above the sea-level. The town is very irregularly built. The church tower is the oldest building in the canton, and is supposed to have been built in the 7th century. The archives are kept in this tower. Herisau has a public library, court-house, arsenal, and an orphan asylum. The neighbouring heights, two of which are crowned with the ruined castles of Schwanberg and Rosenberg, afford beautiful walks. It has important cotton, muslin, and silk manufactories, and carries on an extensive trade. The baths of Heinrichsbad are a mile distant. Pop. 2700.

HERMANN, Johann Jakob Gottfried, a celebrated Greek scholar of Germany, was born at Leipzig, November 28, 1772. He studied law and philosophy at Leipzig and Jena. In 1794, he began his course of lectures on ancient literature in Leipzig, was made professor of eloquence in 1798, and of poetry in 1809. He died in 1848.

Though destined for the study of law, yet, under Professors Ilgen, Beck, and Ernesti, he acquired the predilection for classic literature which afterwards rendered him famous. He set himself to revise thoroughly the classic metres and the Greek grammar. In the prosecution of this task he published a great many editions of classic authors. The principles which he entertained regarding the classic metres, were published in his work *De metris poetarum Græcorum et Romanorum* in 1796; and in his *Handbuch der Metrik* in 1799. These were drawn up in a more complete form in his *Elementæ doctrinæ metricæ* in 1816, of which his *Epitome*, &c., appeared in 1818.

He extended his literary reform to the study of the Greek grammar and his work *De emendendâ ratione Græcæ grammaticæ*, was published in 1801. As this treated of accentuation and the analysis of letters, Hermann gave his views on syntax in the shape of notes, and extensive additions to Vigier's work *De præcipuis Græcæ dictionis idiotismis.* He has been accused of viewing the ancient classics too exclusively from the stand-points of grammar and criticism; still his views, both medical and grammatical, have been extensively adopted throughout Europe.

His editions of the classics are:—Æschylus and Euripides, complete with Latin notes, 1798. The *Eumenides* of Æschylus and *Clouds* of Aristophanes, with introduction, commentary, and scholia, 1799. *Hecuba* of Euripides, with the notes of Porson and Wakefield as well as his own; and the *Trinummus* of Plautus, in 1800. The *Poetics* of Aristotle, with Latin translation, commentary, and disquisitions, in 1802. The *Hymns* of Orpheus in 1805, and those ascribed to Homer in 1816. The *Hercules Furens* of Euripides, 1810. The *Suppliants* of Euripides in 1811. The *Medea* of Euripides, 1822. The *Alcestis* of Euripides in 1823. The unfinished edition of *Sophocles* by Erfurdt, was completed by Hermann in 7 vols. in 1825. The *Ion* of Euripides in 1827. The *Opuscula* of Hermann, begun in 1827, is a collection in 6 vols., of literary and scientific articles from German publications.

HERMANNSTADT (the Hungarian *Nagy-Szeben*, the Wallachian *Szibin*, the Roman *Cibinium*), a town of Hungary, capital of Saxon-land, in Transylvania, on the Zibin, near the Wallachian frontier, 72 miles S.E. of Klausenburgh; N. Lat. 45. 47.; E. Long. 24. 10. It is the seat of the highest tribunal in the province, the residence of the governor, the see of a Greek bishop, and head-quarters of the military commandant of Transylvania. The town, surrounded by a double wall and deep ditch, has five gates, and is divided into two parts, the upper and lower. The connexion between the two is kept up by flights of stone steps. The old citadel stands in the upper town. The houses are Gothic, and regularly built, and the streets, though narrow, are clean. It has a square in which are a fountain and statue. The important buildings are,—the Brückenthal palace, which contains a public library of 15,000 vols., picture gallery, and museums of medals and antiquities; the Lutheran cathedral, Gothic town-hall, barracks, hospital, and numerous churches. In the Lutheran gymnasium, divinity, law, and philosophy are studied. The manufactures of Hermannstadt are linen and woollen stuffs, hats, leather, and ropes. It has also paper and powder mills; but its trade has declined. The Carpathian Mountains in the vicinity afford fine views. Pop. 20,000.

HERMAPHRODITE (Ἑρμης *Mercury*, and Ἀφροδιτη, *Venus*), a term applied to a human being possessed of the characteristic organs of both sexes. In the human subject, one or other of the organs is rudimentary. Amongst the *invertebrata* hermaphroditism is a reality, and occurs most frequently in the mollusca and radiata. In vegetable life it is the normal condition. A flower is termed hermaphrodite when it contains stamens and pistils within the same calyx and petals. See Botany.

HERMAS, one of the Christians to whom Paul addresses a salutation in the end of his Epistle to the Romans. By some he is regarded as the author of an apocryphal book called the *Shepherd*, from having been dictated to the writer by an angel in pastoral dress. With the exception of a few fragments in the original Greek, this work exists only in a Latin version. In the very earliest ages its canonicity was regarded with suspicion; but from its taint of superstition and absurdity, it is wonderful that it should ever have been received with approbation. It is to be found in editions of the Apostolic Fathers, and has been translated by Archbishop Wake. The authorship of the book is by others attributed to a brother of the Roman Bishop Pius (A.D. 140), or to one of the seventy-two disciples who is said to have been bishop of Philippopolis.

HERMENEUTICS, the science of exposition, generally applied as a theological term to the exposition of Scripture.

HERMES and Hermæa. See Mercury.

HERMETICAL SEALING, a manner of completely closing glass vessels, for chemical operations, by heating the neck of the vessel in the flame of a lamp till it be ready to melt, and then twisting it close.

HERMIANI, also called Seleuciani, a sect of heretics in Galatia, who held the corporeality of God, and the creation of souls by the angels from water and fire. They rejected baptism, and regarded immortality as simply the transmigration of the souls of the dead into the bodies of the newly-born.

HERMIT, or Eremite (ἐρημος, a desert), one who lives in a desert, or passes his life in solitude. Hermits were distinguished from anachorets or anchorets, in that the former ranged at liberty abroad in the world, while the latter isolated themselves, not only from the abodes of other men, but from the cells of similar devotees. Thus, a hermitage was, in ancient times, often surrounded by a *laura*, or collection of isolated cells where the anchorets lived alone.

HERMOGENES, an African painter, who in the second century projected a system of mingled Stoicism and Christianity. One of his pupils was Seleucus, the joint founder of the Hermiani mentioned above.

Hermogenes, *Tarsensis*, an eminent Greek rhetorician, born at Tarsus about the middle of the second century A.D. He was surnamed *Xyster*, from the great value which he attached to *polishing* in composition. While only about fifteen years of age he attracted the attention of the Emperor Aurelius, and became professor of rhetoric at Rome. His brilliant career was terminated at the early age of twenty-five, not by death, but by a weakening of his faculties, which reduced him very nearly to the condition of an idiot. In this state he lived to an advanced age. His great work on rhetoric is divided into five parts:—1. Rhetoric as applied in the courts of justice. 2. The conduct of a discourse as to introduction, plan, argument, &c. 3. On style. 4. Hints for the practical application of the rules relating to style. 5. The use of models in rhetoric. The last, in the abridged form, was translated into Latin by Priscian.

This work of Hermogenes became popular in the schools; many commentaries and abridgments were made of it, but it maintained its ground till supplanted by the abridgment of Aphthonius. The original work was well illustrated by examples from the best writers; and though traces of the youthfulness of the author are discernable, yet it is temperate, perspicuous, and free of conceits. His other works have perished.

HERMON, a mountain belonging to Anti-Libanus, and forming the northern boundary of the country conquered by the Hebrews from the Amorites. It is the Sirion of the Sidonians, the Shenir of the Amorites, the Jebel Es-skeikh or Old Man's Mountain of the present day. It is considered the highest of the Lebanon range, and the snow is perpetual, at least in the ravines, though sometimes even in midsummer the upper part is quite covered with snow. Some have imagined, from certain passages in Scripture, that there must have been another Hermon near Tabor, but this is improbable.

HERMOPOLIS MAGNA (now *Eshmoon* or *Ashmouncm*), a city of Heptanomis or Middle Egypt, on the left bank of the Nile, in N. Lat. 27. 50., E. Long. 30. 53. Owing to its frontier position with reference to Middle and Upper Egypt, the ancient Hermopolis was a place of importance, second only to Thebes. The portico, still remaining, of a magnificent temple has attracted the notice of travellers. It consists of twelve pillars, each 40 feet high, in two rows of six to each row, painted with bands of blue, red, and yellow. These pillars are composed of irregular masses fitted together—a peculiarity of extremely rare occurrence in Egyptian architecture. The ruins of Hermopolis have been greatly destroyed by the Mohammedans, who have used them for building purposes.

HERMUS, now the SARABAT or KEDOUS, in *Ancient Geography*, a river of Asia Minor, which, rising among the hills that separated Phrygia from Lydia, flowed due E. through the latter country, which it divided into two nearly equal parts, and fell into the Gulf of Smyrna. On its northern bank it received the Hyllus, and on its southern the Pactolus, both of which tributaries, like the river itself, were often celebrated by the poets of antiquity. In fact, all these streams derive their chief importance from their poetical associations.

HERNE BAY, a village in the county of Kent, 8 miles N.N.E. of Canterbury, on the estuary of the Thames. It has recently come to be much frequented as a bathing place, and as a consequence, hotels, villas, assembly rooms, libraries, &c., are rapidly springing up. It has a pier upwards of three quarters of a mile in length, which forms a pleasant promenade. Pop. of parish (1851), 3094.

HERNIA, from ἔρνος, a branch, is a term applied to several surgical complaints, of which the characteristic symptom is that a part of one of the organs of the body protrudes through some aperture. Hence when the brain protrudes through an aperture in the skull it is styled a *hernia cerebri.* Most commonly, however, the term is limited to a protrusion of the bowels through some aperture in their containing walls, the integument still remaining entire; and though this protrusion may occur at almost any part of the abdomen, it does so most frequently through those apertures which naturally exist for the transmission of vessels. These natural apertures are the umbilicus, and the inguinal and femoral canals. Hence hernia tumours which occupy these apertures are named umbilical, inguinal, and femoral herniæ. As herniæ, when not congenital, are generally the result of violent exertions, as from lifting heavy weights, leaping, violent fits of coughing, &c., and the patient at the moment experiences a sensation as if some part of the bowels had been ruptured, the disease in common language is significantly styled a *rupture.* In all cases the bowel pushes before it a portion of the peritoneum, the smooth membrane which lines the cavity of the abdomen, and this membrane constitutes the *sac* of the hernia.

Umbilical hernia is almost always congenital, or makes its appearance shortly after birth. If there be no malformation, and means are used to reduce the protrusion and prevent its recurrence, a cure of this form of hernia may in general be easily effected, as the aperture through which the protrusion occurs has a natural tendency to become obliterated. But if means be neglected in infancy the complaint remains for life. A halfpenny or a slice of cork enveloped in chamois leather, and fixed over the umbilicus by means of a broad strap of adhesive plaster, after the hernia is reduced, is the best mode of treating the complaint. A conical compress, recommended by many, is objectionable, as it tends to prevent the natural obliteration of the aperture, and is apt to render the complaint permanent.

Inguinal Hernia. The vessels of the testicle in the male, and the round ligament in the female, proceed through the parietes of the abdomen at the groin in an oblique canal about 2½ inches in length. This canal has consequently an upper aperture or *ring*, where the vessels enter it, and a lower *ring*, where the vessels leave it. These two points, then, are probably the weakest parts of the walls of the abdomen; and on any unusual strain a knot of bowel or of omentum is apt to be forced either into the upper aperture and down the course of the vessels, or directly through the lower or external ring, where the vessels leave the canal. If the tumour remains small, and is confined to the groin, it is termed a bubonocele; but if large, as it usually is when congenital or of long duration, and distends the scrotum or labium, it is termed a scrotal or pudendal hernia. Inguinal hernia is often congenital in the male, in consequence of the aperture not having become obliterated through which the testicle descended to the scrotum; and from the much larger size of the inguinal canal in the male this form of hernia is very much more common among males than among females.

Femoral Hernia is constituted by the viscera protruding through the space between the femoral vessels and the crescentic margin of the crural arch. In consequence of the breadth of the female pelvis, and the consequently larger size of the femoral aperture, this form of hernia is much more common in females than in males.

All the forms of hernia are met with in three states:—1st, *Reducible*, in which the tumour may be pressed back into the abdomen, when it disappears with a gurgling noise. 2d, *Incarcerated*, in which the viscera have contracted adhesion to the sac, and cannot be pressed back into the abdomen, but the person suffers no particular uneasiness. 3d, *Strangulated*, in which the viscera in the hernial tumour are subjected to such an amount of constriction that their functions are impeded, when violent and dangerous symptoms arise, which, unless speedily relieved, end in mortification and death. All forms of hernia are apt, from special causes, to end in strangulation; hence the existence of hernia is always looked on with suspicion, as rendering life more than usually hazardous.

When a hernia occurs the person should be laid in the horizontal position, and pressure should be so applied to the tumour as to induce its return to the cavity of the abdomen. The effect of this external and scientific application of pressure—the *taxis*—is frequently aided by warm baths, blood-letting, the administration of tartar emetic, or tobacco enemata, with the view of inducing relaxation of the ring which prevents the return of the bowel, or of inducing collapse of the protruded bowel. Ice and ether are also sometimes applied over the tumour with the same view. If the taxis fails, and urgent symptoms arise, as constant vomiting, redness, swelling, and excessive pain in the tumour, high fever, &c., a surgical operation is required to relieve the strangulation, else rapid mortification of the tumour may occur, and death ensue within a few hours. In all cases, after the hernia is reduced, a pad with a bandage, or *truss*, must be applied and constantly worn, that by pressing on the aperture through which the bowel descended a recurrence of the protrusion may be prevented. (J. S—K.)

HERNICI, an inland tribe of Italy, apparently of Sabine origin, inhabiting that part of Latium which was bounded on the N. by the Æqui and on the S. by the Volsci. They seem to have been at first on friendly terms with Rome, but after the great Gallic invasion they joined the Æqui and Volsci against their former friends. Their rebellion was at first successful, but their capital, Ferentinum, at length fell into the hands of the foe, and they were compelled to acknowledge the Roman supremacy. They obtained, however, such favourable terms that in the general rebellion of the Latins, B.C. 340, they remained faithful to their allegiance. At the end of that same century they again appear in arms against Rome, but there was no unity of action among them, and they were easily subdued. Such of their cities as had refused to countenance this rebellion were allowed to retain their own laws and magistrates. Anagnia and the other towns that had held out were presented with the honorary civitas of Rome, and reduced to the condition of præfecture. After this date the Hernici disappear from the political history of Italy. Their chief towns, besides Anagnia, were Ferentinum, Verulæ, Aratrium, and perhaps Trebia. The country of the Hernici, lying along the upper course of the Trerus (now the Sacco), is described by Virgil as the *Roscida rivis Hernica Saxa.* Besides being well watered with countless streams, it contained magnificent woods of chestnut and oak trees, making it in all one of the most picturesque and delightful nooks of the Apennine range.

HERNOSAND or **Wester Norrland**, a län of Sweden, lying chiefly between N. Lat. 62. and 64. and E. Long. 15. and 19., and bounded on the N. by Umea, W. by Ostersund, S. by Gefle, and E. by the Gulf of Bothnia. Its greatest length along the coast is about 140 miles, and its breadth varies from about 20 to 100. Area about 9500 square miles. Hernosand presents an extremely varied surface. Its elevations, frequently steep and rocky, and generally for the most part covered with trees, its deep and narrow valleys, with rapid and winding rivers, and its fine mountain lakes, all conspire to render it superior to most if not to all the other läns in Sweden. The chief products, besides corn, which is scantily grown, are deals, tar, and some iron. The principal branch of industry is the manufacture of linen, which is extensively carried on, the spinning being done by both sexes during the long winter nights. The rearing of cattle receives some attention. Pop. (1850) 99,558.

Hernosand, the capital of the above län, stands on the W. side of the island of Hernön, at the mouth of the Angerman River, but connected with the mainland by a bridge. It is the see of a bishop, and has a gymnasium, library, public baths, and building docks. The harbour is excellent, and a considerable trade is carried on. Pop. about 2200.

HERO. The story of Hero and Leander is one of the best known in the whole mythology of Greece. The myth, in its simplest form, is as follows :—Hero was a priestess in the service of Venus at Sestos, and her lover, Leander of Abydos, used nightly to swim across the strait of the Hellespont to pay his court to her. One stormy night he was drowned, and in the morning the billows washed his body ashore to the feet of his betrothed, who, when she saw it, threw herself into the sea, and perished by the same fate as her lover.

Hero. This term was of somewhat indiscriminate application. It was applied to those who were partly of human, partly of divine origin, or to men who did illustrious actions for the benefit of mankind. Homer applies it to the whole of the Grecian army, and sometimes to individual heralds. The warriors who took part in celebrated sieges and battles, such as Troy and Marathon, were called heroes. Etymologically, the word indicates the possession of extraordinary strength and courage, and is supposed to be connected with the Latin *Vir*, and the German *Herr*. This points naturally to the leadership or mastery which results from the possession of superior courage and strength. It is said that this etymology can be traced in the designation of the body from which sprang the military adventurers of the Lombards. In the same way the primitive heroes may have been the leaders who particularly distinguished themselves amongst the wandering hordes who sought new settlements in different parts of Greece. The heroic age is variously estimated at six centuries between 1800–1200 B.C., or six generations terminating at the same epoch, that is, about the time of the Trojan War. The heroic age was certainly past when Hesiod wrote.

In after times the reverence with which the heroes were regarded assumed the form of worship. The national vanity and the martial poetry of the Greeks were directly favourable to the posthumous fame of the heroes. Raised above the rank of mortals, the next step was to admit heroes to a participation with the nature of the gods. Elevated thus far, they were naturally considered as still exerting a powerful influence over the destiny of mortals. Hence splendid temples and costly monuments were built in honour of them, and propitiatory sacrifices offered to them. The canonization and worship of saints in later times affords an obvious analogy to the case of the classic heroes.

HEROD THE GREAT, the second son of Antipater of Idumæa, was made governor of Galilee at an early age, and effectually repressed the depredations of the bands of robbers by which the country was infested. Tried for executing Jewish citizens without legal trial, he confronted the Sanhedrim with an armed retinue, himself clothed in purple. He was made governor of Cœle-Syria by Sex. Cæsar, in which he was fully confirmed by Cassius. Felix and Antigonus attempted to drive him from power, but they were defeated, B.C. 41 ; Antony arrived in Syria, and Herod obtained his favour by costly presents. Favoured also by the venerable Hyrcanus, Herod, and Phasaël his brother, seemed established in power. Next year, however, Pacorus the Parthian, favouring the pretensions of Antigonus to the throne of Judæa, and encouraged by the discontent on account of the Roman exactions, led an army against Herod and Phasaël. Herod escaped, and being refused assistance from the king of Arabia, he hastened to Alexandria, whence he embarked for Rome. Here, through his influence with Antony, he was made king of Judæa, and set out under Roman auspices to wage war against Antigonus, his rival to the Jewish throne. After three years of vigorous warfare he regained possession of Jerusalem, B.C. 37. Summary executions were now the readiest means of getting possession of great wealth, and with this wealth he kept on good terms with Antony. So great was his power with the Romans that he made head against all the influence of Cleopatra, who cast a longing eye on Judæa, and who had used her influence with Antony to get that kingdom annexed to Egypt. Such was his address that, after the power of Antony was wrecked at Actium, Herod boldly went to Rhodes to meet Augustus, and expatiated upon the steadiness of his attachment to Antony. The scheme succeeded. Augustus established him on the throne of Judæa, and annexed several other places to his kingdom. He thus reached the summit of power in spite of busy enemies and deeply-seated unpopularity. His rival, Antigonus, as a representative of the Asmonæan line, had been the favourite of the people. When he regained possession of Jerusalem, he had executed almost every member of the Sanhedrim, besides others of distinction. Having put Antigonus to death, the high priesthood devolved upon Aristobulus, his wife Mariamne's brother, but he gave it to Ananel. Finding it politic, however, to reinstate Aristobulus, and then becoming jealous of his popularity, he had him secretly assassinated. Fearing he might fall by the snares of his enemies when he went to meet Augustus at Rhodes, he left orders that, in that case, Mariamne should be put to death. He had done the same on a former occasion, when he went to meet Antony, and in both cases the fact was divulged to Mariamne. At the instigation of his mother and sister, Mariamne was tried for adultery, and executed by his order. Notwithstanding the barbarous conduct which he thus exhibited, it was the strange fate of this monster to be passionately attached to Mariamne. The consequence was that after her death he became sullen, ferocious, and a greater terror to all near him than he had ever been before. Remorse acting on such a character brought on something like insanity, and a violent fever seemed as if the world were soon to be rid of him. *Herod's Lament for Mariamne* forms the subject of one of Byron's *Hebrew Melodies.* Upon his recovery, Alexandra, Mariamne's mother, and several others, were put to death.

Secure in the favour of Augustus and Agrippa, Herod did many things to render himself still more odious to the

Jews. He rebuilt Samaria and called it Sebaste, in honour of Augustus. He built a seaport, to which he gave the name of Cæsarea. He built a theatre in Jerusalem itself, and an amphitheatre beyond the walls, in which Roman shows of gladiators and wild animals took place. After an attempt made to assassinate him, he fortified Jerusalem, so as to render himself secure against popular outbreaks. Amongst the strongholds thus erected were Antonia and Hyrcania, the latter being used as a prison. Notwithstanding his generally oppressive government he made some attempts to ingratiate himself with the people. During a famine he distributed immense quantities of corn throughout the whole country, and more especially he undertook to rebuild with great splendour the temple at Jerusalem.

The closing years of Herod's life present a dark history of family discords, intrigues, jealousies, poisonings, and assassinations. He had two wives, of whom the most celebrated is Mariamne. Two of her sons, Alexander and Aristobulus, after having been educated at Rome, returned to Jerusalem, where they were in high favour both with their father Herod and the populace. However, Antipater, another son of Herod, by Doris, planned their ruin, and, after several unsuccessful accusations of conspiracy, the two sons of Mariamne were executed. Antipater himself engaged in a conspiracy, which being detected he was executed. Very shortly before the close of his life Herod ordered the massacre of the infants at Bethlehem. He was carried off by an excruciating internal malady in the 70th year of his age, after having been king of Judæa for nearly 40 years.

Herod, *Agrippa*. See Agrippa.

Herod, *Antipas*. See Antipas.

HERODIANS, a sect among the Jews, concerning whose origin and tenets very various opinions have been expressed. It is most probable that they were a political party who favoured the claims of Herod Antipas to the title of king. These *royalists* are in the New Testament generally opposed to the Pharisees or hierarchical party who struggled for the theocratic independence of the Jewish nation.

HERODIANUS, the last Greek historian of any note who wrote before the partition of the Roman empire. The date and place of his birth are unknown, but he flourished in the first half of the third century of the Christian era, and seems to have spent most of his life at Rome. His history, which is divided into eight books, embraces the interval between the death of Aurelius Antoninus, A.D. 180, to the accession of the younger Gordian, A.D. 238—comprising the reigns of Commodus, Pertinax, Julian, Niger and Albinus, Severus, Caracalla and Geta, Macrinus, Elagabalus, Alexander Severus, Maximin, the two Gordians, and Balbinus. This period, it will be seen, was one of the deepest historic interest from the frequent changes of emperors, the bloody wars, both foreign and domestic, the reckless struggles for power, the court intrigues, and the gradual decay of the old Roman empire before the inroads of the northern barbarians. Herodian's work, while it makes no pretensions either to critical views of history or to deep philosophy, yet bears an aspect of truthfulness and honesty, and embodies many details which would otherwise have infallibly perished. The best editions of Herodian are those of Irmisch, Leipzig, 1789; and Bekker, Berlin, 1826. Of the German translations the best are those of Gunradi, Frankfort, 1784; and Osiander, Stuttgardt, 1830.

HERODOTUS, the "Father of History," and the earliest of the Greek historians properly so called, was a native of Halicarnassus, a Doric colony of Caria, which at the time of his birth was ruled over by Artemisia, the heroine of Salamis. The date of his birth, once a subject of much dispute, is now fixed at B.C. 484, and few other incidents of his life are so well determined. A scanty notice of him by Suidas, and occasional allusions in his own works, are the materials from which his biographers have to construct his life. From these we learn that his family was one of noble rank in Halicarnassus, that his father's name was Cyxas, and his mother's Dryo, and that the famous epic poet Sanyasis was his uncle. On reaching manhood he found his native city enthralled by the tyrant Lygdamis, the grandson of Artemisia, and in disgust he retired to the island of Samos, where, besides learning the Ionian dialect, in which his history is written, he concerted measures for the emancipation of his birthplace. These measures were successful, but in the struggle which next ensued between the aristocratic and popular parties, Herodotus saw fit to leave his native town altogether. He is believed to have then joined a colony which the Athenians were sending out to Thurii on the Tarentine Gulf in Southern Italy, B.C. 445. Whether the historian joined the colony in that year or at a later period, as is sometimes affirmed, certain it is that he died at Thurii and was buried in the market-place of the town. The tradition of his having died at Pella in Macedonia is so ill-authenticated that it is needless to waste time refuting it. The exact date of his death is unknown, but he was alive in B.C. 408, being then in his seventy-eighth year, which it is probable that he did not long survive. Herodotus appears before posterity in the twofold character of traveller and historian; but the traveller is so subordinated to the historian as to be only called in at rare intervals to testify to the truth of some extraordinary statement. It is of course impossible from these slight hints to lay down a plan of his travels in strict chronological order. Yet modern scholarship has proved that he derived the greater part of the materials of his history from personal observation of the countries which he describes. With everything included under the general head of Hellas he was as familiar as with his native town; in many individual cities, such as Athens, Thebes, and Corinth, he is known to have spent a very considerable time. He also visited most of the Greek islands, as well those in the Ionian as in the Ægean Sea; all the colonies in Asia Minor; the whole circumference of the Black Sea, Scythia, and Thrace. In Asia he penetrated as far as Babylon, visiting also Ecbatana and Susa, besides making a special pilgrimage to Tyre to investigate the worship of Hercules. His account of Egypt, though a mere episode, is the best that antiquity has transmitted to us. Entering that country from the Mediterranean, he penetrated as far as Elephantine, its most southerly point. He then turned his face towards the west, and it is known that in this direction he reached Cyrene, though it is not improbable that he may even have visited Carthage. His taste for travel does not seem to have left him in his old age, for after finally settling at Thurii he travelled through the southern portion of the Italian peninsula, and some parts of Sicily. The fact that he visited all these countries is sufficient proof of his having visited many more; but his admiration for Greece and its laws and liberty remained unshaken to the last.

At what period of his life his travels were undertaken, is, like most of the other facts of his life, a matter of dispute. It is most likely that they were begun soon after his voluntary exile from his native city, and that they extended over the whole interval between that date and his fixing his residence at Thurii. Equally uncertain is the period of his life in which he reduced the results of these travels and observations into a comprehensive history. A story is told by Lucian, apparently in jest, that Herodotus read his "History," in its finished form to the assembled Greeks at Olympia, B.C. 456; that among his hearers was Thucydides, then a lad of fifteen, who was melted to tears by the recitation, and that the audience were so enchanted by the whole performance, that they called the nine books, into which the work was divided, by the names of the Nine Muses. Now, in that year the historian was only thirty-two years of age, and the work not only bears the marks of a matured and practised writer, but actual allusions to events which only took place many years after this date. Dahlmann, however, in his *Herodot, aus seinem Buche sein Leben*, proves beyond a doubt that the story is a mere figment of Lucian, and incapable of defence. Equally preposterous is the tradition that he read his work at Athens at the Panathenaic festival, B.C. 445, and that there existed among the archives of that city a decree awarding the historian ten talents as a token of national admiration for his genius. The preservation of this story is due to Plutarch, who records it in his essay on the *Malignity of Herodotus*. The general drift of this composition is to prove that Herodotus had been bribed by the Athenians. But the real ground of the Theban essayist's dislike to the panegyrists of Athens is that he recorded with the stern severity of truth the poltroonery of the Theban policy during the Persian War. Both these stories may therefore be safely dismissed as quite unworthy of attention.

The great work of Herodotus, which is divided into nine books, called by the names of the Nine Muses, is a history of the Greeks and their relations towards each other, and towards the foreign powers with which they came in contact, from the fall of Sardes before the victorious arms of Persia, B.C. 546, to the taking of Sestos, B.C. 478. To weld into one harmonious whole the different parts of so complex a subject, to order the march of events so that the story advances from a beginning to an end with the precision of a well-planned drama, to manœuvre the episodes and minute details so as to make them tell on the general result without impeding or interfering with it—such seems to have been the author's aim, and he has hit his mark so truly that Colonel Mure pronounces the *History of Herodotus* to be, next to the *Iliad* and *Odyssey*, the greatest effort of Greek literary genius. "The one," he says, "is the perfection of epic poetry, the other the perfection of epic prose. Were it not for the influence which the prior existence of so noble a model, even in a different branch of composition, has evidently exercised on the historian, his title to the palm of original invention might rival that of his poetical predecessor. In the complexity of the plan of his history, as compared with the simplicity of the execution; in the multiplicity and heterogeneous nature of its materials, and in the harmony of their combination; in the grandeur of its historical masses, and the minuteness, often triviality, of its illustrative details, it remains not only without equal, but without rival or parallel in the literature of Greece or of Europe." So great, indeed, is the entire work, that it has been left to posterity fully to appreciate it, and assign to its author his place among historians. It quite transcended the sphere of the small wits of Herodotus' day, who called his marvellous stories the tales of a traveller, little anticipating that after-ages as they rolled on would only confirm the truth and accuracy of the narrative in which they only found subject for laughter, and would acknowledge with one accord that without the history of Herodotus the annals of Greece would be an unintelligible blank.

The history of Herodotus having been written at a period when poetry had ceased to be the common vehicle of thought, and the art of writing prose had not yet been perfected, bears marks of this transition epoch. The logic of composition is not always observed, and many ill-compacted sentences might easily be pointed out. But there are few writers in any tongue in whom such slips are so easily pardoned or so thoroughly redeemed. Both in his style and his vein of sentiment there is a freshness which never fails, and which often rises to the poetical. Whatever the subject under treatment may be, it is sure to be invested with an interest which prevents the most fastidious of readers from feeling ennui. No chronicle of Froissart, or romance of Sir Walter Scott, was ever more interesting than the history of Herodotus. No traveller ever possessed in a higher degree than he the power of sifting what he observed, of preserving what was valuable, and rejecting what was silly or useless. This power he shows even in what many regarded as his weak point—his superstition. He always bows the head before what seems to him the saving element in the religious observances of the various peoples whom he describes. But though he is careful never to laugh at the monstrous absurdities with which these rites were sometimes accompanied, he always makes it plain that he saw through them. "The charm of Herodotus," says Dahlmann, "lies in that child-like simplicity of heart, which is ever the companion of an incorruptible love of truth, and that happy and winning style which cannot be attained by any art or pathetic excitement, and is found only where manners are true to nature; for while other pleasing discourses of men roll on like torrents, and noisily hurry through their short existence, the silver stream of his words flows on without concern, sure of its immortal source, everywhere pure and transparent, whether it be shallow or deep; and the fear of ridicule, which sways the whole world, affects not the sublime simplicity of his mind."

The literature of Herodotus is very extensive and important. The first edition of the Greek text was published by Aldus, Venice, 1502. A great advance on this was the edition of Henry Stephens, Paris, 1570. The next of any considerable value was that of Gronovius, Leyden, 1715; which was in its turn eclipsed by that of Wesseling and Walckenaer, Amst., 1763. Perhaps the best edition of this class, however, is that of Schweighaüser (Strasbourg, 1816), who has also published a very correct but rather meagre *Lexicon Herodoteum*. Next comes the edition of Gaisford, Oxford, 1824; a very careful work, but making comparatively little advance on its last German predecessor. The last edition is that of Bähr, Leipzig, 4 vols. 8vo, 1830. The best school editions are those of Matthiæ, Bekker, and George Long. On the geography of Herodotus valuable treatises have been written by Rennell, B. G. Niebuhr, Dahlmann, and Heyse. The best translations of Herodotus into modern tongues are those L'Archer, and Lange—the former into French, and the latter into German. There are several English translations, such as those of Beloe, Taylor, Cary, and others, but none which do any justice either to the spirit or the form of the original.

HERON, a mathematician and natural philosopher of Alexandria, was the pupil of Ctesibius, and flourished B.C. 284–221. His name has been preserved in the well-known experiment of Hero's Fountain, in which, by means of condensed air, water is made to spring from a jet in a continuous stream. The loss of some of Heron's works is matter of much regret. In those that survive mention is made of a steam-engine which seems to have been set in motion exactly on the principle of what is popularly known as *Barker's Mill*. It is only recently, however, that Heron's claims have found an advocate, and it is expected that further researches will bring to light results in the meantime quite unlooked for. (See Heron, by Augustus de Morgan, in Smith's *Dict. of Biog.*) Heron's most valuable work is that on *Pneumatics*, in which are given his experiments on the elasticity of the air and of steam. Besides his *Pneumatics* may be mentioned his *Barulcus*, an essay on the lifting of heavy weights; his essay on the *Construction of Automata*; his *Chiroballistra*, and his *Belipœica*, which treat of the artillery of the ancients; and a fragment on *Dioptrics*. Most of these works are to be found in the *Mathematici Veteres*, Paris, 1693.

Heron, called *the younger*, to distinguish him from his namesake of Alexandria, was, like him, a mathematician and natural philosopher. His birthplace, or even his country, is quite unknown, and even his *floruit* is only guessed to have been contemporaneous with that of the Emperor

Heraclius, A.D. 610–641. The writings assigned to this Heron are a treatise on *Geodæsia*, or practical geometry; another on the *Terms of Geometry;* and some works on various military matters, such as *The Attack and Defence of Towns;* the *Machines of War*. Some of these works appear in the *Mathematici Veteres;* others are printed separately; and some are still in MS.

HERON. See index to ORNITHOLOGY.

HERPETOLOGY, the natural history of reptiles. See REPTILIA.

HERRERA TORDESILLAS, ANTONIO DE, a Spanish historian, the son of Roderigo de Tordesillas and Agnes de Herrera (it being the custom of that country to bear the mother's name), was born in 1565. He was at first secretary to Vespasian de Gonzaga, viceroy of Naples, but was afterwards appointed historiographer of the Indies by Philip II., who granted him a liberal pension. Whilst he held this office he wrote his *General History of the Indies from* 1492 *to* 1554, in four volumes folio. Of all the Spanish authors, Herrera is the one who has given the most exact and circumstantial recital of the conquest of Mexico, and the other events in America. Hence, to use the words of Dr Robertson, his work "furnishes the fullest and most accurate information concerning the conquest of Mexico, as well as every other transaction of America. The industry and attention with which he consulted, not only the books, but the original and public records, were so great, and he usually judges of the evidence before him with so much impartiality and candour, that his decades may be ranked among the most judicious and useful historical collections." His death, which happened at Madrid on the 29th of March 1625, prevented him from occupying the office of secretary of state, to which Philip IV. had just raised him.

Besides the work above-mentioned, Herrera wrote in Spanish—1. Description of the West Indies, Madrid, 1601, in folio; 2. History of what passed in England and in Scotland during the forty-four years of the life of Mary Stuart, queen of Scotland, Lisbon, 1590, in 12mo; 3. Five books of the History of Portugal, and the conquest of the Açores in the years 1581 and 1583, Madrid, 1591, in 4to; 4. History of the affairs of France from the year 1585 until the end of the year 1594, Madrid, 1598, in 4to; 5. History of the World under the reign of Philip II. from the year 1584 until the year 1598, Valladolid, 1606, in three vols. folio; 6. Historical Treatise, Relation, and Discourse, of the Movements which took place in Aragon in the years 1591 and 1592, in 4to; 7. Commentary on the Proceedings of the Spaniards, the French, and the Venetians, in Italy, from the year 1285 until the year 1559, Madrid, 1624, in folio.

HERRERA, *Ferdinand de*, a Spanish poet of the sixteenth century, was born at Seville about the year 1516. He was thoroughly conversant with the Greek, Latin, Italian, and French languages, and also passed for a profound theologian; but he applied himself, in preference, to poetry, and was the first of the four Spanish poets who obtained the surname of divine. Although he had taken holy orders at the age of thirty, all his verses are addressed to a distinguished lady of Andalusia, whom he celebrates under various names; but his love was as pure and platonic as that of Petrarch, whom he endeavoured to imitate, in following the footsteps of Boscan and Garcilaso. Herrera died in his native place about the year 1595. The collection of his poetry—entitled *Obras de Herrera*, Seville, 1619—contains sonnets, songs, lyrics, and elegies, full of spirit, grace, and expression; but his style is at times deficient in correctness. Herrera was also the author of—1. *Relacion de la Guerra de Cypre y batalla de Lepanto*, Seville, 1572; 2. *Vida y Muerte de Thomas Moro*, ibid., 1592, translated from the Latin of Stapleton; 3. An edition of the *Poems of Garcilaso de la Vega*, with interesting notes, Seville, 1580, in 8vo.

HERRICK, ROBERT, a popular English poet, was born in London, August 20th, 1591. He was of an ancient and considerable family in Leicestershire. For centuries the Herricks had possessed the manors of Stretton and Houghton-on-the-Hill; and, settling in the town of Leicester at the beginning of the reign of Henry VIII., they gave a succession of mayors and parliamentary representatives to the borough. The literary honours of the race were not confined to the author of the *Hesperides;* from a branch of the same family was descended the mother of Dean Swift. Nicholas Herrick, the poet's father, being a younger son, removed to London, and commenced business in Cheapside as a goldsmith and banker. He died in 1592, leaving five children, of whom Robert was the fourth. Robert was indebted for a learned education to a rich uncle, Sir William Herrick, a man of abilities and address, who held offices of trust under Elizabeth and James, and was knighted in 1605. Sir William entered his nephew as a fellow-commoner of St John's College, Cambridge, in 1613. The latter afterwards removed to Trinity Hall, intending to study law; but he seems to have soon abandoned this intention, and, taking his degree of M.A., was presented by Charles I. to the vicarage of Dean Prior, near Totness, in Devonshire. Herrick was then thirty-eight years of age. He was probably known as a poet, and he had been a guest at the lyric feasts of Ben Jonson—

> "Made at the Sun,
> The Dog and Triple Tun,
> Where we such clusters had
> As made us nobly wild, not mad."

Such a brilliant town life was not fitted to recommend that of a poor vicar in a remote country parish, and Herrick appears to have been disgusted with "dull Devonshire," and with his parishioners, whom he describes as rude savages, "churlish as the seas." Even the rocky and picturesque scenery of the place comes in for a share of his vituperation. He admits, however, that he wrote his best poetry there, and much of it is devoted to praise of a country life. He paints in lively colours the charms of the rural May-day, village wakes, the harvest-home and Christmas revels, the herd whistling at the plough, the meadow enamelled with cowslips, and the autumn wain laden with its nodding sheaves. He solaced himself also by framing poetical posies for a string of imaginary beauties—his Julia, Anthea, Corinna, Electra, &c.; but Philips says he was "not particularly influenced by any nymph or goddess, except his maid Prue." Indeed, it is easy to see that in these curious and passionless love verses Herrick merely copied the fashionable style of poetic gallantry which had been common among the amatory and cavalier poets from the time of Lyly, Lodge, and others of the elegant Elizabethan versifiers. His praise of his housemaid Prue—

> "Jocund his muse was, but his life was chaste"—

was probably sincere. She had stayed with him, he says, till he had grown old, after all the summer birds had flown; and though "the grange" or parsonage at Dean Prior was humble enough (not even boasting a clock, to tell how night drew on), he and Prue were content with their humble Epicurean privacy, living on "their own," and having no fear of landlord or usurer to disturb their slumbers. The small establishment, however, was broken up by the storms of the Civil War. The Long Parliament ejected Herrick from his vicarage, and he flew, ravished in spirit, as he tells us, from loathed Devonshire to London, "the blest place of his nativity." Here, however, he found fresh cause for discontent and grief. He was reduced to depend solely on the generosity of his relatives and that of his brothers in misfortune, the cavaliers. He published his poems; his *Noble Numbers* in 1647, and his *Hesperides, or Works Humane and Divine*, in 1648. He mixed with the wits and poets of the time. Ben Jonson was gone, but he numbered among his friends Charles Cotton (a congenial spirit), the learned Selden, Sir John Denham, and Henry Lawes, who set some of his pieces to music, as he had previously done the lyrics in Milton's *Comus*. To all of these, and to most of the royalist nobles, Herrick addressed encomiastic verses. His works he dedicated to "the most illustrious and *most hopeful* Prince Charles," afterwards Charles II. His loyalty and sufferings merited reward when the Restoration came, but nothing better was done for Herrick than restoring him to his vicarage in Devonshire, which was probably welcome to him as a quiet retreat, for he was then bordering upon seventy. He lived fourteen more years; and the parish register of Dean Prior records that "Robert Herrick, vicker," was buried on the 15th of October 1674.

The works of Herrick have been often reprinted, both in an entire and a selected form. They consist of a multitude of small pieces classified under various heads—as pastoral and descriptive, amatory odes, aphorisms, anacreontic and bacchanalian, moral and pathetic, &c. His best inspiration, like that of Anacreon, sprung from wine, beauty, and flowers. He is often indelicate—gross in taste rather than licentious, and has many puerile and ridiculous conceits. He sometimes steals from his contemporaries. One short poem is servilely copied from a beautiful lyric in Ben Jonson's *Epicœne;* another is taken from Suckling; and there are imitations of Raleigh and others. He has no poem so fine as Cowley's *Chronicle* or *Grasshopper*, or Suckling's *Wedding;* and the exquisite snatches of verse, so full of classic grace and polish, scattered through Jonson's masques and plays, are of a higher mood than anything in Herrick. Perhaps in rural description he must also yield to another Devonshire poet of that period—Browne, author of *Britannia's Pastorals.* But Herrick's airy voluptuous style is decidedly original. His gaiety was of the heart, and was irrepressible. Some of his lyrics are so melodious as scarcely to require the aid of music to be sung; and his best pieces—as *Gather ye Rose-buds while ye may; Cherry Ripe; To Blossoms;* the *Parliament of Roses* (he has fairly exhausted the vocabulary of roses and kisses); *To Anthea, who may command him*, &c.—are of the real essence of poetry, unsurpassed for delicacy of sentiment and refined gallantry. (R. C—S.)

HERRING, in *Ichthyology*, a species of CLUPEA. See FISHERIES, and ICHTHYOLOGY.

HERRNHUT, a town of Saxony, circle of Bautzen, and 18 miles S.E. of the town of that name, on the Löbau and Zittau Railway. It was founded in 1722 by a colony of Moravians, who, having been driven by persecution from their homes, found an asylum here with Count Zinzendorf; and hence the Moravians are on the Continent generally styled *Herrnhüter.* It is still considered the chief seat of that body. Pop. about 1200.

HERSCHEL, SIR WILLIAM. See Sixth Preliminary DISSERTATION.

HERSFELD, a town of Hesse-Cassel, province of Fulda, on the left bank of the River Fulda, and 23 miles N. of the town of that name. It has several handsome churches, a reformed gymnasium, and a trade school. The chief manufactures are woollens and leather. Pop. 7000.

HERSTAT, a town of the Netherlands, in the province of Liège, on the left bank of the Meuse. It is a place in which there are very large iron works, and near to it is abundance of coals. It contains 4710 inhabitants, chiefly employed in making ironmongery.

HERTFORD, the capital of the county of Hertford, which is so called after it according to the Saxon custom. It is situated in a sheltered valley, on the River Lea, and, though of ancient origin, is now a neat, clean, and well built town. Hertford, pronounced Har'ford, is most probably a corruption of *Here*ford, or army ford, as it is situated near a ford of the River Lea, and it is also spelt Hereford by Saxon authorities, and in some monastic charters. Hertford is supposed to have been a principal residence of the East Saxon kings; and a castle, of which some relics still exist, was built here in 909 by Edward the Elder, to defend it from the Danes, who more than once ascended the River Lea and attacked it. In later times it was the scene of many historic events. The revolted barons, headed by the dauphin of France, captured Hertford Castle in the reign of King John. Edward III. made it the occasional prison of John II. King of France, and David King of Scotland. The court was several times held here, amongst others by Henry Duke of Lancaster, after the deposition of Richard II.; Henry VI., and Queen Elizabeth. Hertford is a corporate town by prescription; the earliest charter in existence is one granted by Elizabeth, but it recites that the place has been a borough from time immemorial. It is now governed by a mayor, four aldermen, and twelve councillors, and its boundaries have been enlarged by the Municipal Act to an extent of eight miles. Hertford returns two members to parliament, and is the assize town of the county. The shire hall is situated over the corn-market. The other public buildings are—the county jail and house of correction; two churches, All Saints and St Andrews; a town-hall; and an edifice built on the site of the ancient castle in the reign of James I. or Charles I., as a preparatory school to the East India Company's College at Haileybury. There is also a preparatory school for Christ's Hospital, located at Hertford in a spacious building. Boys are sent to it prior to being drafted into the school in London, while the girls admitted remain until their superannuation. The inmates usually number nearly 500, of whom four-fifths are boys. Hertford has also a free grammar school for thirty-six boys; a green-coat school for forty-five boys, the children of poor parents, who have never received alms; and the usual national and dissenting schools. It is a thriving town. A large quantity of malt is made here for the London breweries, and much wheat and wool is sent to the metropolis in exchange for coal, manure, and general commodities. The corn-market, held at Hertford on Saturdays, is one of the largest in the kingdom. The population was, in 1831, 5615; in 1841, 5911; and in 1851, 6605.

HERTFORDSHIRE, an inland county of England, bounded on the N. by Cambridgeshire, N. W. by Bedfordshire, E. by Essex, S. by Middlesex, and S.W. by Buckinghamshire. It is divided into eight hundreds, and 134 parishes, and has an area of 611 square miles, or 391,141 statute acres.

The level surface of the county is broken by gentle undulations, which in some parts form a quick succession of hills and valleys. The summit of Kensworth Hill, on the borders of Beds, the highest hill in the county, is 909 feet above the level of the sea. The county is rich in natural advantages. In early times, we are told by Camden, its ledges of hills yielded shelter, its woods fuel and building material, and its rich valleys, grassy bottoms, and teeming rivers furnished food, thus meeting half way the wants of its uncivilized inhabitants. "Its sweet, clear, and very beautiful air," says a later writer, "led many of our kings to build palaces in the county for their own residence, as well as for the training of their children." The London physicians sent patients there to prolong life when their skill was ineffectual, and the noble and wealthy built mansions, so that the county became subdivided into a large number of small estates, and the competition for land was so keen that it was a common saying, "He who buys a house in Hertfordshire pays two years' purchase for the air." The aspect of the county is pleasant and picturesque. Fine oak and other trees are grown in the hedges for fuel, and being interwoven by "plashing" their branches and stems, that is, by cutting them obliquely, so that they grow into each other, they form high walls of living timber, shading narrow winding lanes. The arable and pasture lands of the farms are intermingled with the parks and ornamental woods of the country seats, which, "mantled deep in leaf," are scattered thickly through the county. These features, varied occasionally by rivers, impart a peculiar beauty to the county, while in luxuriance it is not surpassed by any other county in England.

Geologically, the county forms part of the London chalk basin. The subsoil in almost every part is calcareous, and consists of two species, one of pure white chalk, the other of a softer kind, mixed with portions of whitish clay, and locally known as *marme*. The chalk substratum chiefly influences the nature of the soil in the northern district; clay prevails on the Essex and Middlesex borders, and in some parts it is highly tenacious and retentive of moisture. There are also some sandy loams mixed with gravel or clay. The vales traversed by rivers and streams exhibit in the bottoms a rich sandy loam; the sloping sides are covered by loams of inferior quality, and the flat surface of the high ground is generally formed of a loam of reddish hue tending towards common clay, with which it is often confounded. Arthur Young estimates that the county contains 46,720 acres of chalk, 90,240 of clay, 142,720 of loam, 5120 of rich loam, and 17,280 of rich gravel. From this it would appear that clay and loam are the prevailing soils.

The rivers of Hertfordshire are the Lea, which rises near Luton in Beds, enters the county at Hidemill, flows by Hertford, where it becomes navigable, and falls into the Thames a little below London, having received in its course the Rib, the Stort, the Quin, the Beane, the Maran, and the Kime; the Stort, which rises in Essex, and divides that county from Hertfordshire, until it falls into the Lea at Hoddesden; the Colne, which rises in Middlesex, passes through the western part of the county, and falls into the Thames at Brentford, receiving the Bulborne and the Ver or Meuse; the Gade, which rises on the borders of Bucks, and falls into the Colne near Rickmansworth; and the Ivel, a river composed of the inferior streams of the Oughton, Iliz, and Pirral, which passes into Beds, and reaches the German Ocean. The artificial stream, the New River, formed to supply the metropolis with fresh water, has its source in some springs near Ware, and running parallel to the Lea for many miles, obtains copious supplies from that stream. The Grand Junction Canal, extending from London to Birmingham, also traverses the county, passing by Watford and Berkhampstead. The Great Northern and Eastern Counties Railways furnish nearly all its towns with communication.

The main produce of Hertfordshire is corn; and the wheat grown at Wheathempsted, on the River Lea, is so fine that it has given a name to the district. The average produce for the whole county is—of wheat, 22 bushels per acre, oats 22 bushels, and barley 32 bushels, though on some highly cultivated farms the yield has been largely increased. Turnips were first introduced into this county in the time of Oliver Cromwell, who gave L.100 to the farmer for his enterprise; a large quantity is still grown. Artificial grasses have been sown to a large extent. There is indeed little natural pasture land. There are some very rich pastures on the banks of the River Stort, extending from Hertford to Hockeril, on the borders of the River Lea, and also near Rickmansworth, where they are watered by the River Colne. The whole of the meadow land might be greatly improved by irrigation, but the streams of water are so valuable for driving mills employed in grinding malt and flour for London, that little is applied to improve agriculture. In the S.W. part of the county large quantities of cherries and apples are grown; the former is the least valuable crop, as the fruit will not bear carriage so well as apples, and it is also inferior in quality to Kent produce, with which it has to compete in the London market. Each cherry-tree is usually allowed nine square perches of land; and the orchards, whether of cherries or apples, are generally four or five acres in extent. On the best soils nearest to London culinary vegetables are forced by the aid of rich manure, and more than one crop is sometimes obtained in the same year. The vicinity of London, in truth, stimulates production by creating a demand for it. The chalk found below the surface, abundantly laid on, greatly improves the heavy lands, while fertility is imparted by the rich manure brought from London in the barges which have conveyed the produce of the county thither. Soot, peat ashes, burnt bones, hair, and woollen rags are used for manure amongst more ordinary substances, while the sheep-fold and farm-yard dung is employed as universally as in other parts of the kingdom. The common system of cultivation is the five course—viz., turnips or fallow, barley, clover, wheat, oats. Naked fallows are very much adopted. Not only are the farms in this county small, but the ownership of the land is also much divided. There are fewer large proprietors than in other counties. The average extent of the farms is about 200 acres; and as this is a corn-growing county the quantity of stock kept upon them is small. Generally speaking there are about 100 ewes and six or eight cows on each farm. The calves are fattened, and the dairy produce sold as butter; the lambs are either fattened or sold as stores. The straw is sold, and soot purchased in its place. Six horses work the farm, and plough three in a line. Not much attention is paid to the breeds of animals, though amongst cows the Suffolk race is preferred, and amongst sheep the Southdown and Wiltshire kinds, and a cross between the Cotswolds and Leicester. The horses generally employed in agriculture are Suffolk punches, and large tracts of land are cultivated with clover and tares for their sustenance, as well as that of sheep and cows. An interesting laboratory of agricultural chemistry has been established near St Albans by a private individual, in which experiments on the nature and adaptation of manures are made on an extensive scale.

The principal trade of the county is in corn and malt, of which large supplies are sent to the metropolis, the transit being facilitated by the water communication which it possesses. Silk and cotton were at one time largely manufactured in the county, but of late years straw-plait has been the chief industrial pursuit. Lace-making and silk-throwing have all but ceased to exist.

Nothing certain is known respecting the tribes who inhabited the district before the Roman invasion. It is supposed, however, that it belonged to the Cassi or Catieuchlani, and that Cassivellaunus was their chief when the Romans destroyed Verulam, its principal city. It is thought that Hertfordshire was the scene of the struggle carried on by Caractacus; and it is certain that Verulam was captured, and its inhabitants massacred after the revolt of Queen Boadicea. When the Saxons subjugated the island, Hertfordshire was divided, and formed parts of the kingdoms of Essex and Mercia. In the year 896 the Danes ascended the River Lea as far as Hertford; but Alfred the Great, who then reigned, adroitly diverted the waters of the river, and compelled the freebooters to abandon their vessels, and seek safety by retreating across the island to the Severn. After the battle of Hastings, William the Conqueror attempted to pass through the county, but Fretheric, abbot of St Albans, who was of the Saxon royal blood, at the head of a confederacy of chiefs, stopped the Normans at Berkhampstead by throwing trees across the roads; and having threatened to raise Edward Atheling to the throne, William the Conqueror was induced to swear that he would govern according to the ancient laws of the realm—an oath which he did not scruple to break on becoming more powerful than those who imposed it. During the civil war of King John, the revolted barons, under the French dauphin, captured Hertford, the capital of the county. In the year 1455, during the wars of the Roses, Henry the Sixth was taken prisoner by the Yorkists, in a battle fought near St Albans; and in 1461 he was rescued in a second battle fought there, in which the Lancasterians were victorious. Hertfordshire was in later times the scene of an exploit which gave indications of the spirit and resolution of Oliver Cromwell. The High Sheriff of the county was proceeding to St Albans for the purpose of proclaiming, by order of King Charles the First, that all the parliamentary commanders were rebels and traitors, when Cromwell did not hesitate to arrest this high official, though at the time he was himself only a simple captain of his own troop of horse.

"There is scarce one county in England," says Camden, "can show more footsteps of antiquity." The Romans had several stations in Hertfordshire, amongst which were Verulamium or Verulam, and Durocobrivis; and traces still remain of the great Roman roads, the Watling Street, the Ichnield Way, and the Ermin Street, which traversed the county. St Albans Abbey is a noble pile, 600 feet long, and 200 broad, founded in 303, in honour of the first Christian martyr of Britain; it was much injured in Cromwell's days, and every style of Gothic architecture has been incorporated in the edifice. One side of the gateway is now a house of correction; the other is a petty jail. The famous cross at Waltham, erected to mark the spot where rested the body of Eleanor, Queen of Edward I., on its way to Westminster for interment, is now beautifully restored. The other antiquities of the county are the massive ruins of Berkhampstead Castle, and those of Bishop's Stortfort, Anstey, and Hertford; Roystone church and cave; the churches of Kingslangley, Baldock, and Hitchen; the remains of Gorhambury Abbey, Wymondsbury Priory, and some minor ruins.

The annual value of real property assessed in the property-tax 1850–1 was L.870,179. Pop. (1831) 142,844; (1841), 156,666; (1851), 167,298. In 1851 there were in the county 347 places of worship, with 95,585 sittings. Of these places of worship 162 belonged to the Church of England, 66 to Methodists of different kinds, 47 to Independents, 44 to Baptists, 7 to Quakers, and 4 to Roman Catholics. There were 236 Sunday schools, with 20,584 scholars; and 554 day-schools, with 23,373 scholars. Of the latter, 244, with 17,507 scholars, were public, and 310, with 5866 scholars, were private day-schools. The county returns three members to parliament, and Hertford two. St Albans returned two members to parliament till disfranchised in 1852, for corruption and bribery. (F. C.)

HERTHA, or HERTHUS, a great deity of the ancient Germans. Her name is doubtless the root of the modern English *earth*, and the German *Erde*, over which part of the world she was believed to preside. Tacitus in his *Germania*, states that she was worshipped with great solemnity by the Suevi, and that her temple stood in an island of the ocean, where her service was performed by a single priest. On great occasions, regulated by this priest, the covered chariot of the goddess was drawn forth from the sanctuary by the sacred cows and led in triumph throughout the country. Those districts was held to be peculiarly favoured through which the chariot passed; arms were laid aside; peace was proclaimed, and the time was spent in universal merry-making, till the priest declared that it was the will of the goddess to return to her shrine. Her image was then washed in a sacred spring; and as all who witnessed the ceremony of the ablution were drowned, the rites of the goddess Hertha were always associated in the minds of the vulgar with feelings of the most reverential awe. The island of Rügen was long regarded as being the sacred island of Hertha, but the honour has also been claimed for Heligoland and Zetland. Recent researches avail no further than to limit the choice to one of the Danish islands. The whole subject of Hertha and her worship is fully discussed by Grimm in his *German Mythology*.

HERULI, a nomad and warlike German tribe who made their appearance in various and widely separate parts of the Roman empire. They first occur in history on the northern shores of the Black Sea. Under the reign of Valentinian, they are associated with the Batavi as allies of the Romans against the Alemanni. They occur also in Britain. When Attila, king of the Huns, made his descent upon Western Europe, he was joined, amongst other tribes, by the Heruli, who subsequently, however, helped to destroy the power of the Huns. But the most memorable event in the history of this tribe was their overthrowing the Roman empire, A.D. 476. Their leader, at this time, was Odoacer, who is called King. Shortly subsequent to this, the Heruli established themselves into a more permanent body, near the banks of the Danube. Here they became a powerful nation, and the Ostrogoths sought their assistance against the Franks. Amongst the tribes which the Heruli had reduced to subjection, shortly after their establishment near the Danube, were the Longobardi, who succeeded in throwing off the Herulian yoke in the beginning of the sixth century. Of the dispersed Heruli, some proceeded to Scandinavia, and others got a settlement in Pannonia. These latter were troublesome neighbours to the western emperors. In Justinian's time they embraced Christianity. Under Todasius, a large party of them joined the Gepidæ in the wars against the Eastern empire, so that the Heruli fought against each other. As a warlike nation they were bold and hardy, and as being perpetually in motion, the helpless, whether from age or sickness, were put to death or left to perish.

HERVEY, JAMES, the author of the *Meditations among the Tombs*, was born in 1714 at Hardingstone, and educated at the grammar school of Northampton, whence in 1731, he passed to Lincoln College, Oxford. At that university he became deeply imbued with the views of the Methodists then struggling into influence and notice; and though he never openly identified himself with their sect, yet the whole tenor of his life was in strict accordance with their views. Entering the English church in 1740 as curate of Biddeford, in Devonshire, he was three years later appointed to succeed his father in the living of Weston Favell in Northampton, to which he afterwards added those of Weston and Collingtree. In this sphere he wrought with the disinterested zeal and fervour of an apostle, sacrificing his health, and finally his life, in the duties of the good cause. He died of consumption brought on by overwork, December 25, 1758. His works, which are numerous, and all on religious subjects, long enjoyed a popularity quite out of proportion to their deserts. His literary merits are very small; and even his *Meditations among the Tombs*, his best work, is so viciously rhetorical, tasteless and diffuse, that it is matter of wonder how it still finds admirers or even readers. Of his other works may be mentioned his *Contemplations on the Night and Starry Heavens; Theron and Aspasio, a Series of Dialogues on the most important Subjects;* and his *Letters*, published in 1811, which illustrate his amiable character and the whole history of his life.

HERVEY, *John*, Lord, the *Sporus* and *Lord Fanny* of Pope's satire, a nobleman of political and social distinction in the reign of George II. He was son of the first Earl of Bristol, and born in 1696. Educated and trained for public life, he became a favourite at the court of the prince and princess (afterwards George II. and Queen Caroline), to which Pope, Gay, Arbuthnot, Chesterfield, and other wits resorted, and which was celebrated for the beauty and accomplishments of its ladies—as Miss Bellenden (afterwards Duchess of Argyle), Miss Howe, Miss Lepell, and Mrs Howard, names which will live for ever in the poetry of Pope, Gay, and Swift, and in the lively memoirs and correspondence of that brilliant circle. Hervey was married to Miss Lepell in 1720. In 1730, he received the appointment of vice-chamberlain to the king; in 1733, Sir Robert Walpole called him up to the House of Lords, where he proved a frequent and effective speaker; and in 1740, he succeeded Lord Godolphin as privy seal, which he held until the Walpole administration was driven from power in 1742. Destitute of any commanding talents or solid principle, a sceptic in religion, and profligate in morals, Lord Hervey was yet far above the intellectual rank assigned him by his merciless satirist, Pope. He wrote and spoke vigorously on public questions, he was studious and laborious, a fair scholar, and a writer of pleasing occasional verses. In his famous quarrel with Pope, the poet seems to have been the aggressor. His pride and jealousy were easily ruffled, and Lord Hervey and Lady Mary Wortley Montagu had, he said, "too much wit for him." Both parties disgraced themselves in their poetical attacks—the lord and lady for having grossly alluded to Pope's obscure birth and personal appearance; and Pope for having indulged in coarse and unmanly slander on Lady Mary, and on the forced abstinence and ill health of Lord Hervey. "It would be now idle," as Mr Croker remarks, "to seek for a cause of quarrel which the parties were, a hundred years ago, unable or unwilling to explain; but may it not be sufficiently accounted for by the jealousies almost inevitable between persons of such similar, and therefore discordant tastes and tempers, living together in a circle of tittle-tattle, scandal, and pasquinades?" Political differences also arose; Lord Hervey and Lady Mary adhered to Walpole, while Pope and his brother wits were chiefly associated with the opposition. Lord Hervey died in 1743. He left behind him *Memoirs of the Court of George II.*, which were not published until 1848, when they appeared in two volumes, edited by Mr Croker. The work throws much light on the interior of the court—its coarseness, dulness, and immorality; but it is as degrading to the author as it is to the English monarchy, for Lord Hervey appears rather in the light of a court parasite and malignant gossip, than in that of an English gentleman or fair historian. (R. C—S.)

HESIODOS, in *English*, Hesiod, one of the earliest poets of Greece, was a native of Ascra in Bœotia. His era is nearly as uncertain as that of Homer, whose name is very frequently associated with his in the classics. Herodotus fixes it at about 400 years before his own time, thus making it about the middle of the 9th century B.C. Velleius Paterculus places him about 120 years after Homer, and that opinion has been very generally adopted by modern scholars; his *floruit* may be thus approximately placed about the middle of the 8th century B.C. Of the personal history of the poet very little is known. His father was a native of Cumæ in Æolis, who emigrated with his son Perses to Ascra, where the future poet was born. He seems to have been a man of humble rank and small means, for his younger son was, at an early age, sent to tend flocks on Mount Helicon. On his father's death he became involved in a law-suit with his brother Perses about the division of the little patrimony. The suit went in favour of Perses, and Hesiod, in disgust at what seemed to him the injustice of the Ascrean judges, retired to Orchomenus, branding his native town as "miserable in the cold, intolerable in the heat, bad always." He spent the remainder of his life in that city, and his tomb was long after pointed out there. Plutarch records a tradition that he met his death at the hands of some youths who had suspected him (quite unjustly, as afterwards appeared) of having dishonoured their sister. This, however, is perhaps only one of the many tales told about the manner of Hesiod's life and death by Tzetzes, Proclus, and others, to which no credence can safely be attached. The works that pass as Hesiod's, though their genuineness is gravely doubted, are three in number,—*The Works and Days*; the *Theogony*; and *The Shield of Hercules*. In the time of Pausanias, the first only of these was believed by the people of Ascra and its neighbourhood to have been really the work of their countryman. The introduction, and many interspersed passages, they regarded as later interpolations. Many parts of the poem, however, are undoubtedly Hesiod's, and there is equally little doubt, that as these now stand, they have been tagged together by a connecting narrative of a later date. The poem itself, which is in a didactic vein, professes to be a series of advices on political, ethical, agricultural, and domestic matters from the poet to his elder brother Perses. It is written in a very unpretending homely style, and accorded so ill with the warlike taste of the time, that Cleomenes the Spartan called its author the poet of Helots. Despite all its want of unity and plan, however, the poem, in its genuine parts at least, is valuable to us from the light it throws on the domestic manners of the early Greeks. The *Theogony* is now admitted, on all hands, to have been the work of a bard posterior to Hesiod, though a member of the Hesiodic school. It professes to describe the creation of the world, the birth of the gods, and the origin of the heroes. Whence Hesiod obtained the materials for his *Theogony* can only be conjectured. Herodotus affirms that he merely collected and systematized the local legends that had existed in various parts of Greece long before his day. But he also awards him the honour of having formed the mythology of Greece as it was now finally accepted, by having impersonated in his gods qualities and attributes that had formerly existed merely in the abstract. This, whether true or not, had given birth to the theory that the sources from which the author of the *Theogony* drew his materials, were philosophical, and not purely mythological speculations, and that in them may be detected the germs that afterwards flowered into the Greek philosophy. The *Shield of Hercules* is an inferior imitation of Homer's magnificent description of the Shield of Achilles. It is believed to have formed part of another poem ascribed to Hesiod, entitled *Eoeæ*, or *Catalogi Mulierum*, giving an account of the most famous of the mythical heroines. Parts of this work are attributed to writers long posterior to Hesiod.

The works of Hesiod were first printed at Milan in 1493, and two years later by Aldus at Venice. Of subsequent editions, the best are those of Daniel Heinsius, Amst., 1667; Robinson, Oxford, 1737; Gaisford, Oxford; and best of all, Dindorf, Leipzig, 1825, and C. Göttling, Gotha and Erfurdt, 1831.

HESPERIDES, in *Grecian Mythology*, the nymphs whose duty it was to watch over the golden apples presented by Tellus to Juno on the occasion of her marriage with Jupiter. Their number and names, like those of the Atlantides, with whom they are often identified, are very variously given; but the received accounts represent them as three in number, and bearing the names of Arethusa, Ægle, and Hesperia or Hesperethusa. Their home, according to the earliest legends, was an island in the western ocean, so near the setting sun that foot of man could never reach them. In their watch over the golden fruit, they were assisted by the sleepless dragon, Ladon. One of the twelve labours of Hercules was to slay this dragon and carry off the fruit. In the attempts to localize the home of the Hesperides, the ancient poets assigned it to different spots of Africa, such as the Cyrenaica, the neighbourhood of Mount Atlas, an oasis in the great desert, or to the Happy Islands in the Atlantic.

HESSE, Hessen, or Hessia, a country of Germany, formerly constituting a province of the empire, under the charge of a landgrave. It formed part of the circle of the Upper Rhine, and was situated on the rivers Rhine and Mayn, to the N. and S. of Frankfort, being about 150 miles in length, with a varying breadth. The northern portion, or Hesse-Proper, was anciently included in the landgraviate of Thuringia; but in the year 1247, it passed by inheritance to Henry the Child, a prince of Brabant, in right of

Hesse-Cassel.

his mother. From him it descended to Philip the Magnanimous, so well known in the history of the Reformation; and by his sons it was divided into several principalities, the princes of each of which retained the ancestral title of landgrave. After undergoing various changes through family successions and political revolutions, the ancient and acquired territories of the Hessian princes are now divided into three sovereign states, members of the Germanic confederation, and named respectively,—1. Kur-Hessen, called also Hesse-Cassel or Electoral-Hesse; 2. Grand-ducal Hessen, or Hesse-Darmstadt; and 3. Hesse-Homburg.

Kur-Hessen, or *Hesse-Cassel*, consists of one large mass, two smaller masses, and several still smaller separate portions of land, all situated to the N.E. of Frankfort-on-the-Maine, to the distance of 110 miles, and containing altogether a superficial area of 3724 English square miles. It is divided, or rather united, for administrative purposes, into four provinces, the names, areas, and populations of which are:—

Names.	Area.	Pop. (1854).
Lower Hesse with Schaumburg	1703	367,575
Upper Hesse	766	124,762
Fulda	720	138,685
Hanau	535	124,328
	3724	755,350

Kur-Hessen is mostly situated on the table-land of Central Germany, at a mean elevation of 500 to 600 feet above the level of the sea; but the southern portion sinks down into the valley of the Maine, beside Hanau and Frankfort. The upper country is hilly and even in its southern portion mountainous; but among the hills there are extensive and even moderately fruitful valleys, drained by abundant streams, which contribute to form the Werra and the Fulda, the two main branches of the Weser; and the Lahn, a tributary of the Rhine. And, as the Fulda becomes navigable at Hersfeldt, 30 miles above Cassel, and the Maine is navigable above Hanau, the country enjoys by their means, an easy access to the ocean for the export of its produce. The climate is generally a degree colder than that of the parts of Baden, at the same elevation.

The chief employment of the people is in agriculture; and rye is the staple production of their industry. Wheat, however, is cultivated in some favourable places, and oats and barley everywhere. Potatoes are likewise cultivated to a large extent, and form a principal part of the food of the Hessians, yielding also a large quantity of brandy. Tobacco is grown on the banks of the Werra, in the district of Schmalkald, and also in the district of Hanau, which is reckoned the best in Germany. The vine reaches the northmost point of cultivation at Witzenhausen, in the valley of the Werra; but the total quantity of ground occupied by vineyards is only about 300 acres, and the produce insignificant. Hemp is raised in Hanau, and flax in the other provinces, and these two, with wood from the forests, are the chief articles of export. There are some mines of copper, cobalt, and iron, to supply the demand for necessary utensils. Manufactures are very inconsiderable, except for domestic purposes, and yield nothing for export.

Till the present century the sovereign of Hesse-Cassel bore the simple title of landgrave; but, in 1802, he was raised to the dignity of an elector of the Holy Roman empire, and, though the empire was dissolved, and the functions of the electors consequently ceased in 1806, his successors were allowed by the Congress of Vienna to retain the title of *Kurfürst*, or Prince-Elector, as higher than that of Grand-Duke, then conceded to the landgrave of Hesse-Darmstadt and several other princes. He takes the prefix of Royal Highness; bears also the title of Grand-Duke of Fulda; and ranks in the 8th place in the confederation, next after the Grand-Duke of Baden. Since that time his territory has been distinguished by the title of *Kur-Hessen*, or Electoral-Hesse. Till 1848 the constitution of the state was that of a monarchy feebly limited by provincial states. In that year the constitution was made more popular; but the subsequent re-action proved most injurious. During the year 1851, Kur-Hessen was occupied by the troops of the confederation, and subjected to military law. In 1852 a new constitution was promulgated, on the illiberal principles dictated by the diet, and the elector is again virtually an absolute prince, whose rule has been very little satisfactory to his subjects. The Hessians were long considered to be behind their neighbours in intellectual cultivation; but that reproach has been, or is in the way of being, wiped off by the establishment of the usual sorts of schools and colleges. There is a university at Marburg containing 30 professors, attended by only about 360 students.

Hesse-Darmstadt.

The state revenue amounts to about L.600,000 a-year, and the expenditure to at least as much; and, like the other states, Kur-Hessen is burdened with a considerable debt, the exact amount of which seems not to be known, as the latest published account of it we have been able to meet with, is no later than 1840, when it amounted to 1,642,566 thalers (L.246,385 sterling).

The Kur-Hessians belong mostly to the Reformed confession of the Evangelical church; there are, however, many Lutherans, a few Romanists, and Jews. In every thousand inhabitants there are reckoned 600 Reformed, 231 Lutherans, 154 Catholics, and 15 Jews; of the latter the total number is estimated at about 10,000.

The Kur-Hessian contingent to the federal army amounts to 5679 men. Kassel or Cassel, a fine town on the Fulda, about 90 miles N.E. of Frankfort, is the seat of government.

Hesse-Darmstadt, or *Grand-ducal Hesse*, consists principally of two large portions of territory, one to the N. and the other to the S. of the River Maine, the latter including the country on both sides of the Rhine, from Worms to Mainz. Three smaller separate portions lie within the territory of Baden; other three separate parcels in Waldeck, and some still smaller in Nassau and Kur-Hessen. The aggregate area is 3232 English square miles; and the separate parcels are united, for administrative purposes, into three provinces, as stated in the following table:—

Province.	Area in Square Miles.	Population in 1852.	Capital.
Starkenburg	1169	319,050	Darmstadt.
Rhenish Hesse	529	225,647	Mayence or Mainz.
Upper Hesse	1543	309,617	Geissen.
	3232	854,314	

In general this territory is rather mountainous; but in the southern division, along both sides of the Rhine, there are extensive plains, rich and fertile; and in the northern province, near the Maine, there are some moderately large valleys. It is generally a well-watered country, its streams pouring themselves into the Rhine and the Weser. Few countries of the same extent have a greater variety of climate. In the neighbourhood of the Rhine and the Maine it is mild and agreeable, the winter is short, the summer warm, and the air generally dry. The hay harvest begins early in June, the corn harvest in the middle of July, and the vintage in the latter part of September. In the Odenwald, on the contrary, the climate is raw and cold, the spring is later, and several weeks more are required to ripen the fruits of the earth. As in Kur-Hessen, here also agriculture employs the bulk of the people. Rye is the chief crop, though some good wheat is grown. Fruit is very abundant, such as apples, pears, plums, almonds, and chestnuts. Wine is, next to corn, the most important product, and its annual value is estimated at about half as much as that of the grain. The breeds of domestic animals are of the usual kinds, and present nothing remarkable. Wood from the forests is an important article of export by the Maine and the Rhine, for the great mart for that commodity in Holland.

The mineral wealth consists of the produce of some iron and copper mines; but the quantity produced is insufficient for the consumption. The manufactures consist chiefly in working up the raw materials of wool, flax, and iron into articles of internal consumption; and there are, besides, some manufactures of paper, glass, copper, and iron wares. The chief articles of export consist of barley, wine, tobacco, rape-oil, dried fruits, madder, clover-seed, wood, honey, wax, and feathers. These are exchanged for colonial wares in Holland, and articles of dress and furniture brought from France and Belgium.

In respect of religion the great bulk of the people are Lutherans; and the relative proportions of the different sects are estimated thus:—Lutherans, 397; Reformed, 84; Mennonites and Inspired, $1\frac{1}{3}$; Catholics, 167; Jews, 20. These proportions, however, vary in the different provinces. In Rhenish Hesse the Catholics form the larger half of the population, or 93 to 87; in Upper Hesse, on the contrary, the Protestants number 251 to $12\frac{1}{2}$ Catholics; and in Starkenburg, 178 to $71\frac{1}{2}$. Education is well attended to in the usual sorts of schools, and there is a university at Giessen, with 32 ordinary professors, and about 380 students.

The reigning sovereign is a landgrave of Hesse; but he now bears the higher style and title of His Royal Highness the Grand-Duke. He is feebly limited by the States, the re-action that followed the revolution of 1848 having had as full effect in Darmstadt as in Cassel. The public revenue is estimated at the yearly sum of 8,206,873 florins (L.820,687 sterling); and the expenditure is fully as much. The public debt, at the end of 1850, amounted to 3,674,622 florins (L.367,462); and the debt incurred in the construction of railways to 11,848,607 florins (L.1,184,860). The army amounted in 1855 to 10,514 men, and the contingent to the federal army is 6195.

The capital of the state and seat of government is Darmstadt, in the province of Starkenburg, about 20 miles S. of Frankfort, with about 25,000 inhabitants; but the principal town is Mainz or Mayence, in Rhenish Hesse, on the S. bank of the Rhine, one of the strongest fortresses in Europe, and the bulwark of Germany against France. It is garrisoned by the troops of the Confederation; but the civil administration belongs to the Grand-Duke. The population, including the permanent garrison of 6000 men, exceeds 40,000.

HESSE-HOMBURG is a very small territory of about 106 square miles, belonging to a prince of the family of Darmstadt, with the title of landgrave. It consists of two principal parts, one on the slopes of the Taunus, N.W. of Frankfort, and the other to the westward of the Rhine, S.E. of Bingen. These form two provinces, of which Homburg, on the N., contained in 1852, 11,166 inhabitants, and Meisenheim in the W., 13,755. Both provinces enjoy a fruitful soil, and a healthful climate, are well cultivated, and yield a surplus of corn, wool, flax, and wood. Meisenheim likewise produces wine and coal, by means of the latter of which the people are enabled to produce some manufactures of glass and ironmongery wares. The majority of the people belong to the Lutheran confession; about 6000 to the Reformed, 3000 Catholics, and 1000 Jews. The public revenue is about L.35,000; and the debt amounted in 1854 to L.115,270 or thereby. The contingent to the federal army is 333 men. Homburg, a small town, with about 3600 inhabitants, 10 miles N. by W. of Frankfort, is the capital. The landgrave is now 73 years of age (April 1856), unmarried, and without heirs male; so that at his decease, his territory will be annexed to that of Hesse-Darmstadt.

HESYCHIUS, author of the *Greek Lexicon* which bears his name. Nothing whatever is known of his history. Some suppose him to have been a Pagan, who lived before the close of the fourth century A. D.; while, from certain glosses in the *Lexicon*, others suppose him to have been a Christian. It is allowed, however, that these glosses are interpolations. The plan of the *Lexicon* is explained in an introductory letter to Eulogus, who also is unknown. In this letter Hesychius proposes to make the Lexicon of Diogenianus the groundwork of his own. It is valuable for the quotations from works which have perished, and more especially as being one of the oldest works of the kind in existence. The best edition of the *Lexicon* is that of Alberti, 1746, completed by Ruhnken, 20 years later.

HETMAN, a Cossack title. See COSSACKS.

HETTOWRA, a town of Hindustan, in the Nepal territories, and the centre of all commerce carried on between the Nepal dominions and those of Oude and the Company. It is situated on the Rapti river, and is a miserable village, consisting only of about sixty houses. E. Long. 85. 3., N. Lat. 27. 26.

HEVELIUS, or HEVELKE, JOHN. See the historical part of art. ASTRONOMY.

HEXAMETER, the commonest and most important form of dactylic verse, so called from its consisting of six feet or measures. In the first four places of the line these feet may be dactyls or spondees indifferently, but the fifth is almost invariably a dactyl, and the sixth always a spondee. In a few rare cases, either to vary the rhythm or to produce some special effect, a spondee is introduced in the fifth place, and the line is then called a spondaic line. The correctness and beauty of hexameter verse depend in great measure on the proper distribution of the cæsural pauses. See CÆSURA.

So far as extant data enable us to judge, we may conclude that the classical tongues of Greece and Rome are alone adapted to the successful cultivation of the hexameter metre. It is certain, at least, that all attempts to naturalize it in modern poetry have only proved failures of different degrees of badness. The first who endeavoured to accommodate it to the structure of the English language was Gabriel Harvey, the friend of Spencer, and the "Hoby nol" whose poem is prefixed to the *Faëry Queen*. So ill was the attempt received, however, that no one stepped forward to take part in his defence, when he found himself assailed with the bitterest sarcasms by the leading wits of the days. Tom Nash in particular, the Lucian of his age, assailed the luckless innovator with a keen-edged malignity that was further whetted by a feud of long standing between him and Harvey. A poem of the latter, entitled *Encomium Lauri*, begins with these absurd lines:—

> "What might I call this tree? A Lawrell? O bonny Lawrell!
> Needes to thy bowes will I bow this knee and vayle my bonnetto!"

Nash happily burlesques these lines by describing Harvey sitting under a yew tree in the grounds of Trinity College, Cambridge, inditing a sonnet to the weather-cock on the spire of Allhallows,—

> "O thou wether cocke that stands on the top of Allhallows,
> Come thy waies down if thou darst, for thy crowne, and take the wall on us."

"The hexameter," he continues, "I graunt to be a gentleman of an auncient house (so is many an English beggar), yet this clyme of ours hee cannot thrive in; our speech is too craggy for him to set his plough in; hee goes twitching and hopping in our language, like a man running upon quagmires, up the hill in one syllable and down the dale in another, retaining no part of that stately smooth gate, which he vaunts himself with among the Greeks and Latins."

The objections brought forward by Tom Nash, three centuries ago, still hold good; and the partial successes of Southey, Lockhart, and more recently of Longfellow, only go to confirm the verdict then pronounced. In German the

Hexapla || Heylin.

result of the experiment, apparently different, is in reality the same. The hexameters of Schiller and Goethe contain too many beauties of thought and poetry to be readily forgotten, yet in so far as they are merely hexameters, they only serve as a beacon to warn less skilful pilots off a coast where shipwreck is certain. English and German being thus doubtful vehicles for the hexameter verse, French and Italian may be given up as wholly impracticable, nor are we aware of a single successful effort in this metre in either of those tongues.

HEXAPLA, a collection of the Holy Scriptures in six languages. The term is generally applied to the edition of Origen, which contains the text in Hebrew and Greek letters, along with the Septuagint versions and three other translations. See Bible, and Origen.

HEXASTYLE, in *Architecture*, a building or a portico with six columns in front.

HEXHAM, a market-town of England, county of Northumberland, on the south bank of the River Tyne, 20 miles W. from Newcastle. A handsome stone bridge of nine arches crosses the river at this point, and the Newcastle and Carlisle railway passes the town. It has some tolerably wide streets, but the greater number are narrow and irregular. The market-place is a spacious square, having a neat market-house, supported by pillars, with an open space underneath, and stalls for country dealers. The priory church is a cruciform structure, in a mixed Gothic and early English style, surmounted by a tower about 100 feet high. The nave, which was burnt by the Scots in 1296, still exists in ruins. Hats and gloves constitute the principal manufactures of the town. It has a free grammar school, mechanic's institute, savings bank, dispensary, and almshouse. Market-day, Tuesday. Roman remains have been found at Hexham, which is supposed to have been a Roman station, probably Axelodunum. In the seventh century a monastery was founded here by St Wilfrid, and soon afterwards a bishop's see was established. The diocese was afterwards united to Lindisfarne. Hexham is noted for the great defeat of the Lancastrians in 1464. Pop. (1851) 4601.

HEYLIN, Peter, D.D., an English miscellaneous writer, was born in 1600, at Burford, near Oxford. He was educated at that university, and, after graduating, lectured publicly on history and geography. Entering the church, he was appointed chaplain to Charles I., who rewarded his bigoted royalism with several valuable livings. His monarchical enthusiasm was by no means quenched when, like all the king's favourites, he found himself marked out for punishment by the parliamentarians, who stripped him of all his preferments and property. He had before this made himself a considerable name as a writer by the publication, in 1625, of his *Microcosmus, or a Description of the Great World*, which had enjoyed a wide circulation, and been several times reprinted. He now devoted himself to literature, and produced in all no fewer than 37 different works on history, geography, and divinity, besides poems and miscellaneous works. These, though now known only to the antiquarians, were extremely popular in the seventeenth century, especially among the royalists, whose cause he vindicated with much ability and zeal. His historical works in especial, were conceived and written in a spirit of the most bigoted partizanship. After the Restoration, Heylin was for a time utterly neglected by the party in whose service he had lost his all; and it was only a very few months before his death, in 1662, that his services were shabbily requited with the sub-deanery of Westminster. Among his principal works are a *Life of Laud*, a *History of the Tithes*, *Defence of the Church of England*, and a very graphic and humorous narrative of a six weeks' tour on the Continent, which repays perusal now better than almost any of his more elaborate writings.

Heyne.

Not long after Heylin's death, two biographies of him appeared, the first by "one Mr George Vernon of Gloucester," and the other by Dr Barnard, the son-in-law of the deceased controversialist, and an accomplished scholar. Vernon was a kind of literary pet of the Heylin family, who seem to have instigated him to a piece of literary workmanship, for which he was quite unfit. The furious quarrel that ensued between him and his learned rival, and which resulted in the complete victory of the latter, has found a place in Disraeli's *Curiosities of Literature*.

HEYNE, Christian Gottlob, an illustrious classical scholar and archæologist, was born on the 25th of September 1729, in a suburb of the city of Chemnitz, in Saxony, where his father, having been compelled by some religious persecutions to abandon his native country of Silesia, had settled, supporting his family in great poverty by exercising the trade of a weaver. It was only by the liberality of his godfathers that Heyne was enabled to obtain his primary instruction in the elementary school of Chemnitz, and afterwards to prosecute his classical studies in the gymnasium of that city. In 1745 he entered the University of Leipzig. There he was so scantily supported by those on whose assistance he relied, that he was frequently in want even of the common necessaries of life, and was sometimes indebted for food to the generosity of a maid-servant in the house where he lodged. In this situation, without even the hope of future distinction, he continued to struggle on against every difficulty and disappointment, in the acquisition of knowledge. For six months he is said to have allowed only two nights in the week to sleep, and was at the same time forced to endure the reproaches which his godfather thought himself entitled to inflict on him for negligence in the prosecution of his studies. His distress had almost amounted to despair, when he procured the situation of preceptor in the family of a French merchant resident in Leipzig. He was thus enabled to continue his studies, though with much interruption; the emoluments of his appointment being sufficient to support him in what was at least comparative comfort. Under Ernesti, he was initiated into the criticism of the classical authors; from the prelections of the celebrated Bach he acquired a competent knowledge of the Roman jurisprudence; and through the instructions of Christius, who lectured on archæology, and with whom he was intimately acquainted, his attention was strongly directed to the works of ancient art. Having finished his studies at the university, he was exposed for many years to all the accumulated distresses of poverty and neglect. The first situation he was able to procure was that of copyist in the library of Count von Brühl, with a salary of only an hundred dollars, which he obtained in the year 1753. From the necessity of adding something to this scanty pittance, he was forced to employ himself in the drudgery of translation; and, besides some French novels, he translated into German the Greek romance of Chariton. He published his first edition of *Tibullus* in 1755, and in 1756 his *Epictetus*. In 1756, his emoluments as copyist were doubled, and the education of Prince Maurice von Brühl was intrusted to him, but without any additional salary. The invasion of Saxony by the Prussians deprived him of his appointment, and even destroyed the library on which it depended. The period of the Seven Years' War was that in which he was chiefly exposed to the storms of fortune; and his marriage with Theresa Weisse, a young woman of distinguished genius, but equally poor with himself, increased his misery. Having been obliged to retire into Lausatia, he lived for some years as steward in the family of the Baron von Leoben. He was enabled, however, to return to Dresden in 1762, where he was intrusted, by Lippert, with the care of writing the Latin text of the third volume of his *Dactyliotheca*.

At length, in the commencement of the year 1763, his merit met with its reward, and a new and illustrious career was opened to him. On the death of John Matthew Gesner, in 1761, it became necessary for the curators of the university of Göttingen to look around for a successor capable of sustaining the reputation which the institution had acquired by the learning and talents of that distinguished scholar. The appointment was offered to Ernesti, who, whilst he declined leaving the university of Leipzig, proposed Ruhnkenius of Leyden or Saxius of Utrecht for the situation. Ruhnken likewise refused the appointment, but having been strongly impressed by the taste and learning displayed by the editor of Tibullus and Epictetus, he advised Muenchhausen, the Hanoverian minister and principal curator of the university of Göttingen, to bestow the professorship on Heyne, whose merit, though known to few, he ventured to promise would do honour to the choice. The minister had the good sense to acquiesce in the recommendation of this great scholar, and Heyne, after some delay, became professor of eloquence in Göttingen. Though his appointments were at first few, and his emoluments inconsiderable, these were gradually augmented in proportion as his usefulness was approved, and as his growing celebrity rendered it an object with the other governments of Germany to secure for their literary institutions the services of so distinguished a scholar. He refused the most advantageous and honourable overtures from Cassel, Berlin, and Dresden. In his different capacities of professor, principal librarian, member of the Royal Society, and chief editor of the *Literary Gazette*, and still more by his publications, he mainly contributed to raise the university of Göttingen to the distinguished rank it holds among the seminaries of Europe. After a long and useful career, graced with all the distinctions which in Germany are conferred on literary eminence, he died, full of years and honour, on the 14th of July 1814.

In Greek literature he has given us editions of Homer's *Iliad*, Pindar, Diodorus Siculus, Apollodorus, and Epictetus; and, in Latin, editions of Virgil and Tibullus; all illustrated with copious commentaries. His *Opuscula Academica*, in five volumes, contain a series of 116 academical dissertations, of which the most valuable are those respecting the antiquities of Etruscan art and history, and the researches regarding the colonies of Greece. He has left us also a great number of papers on almost every subject of erudition, more especially on ancient mythology, amongst the *Commentationes Societatis Regiæ Gottingensis*. His *Antiquarische Aufsätze*, in two volumes, comprise a valuble collection of essays on different subjects connected with the history of ancient art. In the earlier part of his life he translated, or rather wrote anew, a great part of the *Universal History*.

After this notice of the chief events of his life, and of his literary productions, it may be proper to say somewhat in regard to the distinctive merit which has raised Heyne to so eminent a place amongst the promoters of classical literature. And here it is chiefly as an interpreter of the ancient poets, and as an original investigator of the ancient mythology, that he must rest his claims to the celebrity he has acquired. As a critic of the works of art, his desert is great, but he has no pretensions to original or peculiar discoveries.

The example of the great philologists of Holland, and the more immediate influence of Ernesti and Gesner on the taste and pursuits of their countrymen, had, before the middle of the last century, awakened in Germany a new zeal for the study of the ancient authors, and had advanced the criticism of classical literature to a rapid and vigorous maturity. The great writers of antiquity ought not, however, to be read with a regard limited merely to their language; they more especially deserve a close and enthusiastic study, for the admirable means which they afford of improving the understanding and of cultivating the taste. From the year 1760, about which period the Germans had begun to devote themselves, with an enthusiasm as zealous as it was tardy, to the cultivation of their native language and literature, several intelligent philologers displayed a more refined and philosophical method in their treatment of the different branches of classical learning; and, without neglecting either the grammatical investigation of the language, or the critical constitution of the text, no longer regarded a Greek or Roman writer as a subject for the mere grammarian and critic, but, considering the study of the ancients as a school for thought, for feeling, and for taste, they initiated us into the great mystery of reading everything in the same spirit in which it had originally been written. They demonstrated, both by doctrine and example, in what manner it was necessary for us to enter into the thoughts of the writer, to pitch ourselves in unison with his peculiar tone of conception and expression, whether erroneous or correct, and in every instance accurately to investigate the circumstances by which the mind of the poet or philosopher was affected, the motives by which he was animated, and the influences which co-operated in giving the intensity and character to his feelings. It was shown how generally the conception of the reader was merely a veil thrown over the thought of the original. It was no longer allowed to combine modern with ancient ideas, to convert the derivative with the original thought, or to translate it by a new and factitious signification. At the head of this school stands Heyne, both as its founder and principal ornament; and, however some of his disciples may have exposed themselves to ridicule in their application of the principles on which this system of interpretation rests, yet it cannot be denied that nothing has contributed so decisively to maintain and promote the study of classical literature, as the combination which Heyne has effected of philosophy with erudition, both in his commentaries on the ancient authors, and in those works in which he has illustrated various points of antiquity, or discussed the habit of thinking and spirit of the ancient world.

The comparative poverty of Germany in ancient manuscripts has compelled her scholars to rest satisfied in general with the critical apparatus which the philologers of other nations have collected. What they necessarily wanted in the originality of subsidiary stores, they have, however, endeavoured to supply, by a sound and rational employment of those already compiled; and the praise of useful diligence cannot certainly, with justice, be denied to their labours in this department. Originality, however, was possible in the *higher* criticism, which does not rest on the collection of readings or the authority of manuscripts, and in the mode of the illustration applied to the ancient writers; in these respects the later philologers of Germany have earned a glory peculiar to themselves, and which must be remembered as long as learning and ingenuity are respected. How cogently have they reasoned on the authenticity or spuriousness of particular writings, and how skilfully have they applied the test to the interpolations of later times; to what new conclusions are we now brought in regard to Orpheus, Homer, Anacreon, Longinus, &c., by the critical investigations of Schneider, Wolf, Fischer, Hermann, Weiske, and others; how differently has the controversy in regard to the authenticity of certain orations of Cicero been latterly concluded by Wolf, compared with the result of Markland's and Gesner's speculations. In this department Heyne does not, however, hold the same pre-eminence which he has attained as an enlightened and popular interpreter; for though his discussions in the higher criticism are both numerous and valuable, he is as much surpassed in boldness and originality by Wolf, as he is inferior to Hermann in the minuteness and subtilty of his reasoning.

There is, however, another department in which the labours of Heyne are more original, and here he merits all the honour to which a discoverer is entitled. Until the middle of the eighteenth century, mythology was nothing else than the nomenclature of divinities, a collection of the manifold and discordant legends of their several relations, actions, and destinies, and the delineation of their forms from the works of the poets and artists, illustrated, perhaps, by a mystical and allegorical commentary. About this period some more profound thinkers began to regard the mythical traditions in a higher view, as sources of human history; but, from too confined an acquaintance with the circumstances and condition of the ancient world, they took too high a standard for their explanations, and, through a mystical and allegorical interpretation, thinking they had discovered, under the veil of mythological narration, ideas of the deepest wisdom, they confidently framed thereon hypotheses for the history of mankind, for the arts, for philosophy, and for the other sciences, which threatened altogether to extinguish the glimmering light that was still afforded us for the periods of remote antiquity.

Heyne opened a less ambitious but more certain path. Following the observations which travellers had collected in regard to new and uncivilized nations, he applied these to the condition of the Greeks, who, as history informs us, from a rude and sensual barbarism, had gradually advanced to a state of civilization and intellectual refinement. He thus arrived at the simple conclusion, that the mythical tales of antiquity contain the first attempts at reasoning, the most ancient history, philosophy, and theology embodied in a poor, unformed, and consequently figurative language; and, therefore, that mythology is a system comprehending partly the original form of representation through objects of sense peculiar to a rude age, expressed in fables, ceremonies, and monuments, transplanted into later times; partly a kind of poetical apparatus derived and formed from this original mythology, and intended only by its authors for the purposes of poetical effect. He hence justly concluded that it is impossible to attain any real insight into the nature of mythical narration, unless the *mythi* of the most ancient poets are carefully distinguished from the abusive applications made of them in the poetry of after times, and unless mythology be kept separate from the philosophy conversant about mythology. In conformity with these fundamental rules, Heyne has illustrated Apollodorus; and in the same spirit he has conducted those researches into the nature and tendency of the different mythi of Greece, which he has published in the *Transactions of the Royal Society of Göttingen.* His views have been almost universally admitted to be correct in principle, and his applications to have been conducted with the most profound learning and almost unequalled ingenuity. A great number of followers have pursued the path he opened; and his theory has now attained the form and stability of a system, through the labours of his disciples. Amongst these, the names of Martin Hermann (not the philologer), of Voss, and of Manso, are especially to be distinguished. The theologians of Germany have likewise applied the same theory to the interpretation of the Sacred Books; and the researches of Eichhorn, Bäuer, Ilgen, Hartmann, Vater, De Wette, and a host of other philosophical divines, into the pretended biblical mythi, have been pursued with a learning and acuteness equalled only by the impious audacity of their conclusions. (W. H.)

HEYWOOD, John, styled the epigrammatist, from a work which he published under the title of *Six Centuries of Epigrams*, was born (it is not known in what year) at North Mims, near St Albans. He was educated at Oxford, and afterwards made the acquaintance of Sir Thomas More, who introduced him at court. His skill in music and his inexhaustible fund of ready wit made him a special favourite of Henry VIII., and afterwards of his daughter Mary;—and it is said to have been only pungent jesting that could move the laughter of two such persons. His *Interludes*, a kind of connecting link between the old moralities and the modern drama, were extremely popular in their day. These generally represented some ludicrous incident of a homely kind in a style of the broadest farce, and in their way displayed no mean skill and talent. One of these interludes, called *The Four P's*, describes a contest between a pedlar, a poticary, a palmer, and a pardoner, as to which of them shall tell the grossest lie. The palmer remarks that he never saw a woman out of patience in all his life; and his rivals, amid much jesting, confess themselves vanquished. Heywood's longest single work is an immense burlesque allegory, published under the title of the *Parable of the Spider and the Fly*. The spider symbolizes the Protestant party, the fly the Catholic. The allegory itself is an account of the conflict between the two parties, but so long-winded, intricate, and unintelligible that, in the words of an old critic, "neither he himself that made it, nor any one that readeth it, can reach unto the meaning thereof." On the accession of Queen Elizabeth, Heywood, who was a zealous Catholic, fled to Mechlin in Belgium, where he died in 1565.

HEYWOOD, *Thomas*, a voluminous English dramatist of the sixteenth and seventeenth centuries, was born in Lincolnshire, and was educated at Cambridge, where he became a fellow of Peter-house. The dates of his birth and death are alike unknown, and the few facts of his life that are known have been gleaned chiefly from his own writings. He is first found writing for the stage in 1596, and is known to have been using his indefatigable pen in 1640; indeed his last-published piece did not appear till fifteen years after that date. Heywood was an actor as well as a play-writer, and to these employments he superadded that of a miscellaneous author. He is believed to be the most voluminous of English writers, and on that score has been likened to Lope de Vega, Kotzebue, and Alexandre Dumas. Putting out of account his non-dramatic works, which fill many folio and quarto volumes, he describes himself as "having an entire hand or at least a main-finger in two hundred and twenty plays." Of these only three-and-twenty survive, but they amply attest that had he chosen to concentrate instead of diffusing his powers, he might easily have ranked with the Massingers, Fords, and others of his great contemporaries. His facility and variety are almost without a parallel, his fancy was inexhaustible, and his invention boundless; but his taste was bad, and he delighted to excess in what he called "merry accidents, intermixed with apt and witty jests;" or, in other words, the broadest and coarsest farce. Many of the songs interspersed throughout his plays were singularly sweet and graceful. His best pieces, such as *A Women Killed with Kindness; The Four Prentices of London; The English Traveller; A Challenge for Beauty;* and *Love's Mistress*, lie chiefly in the department of what has been called the domestic tragedy, in which he is in some respects at least superior to Lillo. Charles Lamb hits his character in a single sentence:—"Heywood is a sort of prose Shakspeare; his scenes are to the full as natural and affecting; but we miss *the poet*—that which in Shakspeare always appears out and above the surface of *the nature*."

HICKES, George, was born at Newsham in Yorkshire in 1642. He finished his studies at Oxford with great applause, and took the degree of A.M. This honour was likewise conferred upon him by Cambridge. For seven years thereafter he fulfilled the duties of lecturer in Lincoln College. His health having been impaired by close study, he accompanied his pupil, Sir George Wheeler, to France, to recruit. Upon his return he graduated in divinity at Oxford in 1675, and was appointed rector of St Ebbe.

This was followed by his becoming chaplain to the Duke of Lauderdale. At the breaking out of the Revolution in 1688 he adhered steadily to the cause of the dethroned James II., and lost all his benefices. Protesting vehemently, by placard affixed to the door of Worcester Church, against his being ejected, he retired to London, where he remained for several years in concealment. After undertaking a difficult mission to the banished king regarding the affairs of the church, Hickes, upon his return, was appointed suffragan Bishop of Thetford. His vehemence in the royal cause would have exposed him to danger had not the Chancellor Somers, in admiration of his great talents, exerted his influence to shield him. He died in the 74th year of his age, A.D. 1715.

Hickes was a voluminous writer. His theological and controversial works are sinking into oblivion. His fame rests upon his philological writings. His *Institutiones Grammaticæ Anglo-Saxonicæ et Mœso-Gothicæ*, &c., afford the first methodic arrangement of the grammatical rules of the Anglo-Saxon language. His *Antiquæ Literaturæ Septentrionalis, libri duo*, &c., 2 vols. folio, Oxon. 1705, long remained as the most complete work on ancient northern literature and languages.

HIDAGE (*Hidagium*) was an extraordinary tax payable to the kings of England for every *hide* of land. This tax was levied in money, provision, armour, and other articles; and when the Danes landed in Sandwich in 994, King Ethelred taxed all his lands by hides, so that every three hundred and ten hides found one ship furnished, and every eight hides furnished one jack and one saddle, to arm for the defence of the kingdom. Sometimes the word *hidage* was used to signify exemption from that tax; and this immunity was also called *hidegild*, and interpreted, from the Saxon, a price or ransom paid to save one's skin or hide from beating.

HIDALGO (*hijo d'algo*, son of somebody), an obsolete title of nobility in Spain; in Portuguese, *fidalgo*.

HIDJELLEE, a town and district of Hindustan, province of Bengal, on the W. bank of the Hooghly River. It is the first town which is seen after entering the river. Here ships formerly used to anchor, but they now run up to Kedjeree or Diamond Harbour. There is here an extensive salt manufactory belonging to government. This place is very unhealthy. It was to Hidjellee that the English retreated in 1687, after escaping from Hooghly. They fortified the island, and held possession of it for three months, against all the efforts of Aurungzebe, till peace was concluded. The vicinity abounds with tigers, and the creeks with sharks and alligators. E. Long. 87. 50., N. Lat. 21. 50. The district is bounded E. by the Hooghly, and S. by the sea. Some of the land is good, and produces a great quantity of rice, cocoa-nuts, betel-nuts, &c. Area of district, 1014 square miles. Pop. 133,265. Its chief towns are Hidjellee and Contai.

HIERAPOLIS, *in Ancient Geography*, the name of several cities, of which the most important were those in Phrygia and Syria.

Hierapolis, in Phrygia, stood on a small tributary of the Mæander, from which it was distant 15 or 20 miles, and was 5 miles N. of Laodicea. It was celebrated for the worship of Cybele, here celebrated with great pomp, for its warm springs, which formed stalactites sometimes attaining an immense size, and for its Plutonium. This was a large cave, from a fissure in the floor of which exhaled a noxious vapour, said to poison all who breathed it except the priests of Cybele. The city was probably founded by the Greeks, though the history, alike of its rise and of its decay, is unknown. Its ruins, which are near a place called Pambuk-Kalessi, have often been visited and described by modern travellers, who likewise describe the extant stalactites, some of which have now reached the size of small hills.

Hierapolis, or (as it was called by the natives) *Bambyce*, in Syria, obtained its name of "the sacred city" from having been the principal seat of the worship of the Syrian goddess Astarte. It was the most important city in the district of Cyrrhestice, and was about 22 miles distant from the right bank of the Euphrates. Under the Seleucidæ it became a great commercial mart from its being on the great highway between Antioch and Seleucia. The Emperor Constantine made it the capital of the province Euphratensis, and it plays a conspicuous part in the Eastern campaigns of Julian; but with the establishment of Christianity and the abolition of the old worship, Hierapolis fell into insignificance and decay. Its ruins were in modern times first discovered and described by Maundrell, but the position of the city was first accurately fixed by Col. Chesney in the course of his expedition. Of the ancient remains the most important are two temples, a larger and a smaller. The massive architecture of the larger one, splendid even in ruins, seems to point it out as the scene of the worship of Astarte. The other ruins are chiefly Mohammedan. The modern name of the place is *Kara Bambuche* or *Membigz*.

HIERAX, a bishop of Leontopolis towards the close of the third century, who expounded Scripture on allegorical principles, and attracted a number of followers, who from him were called Hieracites.

HIERO I. and II., kings of Syracuse. See Hieron.

HIEROCLES, the name of several Greek writers, of whom the most notable are the following:—

Hierocles, born at Alatanda, in Caria. He and his brother Menecles were considered the first orators of Asia Minor. Their exuberant and florid style is pronounced by Cicero far inferior to that of the Greek masters.

Hierocles, of Bithynia. He was the author of the fierce persecution of the Christians under the reign of Diocletian, at the beginning of the fourth century. At first he was a judge at Nicomedia, where his persecuting zeal raised him to the governorship of Alexandria. He wrote two books addressed to the Christians, in which he endeavoured to show that the Christian Scriptures were full of contradictions; and also that the miracles ascribed to Jesus Christ were equalled by those ascribed to Apollonius of Tyana. He was answered by Lactantius and Eusebius. He is sometimes confounded with Hierocles the Platonic philosopher.

Hierocles, the neo-Platonic philosopher, had a flourishing school at Alexandria in the beginning of the fifth century, and was greatly admired for his ease and elegance of style. The works ascribed to him are:—1. A Commentary on Providence and Fate, and the Agreement between Divine Government and Human Liberty, in seven parts. Mere fragments of it are all that now exist. He reasons in favour of human liberty of will by supposing the pre-existence of the soul. He denies the eternity of matter. 2. Philosophical Maxims, preserved in the shape of extracts in Stobæus. 3. A Commentary on the Golden Verses of Pythagoras. This has come down to us entire, and is valuable as giving us a view of the Pythagorean philosophy. The best edition of it is by R. Warren. London, 1742.

HIEROGLYPHICS.

Introduction.

INTRODUCTION.

The object of the present essay is to give a concise account of the language of the ancient Egyptians and of the written characters by which it was expressed, from the age of the Great Pyramid to the third century after the Christian Era. Many valuable works have been written on various portions of this subject, but they have been addressed rather to a small body of students than to the learned generally. It has seemed therefore desirable to place before every scholar the means of forming an independent judgment respecting the method of interpretation originated by Young and Champollion, and this may be best done by as complete an account of the results of their method as can be comprehended within the limits of this article, with the addition of corroborative facts.

It is upon the results of the interpretation of hieroglyphics that its truth mainly depends. If those results be correct, the lost Egyptian history has been restored, and we have been made acquainted with the manners of the Egyptian people from the patriarchal times. Formerly we were obliged to look, as to a historical narrative, to the uncertain statements of Herodotus, who candidly told us not to trust to what he related on the authority of others;[1] statements rendered more doubtful by their abounding in positively fabulous or glaringly inconsistent matter. We were forced to endeavour to find some traces of truth in the careless and uncritical compilation of Diodorus Siculus, and to construct a history from the dry lists of Manetho, preserved by inaccurate or falsifying editors,[2] in forms self-contradictory and contradicting one another. Others who wrote in Greek and Latin had indeed preserved a few traditionary tales, which had come down to us in the last stage of a series of corruptions. In the Bible indeed are found some remarkable notices of Egypt, throwing great light upon the manners of the inhabitants at different times, but from which little historical information could be obtained without a previous knowledge of the history itself. From these materials arose a variety of histories of Egypt, no one of which was connected, and most of which contained, if the recent discovery be true, repetitions of the same king, on account of the different forms in which his name was given. In truth, all that was known of the earlier history was that Mênês was said to have founded the kingdom at some time between 17,000 and 2000 years B.C.—according to various authorities—that certain kings, as to whose time of rule there was a great discrepancy, built the most celebrated pyramids, and that some isolated sovereigns had been famous as warriors or lawgivers. It was not until the seventh century B.C. that any connected history began, and yet the most moderate computations assigned to the Egyptian kingdom or kingdoms a duration before that time of more than 1400 years. So vague, indeed, was the knowledge respecting this time of darkness, that it was not determined whether there had been but a single monarchy or whether Egypt had been ruled at any time by contemporary sovereigns. The best scholars generally scouted the idea of contemporary dynasties, yet now there is scarcely any one who maintains that there was but a single monarchy. Of the Pharaohs mentioned in the Bible, the later ones alone—Tirhakah the Ethiopian, Necho, and Hophra—had been identified with those mentioned by profane writers; and the chief part of what was said in the Sacred Records could not be attached to any portion of the Egyptian history derived from other sources. The manners of the people were better known, both from these various authorities and from the sculptured and painted monuments of the country; but these materials were not enough to enable us to understand the national character. From these sources, moreover, there could not be formed any very clear view, since most of what the Bible contains respecting the Egyptians refers to the time when the Israelites were in Egypt, a time at which the population was much mixed with Semitic or other colonizers,[3] and to the part of the country in which dwelt most of the strangers, and since the Greek writers speak of periods when the nationality of the inhabitants was greatly changed.[4] If the interpretation of Young and Champollion be true, we have contemporary historical and religious monuments of almost every century from the third after that in which ruled the first king of Egypt.[5] From the evidence of these monuments the chronological differences have been so greatly reduced, that the best authorities disagree at the utmost about 1000 years as to the earliest period, and are comparatively almost agreed with respect to the age of the Twelfth Dynasty, variously held to have commenced from twenty-seven to twenty-one centuries before the Christian Era. Not less satisfactory, though very

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[1] Few writers have been more careful than Herodotus in warning their readers to discriminate between what is related on personal authority and what is derived from others. Thus, after describing Egypt, and before speaking of its history, the very part to which we have alluded above, he says,—Μέχρι μὲν τούτου. ὄψις τε ἐμὴ καὶ γνώμη καὶ ἱστορίη ταῦτα λέγουσά ἐστι· τὸ δὲ ἀπὸ τοῦδε, Αἰγυπτίους ἔρχομαι λόγους ἐρέων, κατὰ τὰ ἤκουον· προσέσται δὲ αὐτοῖσί τι καὶ τῆς ἐμῆς ὄψιος, ii., 99. In the narrative which follows this, the historian plainly states his method throughout the work,—ἐμοὶ δὲ παρὰ πάντα τὸν λόγον ὑπόκειται, ὅτι τὰ λεγόμενα ὑπὲρ ἑκάστων ἀκοῇ γράφω, ii., 123. In a much later place he repeats this avowal of his system,—Ἐγὼ δὲ ὀφείλω λέγειν τὰ λεγόμενα, πείθεσθαί γε μὲν ὦν οὐ παντάπασι ὀφείλω· καί μοι τοῦτο τὸ ἔπος ἐχέτω ἐς πάντα τὸν λόγον, vii., 152. It was therefore absurd and unfair to receive, as did most critics until recently, much that Herodotus evidently related on hearsay evidence as true because of their conviction of his veracity, which had nothing to do with that of his informants; and it was equally unjust of a more recent school to cast doubt upon all he related, because his history had been before received with an indiscriminating confidence.

[2] In saying this we would not be supposed to cast any slur upon Africanus, Eusebius, or Josephus; but we think that there can be no doubt that the discrepancies between what they have stated on Manetho's authority must be, at least in the case of Eusebius' version, the result of a deliberate falsification. We have a similar instance in the differences between the present Hebrew text of the Pentateuch, and the Septuagint and Samaritan versions, as to the lengths of the patriarchal genealogies before Abraham, which must have arisen, in two of the three cases, from systematic alteration, effected probably with the same object that induced the falsification in part of Manetho's lists. It does not follow that this was in each case the work of the Alexandrians.

[3] The existence of a large foreign population in Egypt at the time when the Israelites were there in bondage appears from various statements in the Bible.

[4] The Egyptians, however liberal they may have shewn themselves towards other nations, evidently were exclusive with the Greeks; and therefore several instances of the adoption of the manners of the latter people, and even of intermarriage with them, mentioned by Herodotus, shew indications of change even in his time. Besides, the Greek visitors associated chiefly with Greeks and Hellenized Egyptians.

[5] This is said on the supposition that the writer's explanation of Egyptian chronology, as given in *Horæ Ægyptiacæ*, and the article EGYPT, is correct. It will, however, be applicable, with some modification, to the longer schemes of chronology.

unexpected, has been the bearing of this history on the statements of ancient writers. The lists of Manetho, who certainly might have been supposed to have possessed very complete and accurate information, have been signally confirmed, and we have even been enabled to restore some parts of them, where they are corrupt, to their original purity, or at least to do somewhat towards effecting this. The veracity of Herodotus has not suffered, but we have become somewhat more careful in accepting what he has related on hearsay evidence. The biblical narrative has received much illustration, and some advance has been made towards the synchronism of Hebrew chronology with Egyptian. In the matter of arts and sciences much new information has been obtained, and the representations of the monuments have acquired an additional value from our having been enabled to fix their dates at least relatively. The congruity of these results, their reasonableness, and their unexpected character, afford no little evidence of the truth of the system by which they have been obtained.

The results of Young's and Champollion's discoveries, with respect to the ancient state of the countries bordering on Egypt, are, if true, of great importance in affording us an insight into their condition at remote periods from contemporary monuments, and thus adding a new set of authorities to the scanty materials for their history. The information that has been thus acquired has tended to confirm reliable records, and has extended our knowledge, not alone of the public affairs of the peoples to which it relates, but also even of their manners and civilization. Nevertheless, our ignorance of ancient geography has so embarassed these inquiries, that much remains to be done, and more may be reasonably hoped as to the future than has been accomplished in the past.

The most remarkable effect of these discoveries, in their whole extent, has been their influence on historical criticism and the kindred branches of knowledge, from which we may not unreasonably argue their truth. A better school of critics has arisen, and almost all scholars have been content with sounder and more moderate views than had before prevailed. Some may indeed ascribe this improvement to other causes, but if they compare the best works on Egyptian matters published before Young's time with those that have since appeared, they must confess that they see a very marked difference of method traceable to the different bases on which the writers have argued. This influence is, however, nowhere more distinctly evident than in the brilliant discoveries of Sir Henry Rawlinson, Dr Hincks, and others. Their method is based on that pursued by the interpreters of hieroglyphics, and if the method be false with respect to these latter, it must in like manner be so with respect to the cuneiform characters, and the results of the interpreters of both be equally visionary conjectures.[1]

It is not easy, therefore, to form a just estimate of the importance of a discovery from which such extraordinary results have been deduced, nor can an inquiry into its truth be lightly set aside, when we perceive what would be the consequences of its abandonment. We should have to unlearn the alphabet of our criticism, to burn many of the most valued works of the last few years, or to use them with suspicion, and to begin afresh from the point to which our fathers had attained, having gained nothing but a rooted historical scepticism. An essay, then, which should give the fullest means of judging this question would be of no slight use, and the present article is intended to supply the want. This may be best done, not by a laboured argument for the system of interpretation, or a detailed examination of what has been urged against it, but by a simple account of the progress and results of the discovery, principally as they relate to the Egyptian language.

No small incitement to the examination of this question and the prosecution of the study by those who may be convinced that they can proceed on sure grounds, may be derived from the promise it affords of further discoveries of greater extent and importance than those which have been already made in the same province. If, from a partial reading of some of the inscriptions, and a yet more partial reading of a few of the papyri, such great results have been obtained, what might not be expected from a fuller examination of more ample materials? We have good reason to anticipate that the clearest light will be thrown upon the state of science among the Egyptians when the most famous pyramids were built, 4000 years ago, that we shall become acquainted with the details of their history from that time, without any great interruption, until the close of the native monarchy, and that most important additions will be made to our knowledge of the early history of the Jews, the Phœnicians, the Greeks, and other nations with whom the Egyptians were brought in contact by war or by trade. The simple fact that it is asserted by some of the best scholars of our day that we can read in Egypt inscriptions more than 4000 years old, contemporary with the events which they record, should stimulate inquiry, and excite for them greater interest than for any other of man's monuments.

Plan of the article.

The first section of this essay will contain a definition of the Egyptian systems of writing, and an account of the means of interpreting them afforded by the Coptic language, the statements of ancient writers, and the ancient Egyptian records. The second section will explain the method of Young, Champollion, and their followers, with a summary of its main results, and the chief reasons for its correctness, which may be deduced from various evidence, chiefly external. In this section the whole of Young's treatise, so far as it relates to the interpretation of the Rosetta Stone, will be reprinted from the fourth volume of the *Supplement* to this *Encyclopædia*, published in 1819, for it has been judged right to maintain this document intact, both in justice to the author and on account of its own importance. The third section will be devoted to a sketch of the grammar of the sacred dialect, expressed by the Hieroglyphic and Hieratic characters; while the principal differences of the vulgar dialect, expressed by the Demotic characters, will form the subject of the fourth and concluding section. In these two sections the object will be rather to point out the main characteristics of the Egyptian language, and to dwell upon those distinctive peculiarities that guide the comparative philologer, than to enter into minute details of interpretation. The essay is, as has been previously stated, especially addressed to the general scholar, who is invited to examine inquiries, which, from the manner in which they have been treated, have hitherto been almost confined to a very limited class.

The woodcuts (exclusive of Dr Young's) which are introduced are merely intended to explain the text. Their selection and the positions in which they have been placed have been determined by this explanatory intention alone.

SECTION I.

THE HIEROGLYPHIC, HIERATIC, AND DEMOTIC SYSTEMS OF WRITING, AND THE MATERIALS FOR THEIR INTERPRETATION.

Since the different systems of writing which prevailed among the ancient Egyptians are merely adaptations of the same principles, varying chiefly in their appearance and their use, they can be best explained by tracing their origin and history before offering definitions of each of them.

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[1] The argument, here given in outline, is more fully stated in the latter part of the second section of the present article.

History of the Egyptian systems of writing.

Although there is reason to suppose that the most ancient kind of Egyptian writing of which we possess examples, the hieroglyphic, originated from pure picture-writing,[1] it will not be safe to attempt a description of anything anterior to the oldest hieroglyphic inscriptions. These are extant in the tombs near the Pyramids of El-Geezeh, and date about the time of the commencement of the Fourth Dynasty,[2] B.C. *cir.* 2440.[3] In them we find a combination of picture-writing with a phonetic system. The picture-writing was by means of what have been termed ideographic signs,[4] which represented real things by their figures, and ideal things by symbols. The phonetic characters were both syllabic and alphabetic—the syllabic being used for particular syllables alone, and sometimes abbreviated by the first character standing for the whole syllable, and the alphabetic being occasionally not arranged in the order of pronunciation, the medial vowel being placed after the consonant or consonants which it preceded in sound. Both systems were combined by the ideograph being used as a determinative,[5] usually following the word for which it stood, and, in a few cases, forming its first phonetic character; but most words were written either by ideographs alone, or phonetically alone, while one of the two classes of characters was not exclusively employed in any inscription. The same continued to be the essential characteristics of the hieroglyphics down to the latest period at which they were employed, the time of the Roman Emperor Trajanus Decius, A.D. 249–252, notwithstanding certain changes which are noticed below (note 1). The earliest hieroglyphic writings are the inscriptions mentioned above, and no papyri have yet been found which can be assigned to the same period; nevertheless, as the character representing a roll of papyrus occurs in these inscriptions, there is no doubt that at their remote period records were preserved in books as well as on stones.[6] It cannot be determined, however, whether the hieroglyphic mode of writing was exclusively used for these books, or whether the hieratic had been already introduced.

Hieroglyphic system.

Rarely do we find the same characters employed without modification for any long period in the inscriptions and books of any nation. Those forms which most suit a stone wall, least suit the convenience of a scribe, especially when they abound in detail or ornament. The hieroglyphics, while they are particularly fitted for inscriptions, are, if not modified, most unsuitable to ordinary writing. First of all, what need would there be in the latter case to colour them either according to the natural colours of the objects which they represented, or of one uniform hue? Then, how could their minute details, rather ornamental than distinctive in their intention, be preserved when they were represented of a small size? We cannot wonder, therefore, that there arose what Champollion has named the *linear* hieroglyphics, in which the simplest forms and outlines of objects were alone given, or even these were further simplified, so as to be formed with one or two strokes. These characters, by being carelessly written, were soon corrupted into ruder forms, and hence originated the *Hieratic* system of writing, which stands in the same relation to the hieroglyphic, that our ordinary written hand does to our ordinary printed character. When the hieratic writing first came into use has not been determined. The rude quarry-marks on the stones of the Great Pyramid,[7] and of other pyramids,[8] certainly bear a strong resemblance to hieratic; but this resemblance is easily explained, if we suppose them to be scrawled hieroglyphics. It seems probable, however, from the nature of the case, that the hieratic system must have been invented soon after the hieroglyphic. The most ancient specimen of which the date is approximatively fixed by our knowing under what reign it was executed, was found on the mummy-cloth of a king[9] Nantef, probably of the Ninth Dynasty,[10] which began B.C. *cir.* 2200. Perhaps the hieratic inscription of the mummy-case of Queen Munthotp may be referred to the same period.[11] Both are undoubtedly of the time before the Eighteenth Dynasty, which began B.C. *cir.* 1525.[12] The difference between the hieroglyphic system and the hieratic, besides that of the form of the characters, is not great, and may be traced to the desire to render the inscriptions of the temples and tombs as ornamental as possible, which was not felt with respect to the hieratic manuscripts. Hence the use of phonetic characters was more prevalent in the latter, and the grammatical forms were more usually expressed, though the advantage that we should expect to gain from these circumstances is outweighed by the careless manner in which the characters have been written, rendering their interpretation often extremely difficult.[13] It must not be supposed that the hieratic system alone

Hieratic system.

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[1] The circumstances that we find the earliest Egyptian inscriptions to contain a larger proportion of ideographic signs than the later, and that this proportion, for the most part, constantly decreased in subsequent times, and, moreover, that the arrangement of the characters shews a greater regard for appearance in these oldest records, all tend to support the opinion that the Egyptian hieroglyphics had their origin in picture-writing. The nature of these hieroglyphics strongly confirms this opinion, no less than do the prevalence of systems of picture-writing among existing savage nations, and the undoubted origin of more than one ancient method of writing from such a system.

[2] The greatest number of inscriptions of this period which have been published are given by Lepsius in his *Denkmäler aus Ægypten und Æthiopien*, Abth., ii., Bl. 1, *et seqq.*

[3] See *Horæ Ægyptiacæ*, p. 223. Some, and particularly Bunsen and Lepsius, carry this date about a thousand years earlier, while scarcely any one possessing any acquaintance with the interpretation of hieroglyphics brings it down to a later period than the twenty-fifth century B.C.

[4] The term "ideographic" must be understood in a metaphysical sense, since it comprehends signs for real as well as for ideal things.

[5] This word "determinative" is retained for lack of a fitter. "Restrictive adjunct" would suit better in most instances, but is not applicable in all cases.

[6] This is observed by Lepsius in speaking of the papyrus:—"Ihre Benutzung lässt sich in Ægypten bis in die ältesten Zeiten zurück nachweisen; die Papyrusrolle und die Schreibapparat finden sich bereits auf Monumenten der vierten und fünften Dynastie, also im vierten Jahrtausend vor Christus" (*Chronologie der Ægypter*, vol. i., p. 33). Manetho tells us that Athôthis, the second king of the First Dynasty, wrote "books on anatomy," which would seem, if Africanus's version be more accurate than that of Eusebius, to have been in existence in the time at which the Egyptian historian lived. *Οὗ φέρονται βίβλοι ἀνατομικαὶ* (Afr.) *Βίβλους ἀνατομικὰς συνέγραψεν* (Eus. Gr.) Libros de ratione secandorum corporum scripsit (Id. Arm. *trans. Mai.*) Manetho also ascribes to Sûphis [I.] of the Fourth Dynasty, builder of the Great Pyramid, the writing of "the sacred book." Such evidence might almost make us say with Pliny, "Ex quo apparet æternus literarum usus" (*Hist. Nat.*, lib. vii., c. 57).

[7] Vyse's *Pyramids of Gizeh.* Fol. plates, pls. v., vi., vii.; and 8vo, vol. ii., pl. facing p. 15.

[8] Vyse's *Pyramids of Gizeh*, vol. iii., p. 13, and pl. facing p. 14.

[9] Thebes, 1848, MS. Notes of the Writer.

[10] *Horæ Ægyptiacæ*, p. 227. Some hold this king to have been of the Eleventh Dynasty; but by doing so, do not much alter his date. It is generally admitted that the line to which he belonged, whether Manetho's Ninth or Eleventh Dynasty, immediately preceded the Twelfth, the commencement of which is usually placed not earlier than the twenty-fourth century B.C., nor later than the beginning of the twenty-first. At least one other king of the same name seems to have ruled as late as shortly before the Eighteenth Dynasty.

[11] Copy by Sir Gardner Wilkinson, presented by him to the Department of Antiquities of the British Museum.

[12] *Hor. Æg.*, p. 198.

[13] The scrupulous accuracy of the monumental inscriptions would lead one to suppose that the papyri would be carefully written,

was used for the class of records to which it doubtless owed its origin, the papyri, for some have been found written in linear hieroglyphics, and others even in characters little or not at all less finished than those of the inscriptions. Historical manuscripts, however, appear to have been always written in hieratic characters, and the many that we possess render a study of these characters second only in importance to that of the hieroglyphics. It does not certainly appear when the hieratic writing ceased to be used; but most of the specimens extant are not later than the time of the Twentieth Dynasty, which began B.C. *cir.* 1220: from the famous passage of Clemens Alexandrinus on the Egyptian systems of writing, we may infer, though not necessarily, that hieratic was still employed when he wrote (A.D. *cir.* 200), and certainly that it was studied by the priests. The circumstance that the earliest demotic scarcely differs from the hieratic, except in the dialect it expresses, affords a strong argument to shew, that the latter was little used at the time of Psammitichus I., when we first find demotic writing.

Demotic system.

At the period of the Saïte kings of the Twenty-sixth Dynasty, if not before, a necessity had arisen for a character by which to express the vulgar dialect. Although there is no doubt that, in the earliest times, the written and the spoken language were the same, the intermixture with foreigners was not long in producing a debasement, which may be dated, if we believe a statement usually ascribed to Manetho, as early as when the shepherd-races were in Egypt.[1] The large importations of foreigners from the east and the south, if not from the west also, under the conquering sovereigns of the Eighteenth, Nineteenth, and Twentieth Dynasties, and their employment in the service of the temples,[2] as well as in constructing them, and in other public works, the maintaining of a mercenary force by those and later monarchs,[3] then the rule of the half-Assyrian or Babylonian Twenty-second Dynasty,[4] and the Ethiopian Twenty-fifth[5]—must have tended to produce what is usual in these circumstances with all languages, and inevitable to a system of characters elaborate in form, if employed by the great body of the people. It is very erroneous to suppose that among so civilized a nation as the Egyptian, learning was confined to the priesthood and the wealthy, and that the lower classes were altogether destitute of a knowledge of their written character.[6] The rude quarry-marks intended to guide the workmen as to their tasks are not erroneous, though carelessly executed, and they must have been meant for men who could understand their import. Besides, for whom was the equally complicated demotic invented, if not for the great body of the people? The religious character of the nation, their complicated mythology, and the importance which their various rites were held to possess, must have necessitated some knowledge of a system of writing, which is in part so addressed to the eye, that it would be impossible for one knowing the speech which it represented not to become somewhat acquainted with the meaning of its signs. The Egyptian language had therefore become corrupt, at least in the mouths of the common people, and a need of some manner of writing it in this state had arisen. The demotic or enchorial system was therefore formed by an adaptation, which soon became a degradation, of the hieratic, from which it differed mainly in expressing a debased form of the language, the vulgar dialect, but also in its signs being, except in its most ancient form, ruder in shape, and probably fewer,[7] and in a preference being given to phonetic characters over representations and symbols. The demotic system was chiefly used for legal documents and religious writings on papyrus, and sometimes, but very rarely, for inscriptions. In the latter case it was occasionally employed, as in the famous Rosetta Stone, to render a hieroglyphic inscription intelligible to the main body of the people. Hieroglyphics continued to be used, as already noticed, as late as in the third century of the Christian Era, not long after which time the demotic system seems to have been abandoned. Soon after the cessation of hieroglyphic writing, the Coptic alphabet appears to have originated, taking the place of the demotic system, for we can trace it back to about the fourth century. This mode of writing is naturally most connected with the demotic, since the language which it expressed differed but little at first from the vulgar dialect expressed by the demotic and, from being used for ecclesiastical purposes, was always preserved in its original form, though possessing three dialects, and since, moreover, it borrowed demotic characters for those sounds for which equivalents were not found in the Greek alphabet in which it was otherwise written. Before noticing the Coptic language, which must be done on account of its great importance as the chief means of interpreting the hieroglyphic, hieratic, and demotic systems, when once the sounds of

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more especially those of the *Ritual.* Such, however, is far from the case; for the historical papyri are most carelessly written, and the copies of the *Ritual,* though executed with more pains, are remarkably different in wording, as if written both at dictation and from memory, and are not free from clerical errors.

[1] Ἐκαλεῖτο δὲ τὸ σύμπαν αὐτῶν ἔθνος Ὑκσώς, τοῦτο δέ ἐστι βασιλεῖς ποιμένες· τὸ γὰρ Ὑκ καθ' ἱερὰν γλῶσσαν βασιλέα σημαίνει, τὸ δὲ Σὼς ποιμήν ἐστι καὶ ποιμένες κατὰ τὴν κοινὴν διάλεκτον, κ. τ. λ. (*Jos. contr. Ap.*, lib. i., cap. 14). Since Josephus does not always quote Manetho verbatim, as appears from a subsequent place, where he says (cap. 26),—Κἄπειτα κατὰ λέξιν οὕτω γέγραφεν; and as in the present place, he appends a remark almost certainly his own—(τινὲς δὲ λέγουσιν αὐτοὺς Ἄραβας εἶναι)—besides that the infinitive is used with φησὶν in what follows this last citation, the etymology given above cannot be positively assigned to the Egyptian historian. It should also be remembered that subsequently Josephus gives, on the authority of Manetho, "in another book of the *Ægyptiaca,*" what must be regarded as a different etymology of the former part of this word (Comp. *Horæ Æg.*, pp. 182–184).

[2] See, for instance, Rosellini, *Monumenti Storici,* No. xlv., 1; and Mr Birch's paper on the Statistical Tablet of Karnak, *Trans. Royal Society of Literature,* New Series, vol. ii., p. 330.

[3] Comp. *Ancient Egyptians,* vol. i., pp. 389, 390.

[4] The importance of mercenaries under this line is shown by the fact mentioned by M. Mariette, in his "Renseignements sur les soixante-quatre Apis trouvés dans les Souterrains du Sérapéum" (*Bulletin Archéologique de l'Athenæum Français,* Oct. and Nov. 1855), that a king's son-in-law held the command of the Mashuash, these being foreigners in the service of the reigning Pharaoh.

[5] The rulers of this Dynasty may be supposed, from Sir Henry Rawlinson's recent discoveries, indicating a connection between the Asiatic and African Ethiopians, to have been of not dissimilar origin to the kings of the Twenty-second.

[6] Herodotus seems to speak of the great body of the people when he says,—Αὐτῶν δὲ δὴ Αἰγυπτίων, οἳ μὲν περὶ τὴν σπειρομένην Αἴγυπτον οἰκέουσι, μνήμην ἀνθρώπων πάντων ἐπασκέοντες μάλιστα, λογιώτατοί εἰσι μακρῷ τῶν ἐγὼ ἐς διάπειραν ἀπικόμην, ii. 77. On this passage Lepsius remarks: "Die letzten Worte beziehen sich nicht auf die geschichtlichen Ereignisse allein, sondern auf alle aufbewahrenswürdige Erfahrungen; Herodot meint, sie waren das litterateste Volk. Vom Gedächtniss ist nicht die Rede; das hatte ihnen Hermes, nach dem Ausspruche des Sokrates durch das frühe Geschenk der Schrift vielmehr verkürzt" (*Chronologie der Ægypter,* vol. i., p. 40, note 4). Herodotus thus clearly makes the Egyptians the most literary people with whom he had associated; and his own nation was then, we must remember, remarkable for the eagerness with which it cultivated letters. The contrary statement of Diodorus Siculus (lib. i., c. 81) cannot be of much value against the opinion of Herodotus.

[7] Since Dr Brugsch has discovered no more than 184 distinct demotic characters, excluding ligatures and numerals, or less than one-third of those found in hieroglyphics, most if not all of which have their hieratic forms, there seems little reason to doubt that the demotic list was more restricted than the hieratic (See *Grammaire Démotique,* Table A.B.). Our opinion is, however, in this particular at variance with Dr Brugsch's.

their characters are known, it will be necessary, in order to avoid confusion, to give definitions of these systems with the different names by which they have been called in ancient and modern times.

The Sacred Characters.

Definition of Hieroglyphics.

1. The *Hieroglyphic* characters, or *Hieroglyphics.*—Eg. " Writing of sacred words."[1] Gr. γράμματα ἱερὰ,[2] γράμματα ἱερογραφικὰ,[3] ἡ ἱερογλυφικὴ (γραμμάτων μέθοδος),[4] τὰ ἱερογλυφικὰ.[5] Lat. Hieroglyphicæ litteræ,[6] hieroglyphicæ,[7] hierographicæ litteræ.[8]

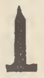


Fig. 1.

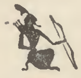


Fig. 2.

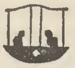
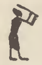


Fig. 3.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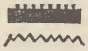
Fig. 5.

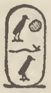
Fig. 6.

Delineations of material objects employed to denote ideographically real things by figures, the iconographic mode, as—(fig. 1) " an obelisk,"[9] (fig. 2) " a soldier;"[10] ideal things by symbols, the symbolic mode, as (fig. 3) " a panegyry," where the place of celebration stands for the thing celebrated;[11] (fig. 4) " to strike," where the act is represented by the agent (whence it is evident that some signs would be used both in a real sense and an ideal, according as they represented the agent or the act); or to represent sounds phonetically by characters, either syllabic, as (fig. 5) " MEN," " to establish, place,"[12] where the first character when written alone implies the second, or alphabetic, as (fig. 6) " SHUFU," or " KHUFU," the name of the second king of the Fourth Dynasty;[13] few signs being used in both classes, or in both kinds of the former class. These characters were written horizontally, from right to left, or from left to right; and vertically downwards, from right to left, or from left to right; but in either case from right to left by preference.

The following examples[14] will show the different modes of arrangement (fig. 7) :—

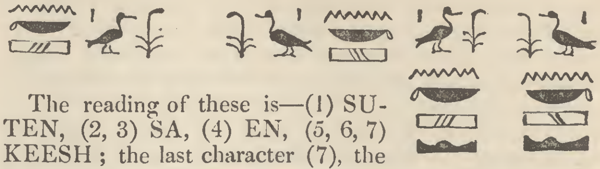
Fig. 7.

The reading of these is—(1) SUTEN, (2, 3) SA, (4) EN, (5, 6, 7) KEESH; the last character (7), the determinative of foreign geographical names, being omitted in the first and second examples. The arrangement may therefore be thus represented :—

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4                   4   3 2 1     1 2 3
5  3 2 1    1 2 3   5     4         4
6                   6     5         5
                          6         6
                          7         7
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The first character or group is that which is highest and nearest to the side towards which the characters of the inscription look, a rule to which very few exceptions have been observed.[15]

Definition of Hieratic.

2. The *Hieratic* characters, Gr. ἡ ἱερατικὴ (γραμμάτων μέθοδος).[16]

A cursive form of the hieroglyphic method of writing, usually written horizontally from right to left, as (fig. 8) " the king of Upper and Lower Egypt, Unas,"[17] the last sovereign of the Fifth Dynasty.

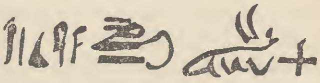
Fig. 8.

The Vulgar Characters.

Definition of Demotic.

The *Demotic* or *Enchorial* characters. Eg. " Writing of books."[18] Gr. γράμματα ἐγχώρια,[19] γράμματα δημοτικὰ,[20] γράμματα δημώδη,[21] ἡ ἐπιστολογραφικὴ γραμμάτων μέθοδος.[22]

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[1] Rosetta Stone, Hierog. Inscript. See Bunsen's *Egypt's Place*, vol. i., p. 598.

[2] Rosetta Stone, Gr. Inscript.; *Herod.* ii., 36; *Diod. Sic.* i. 81.

[3] Syncellus *Chron.*, p. 40, à Pseudo-Manethone.

[4] *Clem. Strom.*, lib. v.

[5] Lucian. *Philop.* 21.

[6] Macrob. *Saturn.*, lib. i., cap. 21.

[7] *Ammian. Marcel.*, lib. xvii., cap. 4.

[8] Id., lib. xxii., cap. 15.

[9] Comp. Obelisks of Amyrtæus, Brit. Mus.

[10] The corresponding phonetic word, of which it is the determinative, is MASH. Chevalier Bunsen supposes its signification to be " an archer " (*Egypt's Place*, vol. i., pp. 471, 503), although he makes its variant, the standing figure, to signify " soldier, archer" (p. 498), but it means simply a foot-soldier, being employed in apposition to " horse " (ex. gr. *Select Papyri*, pl. xxiv., lib. 1), by which term, when used of an Egyptian army, the chariot-force seems always intended; and this may explain the employment of " horsemen " in the Bible for that force, except auxiliary horse be meant, for the Egyptians appear to have had no native cavalry. It should also be noted that the Coptic corresponding words do not indicate the meaning of archer, but simply of warrior. The archer's figure was chosen since most of the Egyptian troops carried bows. So in the Bible we read,—" The children of Ephraim, armed of the archers, turned back in the day of battle." (Ps. lxxviii. 9; comp. 2 Chron. xvii. 17.) The root MASH may be compared with the Greek *Μάχη*.

[11] The HEEB has been called a panegyry, since it is so translated in the Greek inscription of the Rosetta Stone, and evidently by Herodotus (ii. 58, 59); and it seems undesirable to alter a rendering that has been universally adopted. Nevertheless the *πανήγυρις* of the ancient Greeks was properly very different from the Egyptian HEEB. The former was, as its etymology indicates, an assembly of the whole nation particularly for games, or an assembly held at the games or at other great festivities. Thus, Agamemnon is made by Æschylus to promise any needed redress of wrongs to his people at the approaching panegyry (*Æsch. Ag.* v. 853, ed. Schütz), where the ambiguity of the poet's language makes it doubtful whether the celebration of games is spoken of in connection with the panegyry or not (comp. the note of Schütz). The HEEB appears to have been properly a solemnity for the dead, since HEB (perhaps HEEB —the vowel being doubtful) signifies to " lament the dead—a funeral lamentation;" and in the earliest inscriptions, which it should, however, be recollected, are almost exclusively in tombs, it is used alone for festivals of the gods for the deceased. In the inscriptions of temples and the like, of somewhat later, and much later times, this word is employed for the festivals of gods celebrated in the temples, and for the king's festivals; and the great hypostyle halls of the temples were especially devoted to such celebrations. They had, however, a strictly religious character, and there is no distinct evidence to show that they were ever political councils. The Greek word would therefore be best rendered " assembly,"—the Egyptian " solemnity."

[12] Most of the syllabic characters are used alone for a single root and words derived from it, and this appears to have been their original use. Their initial letter, which is the principal one of the two or three of which they are composed, has sometimes a determinative power, and this was probably the case with all such letters originally. Hence arises the division of syllabic characters into the simply phonetic and the determinative-phonetic.

[13] This king, the Sûphis (I.) of Manetho (Africanus) and the Cheops of Herodotus, is recorded to have been the builder of the Great Pyramid, which, however, was probably the joint work of himself and Num-Shufu, Sûphis (II.), who appears to have been his co-regent. (See art. EGYPT.)—It is difficult to decide whether the alphabetic consonants have inherent vowels, when no vowels are expressed, as Dr Hincks has supposed (see his learned papers in the *Transactions of the Royal Irish Academy*, vol. xxi., pt. 2), and the reply of Chevalier Bunsen (*Egypt's Place*, vol. i., pp. 733, *et seqq.*), who nevertheless inclines to admit Dr Hincks's theory in some instances, as appears from his *Alphabet and Syllabarium* (Id., pp. 556, *et seqq.*) The constant writing of foreign names with the vowels would seem to favour the idea of their being inherent, but this is only *primâ facie* evidence, for the Arabs usually omit the vowel points except in difficult words or passages, as in poetry and the like.

[14] The examples in this essay are given in their original directions.

[15] Rosellini, *Mon. Stor.*, Nos. cxxxix.-cxli.

[16] *Clem. Strom.*, lib. 5.

[17] *Turin Papyrus of Kings*; ed. Wilkinson. There is great difference in the various " hands" in which we find hieratic written; the best most resemble the hieroglyphic, and the worst rather approach the demotic, the earliest form of which, indeed, differs from the hieratic in expressing the vulgar dialect rather than in its appearance. (Comp. *Brugsch's Grammaire Démotique*, pl. i.)

[18] Rosetta Stone, Hierog. Inscript. (Comp. *Gram. Dém.*, pp. 2, 3.)

[19] Inscr.

[20] *Herod.* ii. 36.

[21] *Diod.* iii. 3.

[22] *Clem. Strom.*, lib. v.

A debased form of the hieratic method of writing, differing from it mainly in expressing the vulgar dialect, but also in its signs being ruder in form, probably fewer, and in a preference being given to the use of phonetic characters over iconographic and symbolic. It was written from right to left, horizontally, as in the following example (figure 9), the name of Ptolemy from the Rosetta Stone.[1]

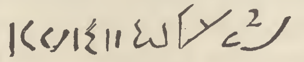

Fig. 9.

These definitions must be regarded as provisional, and the observations which have preceded them as hypothetical, in the present stage of the inquiry. It is, however, advisable to premise thus much in order to render what follows clear, and these premises will receive entire confirmation in the succeeding portion, of which they may indeed be regarded as the results.

elation of ncient gyptian o Coptic.

When anything written in cipher is placed before one to be deciphered, his first inquiry is what language it conveys. Before attempting to read the Egyptian characters, our first step must be to ascertain from other sources, if possible, the language they express. We find by the Rosetta Stone that both hieroglyphic and demotic were in use as late as the time of Ptolemy Epiphanes, on the 27th March (Jul.) of whose 9th year (B.C. 196)[2] the decree on that monument is dated, and we can trace up Coptic to the fourth century of the Christian Era, so that there is an interval of not more than about 600 years from the latest hieroglyphic and demotic writing to the earliest Coptic, which, it should be observed, is identical with the later Coptic. We cannot doubt, therefore, that the vulgar dialect expressed by the demotic characters of the Rosetta Stone differed from the Coptic but little. The sacred dialect must have differed from the latter somewhat more. The essential identity of the two can, however, be satisfactorily proved by the etymology given by Greek and Latin writers of certain Egyptian words, which must have belonged from their nature to the sacred dialect, and which may be equally derived from Coptic.

Thus, among names of divinities, Plutarch gives us two etymologies of that of the chief god of Thebes :—*ἔτι δὲ τῶν πολλῶν νομιζόντων ἴδιον παρ' Αἰγυπτίοις ὄνομα τοῦ Διὸς εἶναι τὸν 'Αμοῦν (ὃ παράγοντες ἡμεῖς Ἄμμωνα λέγομεν), Μανεθὼς μὲν ὁ Σεβεννίτης τὸ κεκρυμμένον οἴεται καὶ τὴν κρύψιν ὑπὸ ταύτης δηλοῦσθαι τῆς φωνῆς· Ἑκαταῖος δὲ ὁ 'Αβδηρίτης φησὶ τούτῳ καὶ πρὸς ἀλλήλους τῷ ῥήματι χρῆσθαι τοὺς Αἰγυπτίους, ὅταν τινὰ προσκαλῶνται. προσκλητικὴν γὰρ εἶναι τὴν φωνήν. κ. τ. λ.*[3] The former of these two etymologies, resting on the high authority of Manetho, the Egyptian historian (B.C. 300), is doubtless from the sacred dialect. In Coptic the word ⲁⲙⲟⲛⲓ signifies "to hold, retain, put round (clothing), prohibit, hidden things," &c., and ⲁⲙⲟⲩⲛⲓ, "hidden things." The derivation of Hecatæus of Abdera is only useful as indicating that the vulgar dialect of his time was similar to the Coptic, in which we find the word ⲁⲙⲟⲩⲛ, meaning, in the Sahidic dialect, "come." Respecting names of Isis, the same writer (c. 56) from whom we have quoted above says,—*Ἡ δ' Ἶσις ἔστιν ὅτε καὶ Μούθ, καὶ πάλιν Ἄθυρι καὶ Μεθύερ προσαγορεύεται· σημαίνουσι δὲ τῷ μὲν πρώτῳ τῶν ὀνομάτων, μητέρα· τῷ δὲ δευτέρῳ, οἶκον Ὥρου κόσμιον. . . τὸ δὲ τρίτον σύνθετόν ἐστιν ἔκ τε τοῦ πλήρους καὶ τοῦ αἰτίου. κ. τ. λ.* In Coptic we have ⲙⲁⲩ, "a mother," which with the sign of the feminine, which was usually written, and evidently sometimes expressed in pronunciation, by the ancient Egyptians, would be MAUT, MAUTH. The abode of Horus, in Coptic, would read ⲏⲓⲛ̀ϩⲱⲣ, where, if we discard the preposition ⲛ̀, there remain ⲏⲓ and ϩⲱⲣ. The Copts would, however, rather have written ⲙⲁⲛ̀ϩⲱⲣ. The third derivation probably cannot be traced in Coptic. Among the names of sovereigns may be specified Νίτωκρις, rendered by Eratosthenes (B.C. 230), *'Αθηνᾶ νικαφόρος.*[4] The first part of this word is the well-known Egyptian name of the goddess Νηΐθ,[5] and the second is traceable in the Coptic ϭⲣⲟ, ϫⲣⲟ, victory. In the same list of Eratosthenes we read *Φρουορῶ ἤτοι* Νεῖλος,[6] corresponding to the Coptic ⲫⲓⲁⲣⲱ, "the river," a name of the Nile.

Much stronger evidence than this from royal names for the essential identity of the sacred dialect and the Coptic is furnished by the names of common things, which are in their nature least of all liable to change. Thus Eustathius says—*ἔστι δὲ ἕρπις Αἰγυπτιστὶ ὁ οἶνος*;[7] and Tzetzes, *Αἰγύπτιοι ἕρπιν καλοῦσι τὸν οἶνον*;[8] and we find in Coptic ⲏⲣⲡ, "wine." The Egyptian for water is given as *μῶ* (*τὸ γὰρ ὕδωρ μῶ οἱ Αἰγύπτιοι καλοῦσιν*[9]) by Josephus, and as *μῶς* (*τὸ γὰρ ὕδωρ μῶς ὀνομάζουσιν Αἰγύπτιοι*)[10] by Philo Judæus, and this is identical with the Coptic ⲙⲱⲟⲩ. The word *πίρωμις*, again (*πίρωμις δέ ἐστι κατ' Ἑλλάδα γλῶσσαν καλὸς κἀγαθός*),[11] is the same as the Coptic ⲡⲓⲣⲱⲙⲓ, "the man." The word *σβῶ* (*ἡ παιδεία παρ' αὐτοῖς σβῶ καλεῖται, ὅπερ ἐστὶν ἑρμηνευθέν, πλήρης τροφή*),[12] is preserved in ⲥⲃⲱ, "erudition, discipline, knowledge," and the like. Herodotus says that crocodiles were called *χάμψαι* (*καλέονται δὲ οὐ κροκόδειλοι ἀλλὰ χάμψαι*),[13] a name which we recognise in the Coptic ⲙ̀ⲥⲁϩ, "a crocodile ;" but from others it appears that a sacred crocodile was called *σοῦχος*,[14] retained in the ⲥⲟϫⲓ of the Copts. St Jerome says of the word "achi,"—"audivi ab Ægyptiis, hoc nomine lingua eorum omne quod in palude virens nascitur appellari ;"[15] and his assertion is borne out by the significations of ⲁϫⲓ (juncus, calamus, alga, carex), and ⲁϧⲓ (pratum, virens herba, juncus, calamus).

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[1] Rosetta Stone, Dem. Inscript.

[2] Comp. *Letronne in Frag. Hist. Græc.*, vol. i.; *Inscription Grecque de Rosette*, p. 13. The ninth year of Epiphanes commenced B.C. 197.

[3] *Plut. de Iside et Osiride*, c. 9. (Compare *Damascius*—*οἱ δὲ Αἰγύπτιοι καθ' ἡμᾶς φιλόσοφοι γεγονότες ἐξήνεγκαν αὐτῶν τὴν ἀλήθειαν κεκρυμμένην εὑρόντες ἐν Αἰγυπτίοις δή τισι λόγοις· ὡς εἴη κατ' αὐτοὺς ἡ μὲν μία τῶν ὅλων ἀρχὴ Σκότος ἄγνωστον ὑμνουμένη καὶ τοῦτο τρὶς ἀναφωνούμενον οὕτως·* Cory's *Anc. Frag.*, 2nd ed., p. 320.)]

[4] *Eratosthenes* ad calc. *Herod.*; Didot, p. 183. The names and their etymologies in this list of Eratosthenes are undoubtedly genuine, although the chronology is extremely corrupt. This corruption may be the result of the fraud of a copyist.

[5] *Plat. Tim.*, p. 21.—*οἷς τῆς πόλεως θεὸς ἀρχηγός τίς ἐστιν, Αἰγυπτιστὶ μὲν τοὔνομα* Νηΐθ, *Ἑλληνιστὶ δέ, ὡς ὁ ἐκείνων λόγος,* Ἀθηνᾶ.

[6] *Eratosth.* (*Herod.*) Didot, p. 184.

[7] *Eustath. ad Od.* ix., v. 359.

[8] *Tzetz. ad Lycoph.*, v. 579.

[9] *Jos. Ant. Jud.* ii. 9.

[10] *Philo de vitâ Mosis*, tom. ii., p. 83.

[11] *Herod.* ii. 143. This rendering of the Greek historian, which has been supposed to prove his ignorance of the Egyptian language, should, we think, rather be considered as an evidence of his acquaintance with it. We find, in the famous procession of the four races, in the Tombs of the Kings at Thebes, that the Egyptians are alone called "mankind," while the other races receive their Gentile appellations, and observe that, on all their monuments, the Egyptians are represented as handsome, and called good, whereas foreigners are represented as ugly, and called wicked. It is surprising that any should have doubted that Herodotus meant that *πίρωμις* signified man, although he indicated that it signified a particular kind of man, since his translation includes the former meaning as much as does its English equivalent "a gentleman," and the context should remove any doubt that might exist.

[12] *Horap. Hierogl.*, lib. i., c. 38.

[13] *Herod.* ii. 69.

[14] *Strabo Geogr.* xvii., p. 811; *Photius Bibl.* ap. Parthey. *Vocab. Copt.*

[15] *Hieron. in Jesaiam*, lib. vii.; tom. iv., col. 291, *Vallars.* See more etymologies given by ancient writers in Parthey's *Vocab. Copt.*

The evidence derived from these etymologies and correspondences as to the essential identity of the Coptic language with the sacred, as well as with the vulgar, dialect of the ancient Egyptian, is well supported by that deduced from the names of ancient cities and nomes of Egypt. Such words as these usually remain unchanged in the course of many centuries, and we find that the Copts called a town by a name derived from that of a divinity of the religion they had abandoned, and that at this day the Muslim inhabitants still use it. If the Coptic affords a satisfactory explanation of the signification of a name which must have been given long before the Egyptian language was called Coptic, and given, necessarily, in the sacred dialect, we obtain a fresh evidence of the essential identity of what we may venture to call the two states of the language. The following examples will show the satisfactory nature of this evidence:—ⲃⲟⲩⲥⲓⲣⲓ, Busiris, ⲡⲟⲩⲥⲓⲣⲓ, ⲡⲟⲩⲥⲩⲣⲓ, a name applied to two other towns, called in Arabic, Aboo-Seer, properly Booseer, certainly meaning "the (town) of Osiris;" the first of these places is mentioned by Herodotus,[1] who visited Egypt, B.C. *cir.* 450. ⲑⲃⲁⲕⲓ ⲛ̀ⲧⲉ ⲡⲓⲁⲙⲟⲩⲛ, ⲡⲓⲁⲙⲟⲩⲛ, Thebes, or Diospolis, "the city of Amen," corresponding to the Hebrew נא אָמוֹן spoken of by the prophet Nahum,[2] B.C. *cir.* 700; ⲙⲁⲛ̀ⲑⲱⲟⲩⲧ, "the abode of Thoth;" ⲛⲁⲏⲥⲓ, "the (abode) of Isis," Anysis, mentioned by Herodotus;[3] ϫⲉⲙⲛⲟⲩϯ, Sebennytus, a name composed of that of Hercules, ϫⲉⲙ (?), and ⲛⲟⲩϯ, a god.

Characteristics of Coptic.

We may therefore safely conclude that the Coptic language is essentially the same as that of the ancient Egyptians in both its sacred and its vulgar dialect, but differing more from the former than from the latter. If then we can discover the sounds conveyed by the hieroglyphic or demotic characters, we shall have to look to the Coptic for their meaning. It will be necessary, however, as a test of the accuracy of this conclusion, to examine the Coptic in order to ascertain its characteristics, and if the conclusion be supported by this inquiry, it will acquire a still more definite form.

An analysis of a single verse of one of the Gospels will give a more distinct idea of the characteristics of the Coptic than any lengthened explanation. Ⲟⲩⲟϩ ⲁⲩⲓ̀ ⲛ̀ϫⲉ ⲛⲓⲫⲁⲣⲓⲥⲉⲟⲥ ⲛⲉⲙ ⲛⲓⲥⲁⲇⲇⲟⲩⲕⲉⲟⲥ ⲉⲩⲉⲣⲡⲓⲣⲁⲍⲓⲛ ⲙ̀ⲙⲟϥ ⲛⲁⲩϣⲓⲛⲓ ⲙ̀ⲙⲟϥ ⲉ̀ⲧⲁⲙⲱⲟⲩ ⲉ̀ⲟⲩⲙⲏⲓⲛⲓ ⲉ̀ⲃⲟⲗϧⲉⲛ ϯ̀ⲫⲉ. (Καὶ προσελθόντες οἱ Φαρισαῖοι καὶ Σαδδουκαῖοι, πειράζοντες ἐπηρώτησαν αὐτὸν σημεῖον ἐκ τοῦ οὐρανοῦ ἐπιδεῖξαι αὐτοῖς.)[4] ⲟⲩⲟϩ, "and," signifies also a "house; to be added, increased; to place to, to inhabit;" &c. ⲁⲩⲓ̀ "came" (they), 3d pl. com. past indefinite of ⲓ̀, "to go, come." ⲁⲩ is a pronominal prefix derived from ⲁ, the characteristic of the past indefinite, and ⲟⲩ, the suffixed pers. pron. 3d pl. com. "they" and "their." ⲛ̀ϫⲉ, a particle prefixed to nominatives. ⲛⲓⲫⲁⲣⲓⲥⲉⲟⲥ: ⲛⲓ, pl. com. of the article prefixed to the corrupt sing. of a Greek word, ⲫⲁⲣⲓⲥⲉⲟⲥ, for Φαρισαῖος, in order to render it plural. ⲛⲉⲙ, conj. "with," also "to" and "also." ⲛⲓⲥⲁⲇⲇⲟⲩⲕⲉⲟⲥ, as ⲛⲓⲫⲁⲣⲓⲥⲉⲟⲥ. ⲉⲩⲉⲣⲡⲓⲣⲁⲍⲓⲛ, "tempting;" comp. from ⲉⲣ, causative prefix, and ⲡⲓⲣⲁⲍⲓⲛ, "to tempt," corrupted from the Gr. πειραζειν. ⲉⲩ, pron. prefix pl. com. of the participle present. ⲙ̀ⲙⲟϥ, "him," deriv. pron. 3d sing. m. for the accusative, from prep. ⲙ̀, and ϥ suffixed pers. pron. "he, his." ⲛⲁⲩϣⲓⲛⲓ, "asked," ϣⲓⲛⲓ, "to ask"— ⲛⲁⲩ pron. prefix 3d pl. com. of imperfect. ⲙ̀ⲙⲟϥ. ⲉ̀ⲧⲁⲙⲱⲟⲩ, "to show," ⲧⲁⲙⲱⲟⲩ, "to show"— ⲉ̀ prep. employed as preformative of the infinitive. ⲉ̀ⲟⲩⲙⲏⲓⲛⲓ, "a sign— ⲉ̀ prep. employed as preformative of the accus., either separately or joined to the noun which it precedes, ⲟⲩ indef. art. com. sing. "a;" ⲙⲏⲓⲛⲓ, a "sign." ⲉ̀ⲃⲟⲗϧⲉⲛ, "from." ϯ̀ⲫⲉ "heaven"; ϯ̀ def. art. fem. sing.; ⲫⲉ, "heaven."

From this analysis we see at once that Coptic contains Greek words in barbarous forms. They are very numerous, and are particularly used to supply deficiencies in the ancient language as well as to express foreign proper names. In both cases they retain their original sound, although sometimes not exactly their original form, and are usually indeclinable except by prefixes, like the greater number of Egyptian words. We may discard these Greek words, having learned from them two things,—(1), how foreign words were introduced into the Egyptian language at a period probably commencing somewhat before the Christian Era, and terminating at, or not long after, the overthrow of paganism in the country; and (2), what words of the ancient language, that is, those referring to religion and metaphysics, we are least to expect to find preserved in the Coptic. It is also worthy of notice that some Arabic words crept into the Coptic after the Muslim conquest of Egypt.

A language may be considered as to its original forms, its derivative forms, its compound forms, its modes of expressing gender, number, relation, and time, and the relative position of its words in sentences, or roots, derivatives, compounds, inflexion, and syntax.

Roots.—It is impossible in Coptic, especially without the aid of the earlier forms of the language, to reduce all words to roots, particularly as we do not possess the entire vocabulary. The great majority of the supposed roots, however, present so remarkable an agreement that we need not hesitate in judging from their characteristics. In form they are monosyllabic, usually consisting of a vowel between two consonants, and are unchangeable except when they become derivatives. Two circumstances render it difficult to determine the original form of a root,—(1), the existence of three dialects of Coptic—the Memphitic,[5] the Sahidic or Theban, and the Bashmuric; and (2), the corruption of the language in form, resulting in the same root appearing in various forms. From these causes necessarily arises a great corruption in signification, words, the same in appearance, having different significations in the dialects, and the converse. Some examples from Peyron's *Lexicon* will explain this corruption, and the consequent confusion.

	Memphitic.	Sahidic.	Bashmuric.
A MOUTH,	ⲣⲟ, ⲣⲱ.	ⲣⲟ, ⲣⲱ.	ⲗⲁ, ⲗⲱ, ⲣⲁ.
TO DO,	ⲉⲣ, ⲓⲣⲓ, ⲣⲁ.	ⲉⲣ, ⲉⲓⲣⲉ, ⲓⲣⲉ.	ⲉⲗ, ⲉⲓⲗⲓ, ⲓⲗⲓ, ⲓⲣⲉ, ⲉⲓⲣⲉ.

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[1] *Herod.* ii. 59. The festival of Isis of which Herodotus speaks was probably held at Iseum, which stood near Busiris, and at the site of which are remains of a magnificent temple, probably founded not long after the historian's visit (see EGYPT).

[2] *Nah.* iii. 8.

[3] *Herod.* ii., 137.

[4] *St Matt.* xvi. 1. The Coptic version is that of the very handsome edition of the Gospels, printed by Mr Watts in 1847.

[5] By Coptic, the Memphitic dialect is usually intended, except when the whole language is spoken of without distinction of dialects. In the dictionaries, the Sahidic and Bashmuric words are alone distinguished as such. It is, however, not certain that the Memphitic is the purest form of the language; for some claim this honour for the Sahidic, all agreeing that the Bashmuric is corrupt.

These instances show not only the various forms which a root may take in the different dialects, but also the care that is necessary to avoid confounding distinct roots which happen to have the same form in different dialects: they likewise show the various forms a single root may assume in one dialect, evidencing the corruption of the language in form and in signification; for a root properly has but one form, and the most marked formal changes undoubtedly originally indicated, as they still do in many instances, a change in signification. At the same time many of the lesser formal changes can only be attributed to the carelessness of the earlier Copts.

Since we must infer from the accounts of ancient writers, without assuming any knowledge of the results of Young's and Champollion's discoveries, that the hieroglyphic method of writing was partly or wholly by ideographic signs, both of real and ideal things, we must expect to find the roots in Coptic having either real, generally substantive, or ideal, generally verbal, significations.

Derivatives and Compounds.—Derivatives are formed in three ways—by a change in sound, effected by the substitution of another vowel for that of the root; by reduplication; and by agglutination, one or more consonants or vowels, originally roots, being prefixed or suffixed to the root. There are properly no compounds, for what appear to be compounds are really words composed of two or three roots agglutinated together with scarcely any, or no, change.

Inflexion.—All Coptic words are in themselves unchangeable, and their inflexion is therefore not by essential changes, but by the addition of prefixes or suffixes. The few exceptions to this rule are susceptible of satisfactory explanation. The inflexion of nouns is effected either by the definite article, or by the addition of a vowel or diphthong, or a diphthong followed by a vowel in the case of the plural number, and by the addition of a vowel in the case of the feminine gender. Forms not agreeing with this rule may yet be traced to its operation. There is no dual in Coptic. The cases are distinguished by prefixed particles, either separate or joined. The inflexion of verbs is extremely complicated, from the great number of tenses. These are generally distinguished by prefixes, terminating in enclitic pronouns, with sometimes one or two separate suffixes.

Syntax.—Notwithstanding that it has been asserted that Coptic has no syntax, we find in it peculiarities of construction and concord that can be referred to no other head. The peculiarities of construction are especially to be noticed in the exuberant use of particles; and among those of concord may be instanced the agreement of a verb sing. fem. with nouns plur. com.

From these characteristics we may draw some conclusions as to the antiquity of the Coptic language, and *the probability of its having passed through considerable changes.* The circumstance that the roots are all monosyllabic indicates an extreme antiquity and fixedness in the language, as does the manner of forming derivatives, and the virtual absence of compounds. The method of inflexion, on the other hand, though essentially in accordance with the evidences of age just mentioned, shows numerous accidental changes, as does the presence of compounds, although the latter may be so easily resolved as not to be considered part of the essence of the language. From the whole survey we must infer that the Coptic is very ancient in itself, and that the changes which it has undergone are, though numerous, for the most part of such a character as not to affect its essential characteristics; and we may, therefore, reasonably expect to find it almost exactly the same as the vulgar dialect expressed by the demotic inscription of the Rosetta Stone, and essentially the same as the sacred dialect expressed by its hieroglyphic inscription, as we had indeed already concluded on other grounds.

Statements of ancient writers respecting the Egyptian characters.

Admitting, therefore, that the language, in two dialects, which we find expressed in the Egyptian inscriptions of the Rosetta Stone, does not essentially differ from the Coptic, we have yet to discover in what manner it is expressed, whether by ideographic signs representing real things by their figures, and ideal things by symbols, in which case the Coptic would be of no use; or by signs having a phonetic value, and being either alphabetic or syllabic; or by a mixture or a combination of these two methods. It is to the statements of ancient writers that we must look for the means of solving this question.

Clemens Alexandrinus.

The celebrated passage in the *Stromata* of Clemens Alexandrinus is the most important of those which bear upon the present question. He tells us that "those who are educated among the Egyptians first of all learn the method of Egyptian writing which is called the epistolographic; and secondly, the hieratic, which the sacred scribes employ; and in the third place, and after the others, the hieroglyphic, of which one kind expresses its meaning directly by letters, and the other is ideographic. Of the ideographic kind one sort expresses its meaning by imitation, and another is written as though tropically, and another is wholly allegorical by means of certain secret signs. Thus, wishing to write sun, they make a circle, and moon, a moonlike figure, according to the kind which expresses its meaning directly. But, when they write tropically, they transfer and transpose according to relation, utterly changing some, but altering the meaning of others in many ways; thus handing down the panegyrics of the kings in theological relations, they write by anaglyphs. Of the third kind, which is by secret signs, let this be a specimen: the bodies of the other stars, because of the obliquity of their course, they represented by those of serpents, but that of the sun by that of a beetle, because [this creature] having moulded a ball-shaped thing of ox-dung, with its face towards it rolls it along,"[1] &c. Certain words and expressions in this difficult passage must not be left unnoticed, since they have been variously rendered. First of all, τὰ πρῶτα στοιχεῖα has been shown by Lepsius to mean here simply "letters," and no one can reject so apposite a rendering. Συμβολικὴ has been translated "symbolical," but this is not its primary meaning, nor does it apply in the present case. Σύμβολον is used in philosophical literature to denote a sign of something thought of in the mind, as Aristotle tells us;[1] and σύμβολικὸς means primarily "ideographic," and then "symbolic" in our use of the word. The latter we have, therefore, rendered "ideographic," and what follows entirely justifies this translation. No satisfactory explanation has been offered of the ἀναγλυφαὶ. Chevalier Bunsen's is very ingenious, but it does not seem to render the passage clearer.[2]

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[1] *Αὐτίκα οἱ παρ' Αἰγυπτίοις παιδευόμενοι πρῶτον μὲν πάντων τὴν Αἰγυπτίων γραμμάτων μέθοδον ἐκμανθάνουσι, τὴν ἐπιστολογραφικὴν καλουμένην· δευτέραν δὲ τὴν ἱερατικήν, ᾗ χρῶνται οἱ ἱερογραμματεῖς· ὑστάτην δὲ καὶ τελευταίαν τὴν ἱερογλυφικήν· ἧς ἡ μέν ἐστι διὰ τῶν πρώτων στοιχείων κυριολογική· ἡ δὲ συμβολική. τῆς δὲ συμβολικῆς ἡ μὲν κυριολογεῖται κατὰ μίμησιν, ἡ δ' ὥσπερ τροπικῶς γράφεται, ἡ δὲ ἄντικρυς ἀλληγορεῖται κατά τινας αἰνιγμούς. ἥλιον γοῦν γράψαι βουλόμενοι κύκλον ποιοῦσι, σελήνην δὲ σχῆμα μηνοειδὲς, κατὰ τὸ κυριολογικὸν εἶδος· τροπικῶς δὲ κατ' οἰκειότητα μετάγοντες καὶ μετατιθέντες, τὰ δ' ἐξαλλάττοντες, τὰ δὲ πολλαχῶς μεταοχηματίζοντες χαράττουσιν. τοὺς γοῦν τῶν βασιλέων ἐπαίνους θεολογουμένοις μύθοις παραδιδόντες, ἀναγράφουσι διὰ τῶν ἀναγλυφῶν· τοῦ δὲ κατὰ τοὺς αἰνιγμοὺς, τρίτου εἴδους, δεῖγμα ἔστω τόδε· τὰ μὲν γὰρ τῶν ἄλλων ἄστρων, διὰ τὴν πορείαν τὴν λοξὴν, ὄφεων σώμασιν ἀπείκαζον· τὸν δὲ Ἥλιον τῷ τοῦ κανθάρου· ἐπειδὴ κυκλοτερὲς ἐκ τῆς βοείας ὄνθου σχῆμα πλασάμενος, ἀντιπρόσωπος κυλινδεῖ. Φασὶ δὲ καὶ ἑξάμηνον μὲν ὑπὸ γῆς θάτερον δὲ τοῦ ἔτους τμῆμα τὸ ζῶον τοῦτο ὑπὲρ γῆς διαιτᾶσθαι, σπερμαίνειν τε εἰς τὴν σφαῖραν καὶ γεννᾶν· καὶ θῆλυν κάνθαρον μὴ γίνεσθαι* (*Strom.*, lib. v , p. 237). The latter part of this passage is remarkably similar to parts of a chapter in the *Hieroglyphics of Horapollo Nilous*, a work for the most part containing explanations of the enigmatical sort. *Μονογενὲ, δη δηλοῦντες, ἢ γένεσιν, ἢ πατέρα, ἢ κόσμον, ἢ ἄνδρα, κανθαρὸν ζωγραφοῦσι. μονογενὲς μὲν, ὅτι αὐτογενές ἐστι τὸ ζῶον, ὑπὸ θηλείας μὴ κυοφορούμενον. μόνη γὰρ γένεσις αὐτοῦ, τοιαύτη ἐστίν. ἐπειδὰν ὁ ἄρσην βούληται παιδοποιήσασθαι, βοὸς ἀφόδευμα λαβὼν, πλάσσει σφαιροειδὲς παραπλήσιον τῷ κόσμῳ σχῆμα· ὃ ἐκ τῶν ὀπισθίων μερῶν κυλίσας ἀπὸ ἀνατολῆς εἰς δύσιν, αὐτὸς πρὸς ἀνατολὴν βλέπει, ἵνα ἀποδῷ τὸ τοῦ κόσμου σχῆμα. αὐτὸς γὰρ ἀπὸ τοῦ ἀπηλιώτου εἰς λίβα φέρεται· ὁ δὲ τῶν ἀστέρων δρόμος, ἀπὸ λιβὸς εἰς ἀπηλιώτην· ταύτην οὖν τὴν σφαῖραν κατορύξας, εἰς γῆν κατατίθεται ἐπὶ ἡμέρας εἰκοσιοκτώ. ἐν ὅσαις καὶ ἡ σελήνη ἡμεραις τὰ δώδεκα ζώδια κυκλεύει. ὑφ' ἣν ἀπομένον, ζωογονεῖται τὸ τῶν κανθάρων γένος. τῇ ἐνάτῃ δὲ καὶ εἰκοστῇ ἡμέρᾳ ἀνοίξας τὴν σφαῖραν, εἰς ὕδωρ βάλλει. ταύτην γὰρ τὴν ἡμέραν νομίζει σύνοδον εἶναι σελήνης καὶ ἡλίου, ἔτι τὲ καὶ γένεσιν κόσμου. ἧς ἀνοιγομένης ἐν τῷ ὕδατι, ζῶα ἐξέρχεται, τουτέστιν οἱ κάνθαροι. γένεσιν δὲ, διὰ τὴν προειρημένην αἰτίαν. πατέρα δὲ, ὅτι ἐκ μόνου πατρὸς τὴν γενέσιν ἔχει ὁ κάνθαρος. κόσμον δὲ, ἐπειδὴ κοσμοειδῆ τὴν γένεσιν ποιεῖται. ἄνδρα δὲ, ἐπειδὴ θηλυκὸν γένος*

The main facts stated by Clemens may be summed up as follows. The Egyptians in the second century after the Christian Era had three methods of writing—the epistolographic, the hieratic, and the hieroglyphic. The first of these methods appears from its name to have been employed for ordinary purposes, and it is therefore reasonable to suppose that it expressed the vulgar dialect. Any doubt that might exist on this matter is removed by the mention of an enchorial (or demotic) system of writing in the Greek inscription of the Rosetta Stone, and by Herodotus and Diodorus Siculus. The second method, the hieratic, is not spoken of by any other ancient writer, as far as is known. Its use by the sacred scribes leaves us no room to doubt that it must be that character in which the greater number of the papyri that have been preserved to our times are written, since it is distinct from the epistolographic on the one hand and the hieroglyphic on the other. The circumstance that the hieratic system is merely a cursive form of the hieroglyphic explains the silence which all ancient writers, except Clemens, appear to have maintained respecting it. The hieroglyphic method of writing was of two kinds, the one by letters, and the other by signs of ideas. The latter or ideographic sort, was divided into three different kinds—the first of these represented an object by a figure of it, the second was tropical, but not in an arbitrary manner, and the third was allegorical. Let us see how an actual examination of the hieroglyphics, without presupposing a knowledge of Young's and Champollion's discoveries, affects this statement. If, for example, we examine the Rosetta Stone, we cannot fail to see in the hieroglyphic inscription certain characters which bear the impress of being ideographic; indeed, at first sight, we might suppose that all the signs were of this sort, but when we come to compare this inscription with the corresponding Greek, it becomes evident that such cannot be the case, for they are too numerous, and that many of the signs must in all probability represent sounds. The two sorts of characters seem, therefore, *primâ facie*, to have been mixed. Many of the sculptures in the tombs indicate how this was done, for we find a number of animals of different kinds pourtrayed, and over each a group of a few characters terminating in a small figure of the animal represented beneath.[3] We may therefore infer that the ideographic signs were occasionally employed as determinatives following the names of the ideas they represented. The allegorical ideographs, of which Clemens speaks, seem from their nature to belong to a separate system, and an examination of the *Hieroglyphics of Horapollo Nilous* supports this view. This work, composed at a late period, and subsequently enlarged by additions, relates almost wholly to such allegorical or enigmatical characters, or uses of characters, and thus affords us a means of judging of their value. We may trace throughout the book evidences of the late origin of the system, both in its being unlike that of a primeval language, and in the marks it bears of Greek philosophy. We must, therefore, look with suspicion upon allegorical explanations of hieroglyphics which, it may be here remarked, Egyptologists have already rejected as inapplicable to those of the Egyptian monuments.[4]

Horapollo Nilous.

Porphyry.

Porphyry, in his *Life of Pythagoras*, speaks of the Egyptian methods of writing in terms which illustrate the statement of Clemens. He says that Pythagoras "in Egypt lived with the priests, and learned thoroughly the wisdom and language of the Egyptians, and the three different modes of writing, the epistolographic [letters], the hieroglyphic, and the symbolic, some conveying a direct meaning by imitation, and some expressing their meaning allegorically by certain secret signs."[5] This passage, from its singular resemblance to that of Clemens on the same subject, may be almost conjectured to have been taken from the same source, or possibly from it. It will be noticed that the hieratic is not mentioned, doubtless on account of its being but a form of the hieroglyphic method

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αὐτοῖς οὐ γίνεται. εἰσὶ δὲ καὶ κανθάρων ἰδέαι τρεῖς. πρώτη μὲν, αἰλουρόμορφος, καὶ ἀκτινωτὴ, ἥνπερ καὶ ἡλίῳ ἀνέθεσαν διὰ τὸ σύμβολον. κ. τ. λ. (lib. i., c. x., ed. *Cory*, pp. 19-21.) Comp. also *Tzetzes from Chæremon : ἀντὶ γενέσεως καὶ αὐτοφυων καὶ ἀῤῥένων, κάνθαρον* (*ἔγραφον*). (ed. *Hermann.*, p. 123, 20, 21.)

[1] *Arist.* Interpr., 2. 2., 14. 14.

[2] *Egypt's Place*, vol. i., p. 340. "He (Clemens) does not say, 'in hieroglyphics'—because in them he had included the secret or enigmatical character—but 'in anaglyphs,' which, as well as the former word, originally designated engraved pictures, either serving as written characters or as ordinary portraits of objects." To this is appended the following note :—"*Ἀναγλύφω* is essentially the same as *ἐγγλύφω* : to engrave *upon* a thing, is just as correct as to grave *in* (*ingrave*) it; *ἀναγράφω, ἀναγραφαὶ* is the regular designation when mention is made of registers of the Egyptian kings."

[3] Comp. *Ælian. Var. Hist.*, x., 10.

[4] Chev. Bunsen remarks on the allegorical system :—"He (Clemens) mentions, likewise, a kind of enigmatical character, or secret writing, in which, for example, a serpent designates the planets on account of their spherical motion; but the *scarabæus*, the sun, probably because of the analogy between the round lump which it rolls before it, and the circular form of the ecliptic. Clemens calls this character the allegorical, and very properly; for the distinction between symbol and allegory is, that the former represents the intellectual object itself by a direct image; the latter conveys the idea of the object only through the medium of a logical notion. The examples in Clemens are the best proof that such a secret writing is as foreign to the sacred books as to the monuments. The serpents and scarabæi occur on the papyri as well as monuments; but the scarabæus never betokens the sun, nor the serpent the planets. The allegorical writing was an artificial one, a late application of the hieroglyphic system, originally, perhaps, for astronomical and astrological purposes, similar to our own planetary signs, and afterwards cabalistically developed. Clemens, therefore, was right in noticing this enigmatical character, in connection with the hieroglyphics; but he never could intend to represent it as a real subdivision of the ordinary hieroglyphic writing, properly so called, which is composed entirely and exclusively of the three elements he had previously enumerated —the phonetic, hieroglyphic, and symbolic signs. His object was to give an example of the manner in which this hieroglyphic character was used, as a whole, the parts of which he describes before explaining the secret character.". . . . . . "The work of Horapollo, dating from a comparatively recent age, also clearly proves the existence and nature of this secret character. While few of the explanations it offers are confirmed by the monuments, the greater part are contradicted both by them and by the Book of the Dead. The explanations themselves are little better than arbitrary subtleties, or false cabalistic mysticism, the simple and historical meaning being palpable and obvious, while the very hieroglyphical representations which he describes are chiefly borrowed from that secret character, and consequently do not apply to the monuments and books" (*Egypt's Place*, vol. i., pp. 339-342).

[5] *Καὶ ἐν Αἰγύπτῳ μὲν τοῖς ἱερεῦσι συνῆν, καὶ τὴν σοφίαν ἐξέμαθε, καὶ τὴν Αἰγυπτίων φωνὴν, γραμμάτων δὲ τρισσὰς διαφορὰς, ἐπιστολογραφικῶν τε, καὶ ἱερογλυφικῶν, καὶ συμβολικῶν. τῶν μὲν κοινολογουμένων κατὰ μίμησιν, τῶν δὲ ἀλληγορουμένων κατὰ τινας αἰνιγμούς.* (*De Vit. Pyth.*, p. 8.)

By the symbolic letters Porphyry evidently intends the allegorical mode of writing spoken of by Clemens, using *συμβολικὸς* in its secondary sense, but it may be doubted whether that mode was as ancient as the time of Pythagoras.

Herodotus and Diodorus Siculus.

Imperfect as are these notices of the Egyptian systems of writing by the late Greek writers, they are ample compared to those which we find in the works of their predecessors. Herodotus merely tells us that the Egyptians "use two kinds of written characters, of which one is called sacred and the other vulgar;"[1] and Diodorus Siculus says the same, only adding that the popular method was learnt by all, while the sacred was understood by the priests alone.[2] Herodotus mentions, in the place above referred to, that they wrote from right to left, contrary to the Greek manner, which indeed was the manner of writing that they preferred, adding, that they said that in doing so, they wrote to the right, but that the Greeks wrote to the left.[3]

The main result of our inquiry thus far is the knowledge that the ancient Egyptian language in its two forms, the sacred dialect and the vulgar, was essentially identical with the Coptic in its three dialects, and that the written characters of the former were phonetic and ideographic, signs of the two classes being sometimes employed together for the same word.

The Rosetta Stone.

Having ascertained thus much, we cannot proceed further with any degree of certainty without the aid of bilingual inscriptions in ancient Egyptian and some known language. Such records do fortunately exist. The most remarkable of them is the Rosetta Stone, a tablet bearing a decree of the Egyptian priests in honour of Ptolemy Epiphanes, issued B.C. 196. Although it has usually been called trilingual, it is properly bilingual, for it is in but two languages, Egyptian and Greek, the former being written in hieroglyphic and demotic characters. Happily, to remove any doubt as to the identity of subject of the three inscriptions, we read at the close of the Greek portion that the decree was inscribed in the characters before mentioned. "ΤΟ[ΔΕΨΗΦΙΣΜΑΤΟΥΤΟΑΝΑΓΡΑΨΑΙΕΙΣΣΤΗΛΗΝΕΚΣ]ΤΕΡΕΟΥΛΙΘΟΥΤΟΙΣΔΕΙΕΡΟΙΣΚΑΙΕΓΧΩΡΙΟΙΣΚΑΙΕΛΛΗΝΙΚΟΙΣΓΡΑΜΜΑΣΙΝΚΑΙΣΤΗΣΑΙΕΝΕΚΑΣΤΩΙΤΩΝΤΕΠΡΩΤΩΝΚΑΙΔΕΥΤΕΡΩ[ΝΚΑΙΤΡΙΤΩΝΙΕΡΩΝΠΡΟΣΤΗΙΤΟΥΑΙΩΝΟΒΙΟΥΒΑΣΙΛΕΩΣΕΙΚΟΝΙ]."[4] Great difficulties, however, beset the inquirer who thinks at first that he can read the Egyptian inscriptions of the record by the Greek. The tablet is so broken that much of the hieroglyphic version, particularly a great part of its earlier portion, is wanting, and some of the Greek has also been lost, as well as of the demotic version. The difficulty of comparing the hieroglyphic version with the Greek is thus greatly increased, and it seems more practicable to commence with the demotic. The indistinctness of the demotic characters, however, as well as their not being separated into groups, makes their study a most difficult task, and it is not to be wondered that many years had elapsed after the Rosetta Stone had been found before any real progress was made in the interpretation of its Egyptian inscriptions.

Gnostic papyrus of Leyden.

The inscriptions of the Rosetta Stone do not, however, afford the only examples known to us of bilingual records in Egyptian and Greek. Besides some tablets, there is in the Musée des Pays-Bas at Leyden, a Gnostic papyrus in demotic characters, accompanied by an interlinear transcription of certain magical words into Greek characters from the demotic words below them.[5] By carefully comparing the demotic characters of these words, when phonetic, with the Greek letters corresponding to them, an alphabet can be formed, as has indeed been done by Dr Leemans,[6] which can be used for the interpretation of the Rosetta Stone, either by being applied to the demotic version of that record, or to the hieroglyphic. In the latter case, it would be necessary to trace the demotic characters to the corresponding hieratic, and these again to the hieroglyphic, and this, notwithstanding its apparent difficulty, would be found the more satisfactory method of the two. In this manner, the Rosetta Stone might have been partly interpreted, and any one may now thus test the accuracy of the results of Young's discovery. But another method was adopted, the papyri not being known, and it depends for its defence rather upon the congruity of its results than upon its logical character. If the more accurate method, however, be tried, the results will be the same.

SECTION II.

THE METHOD OF INTERPRETING THE ANCIENT EGYPTIAN CHARACTERS EMPLOYED BY YOUNG AND CHAMPOLLION, AND THEIR FOLLOWERS.

Young's and Champollion's method.

From certain differences it has been supposed that Young and Champollion followed different methods. But since these differences are the marks of early stages of the inquiry, and since the distinctive peculiarities of the results arrived at by both these interpreters are preserved in the present theory as accepted by later scholars, it is best to consider the method to be but one.

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[1] Γράμματα γράφουσι καὶ λογίζονται ψήφοισι, Ἕλληνες μὲν, ἀπὸ τῶν ἀριστερῶν ἐπὶ τὰ δεξιὰ φέροντες τὴν χεῖρα· Αἰγύπτιοι δὲ, ἀπὸ τῶν δεξιῶν ἐπὶ τὰ ἀριστερά· καὶ ποιεῦντες ταῦτα, αὐτοὶ μέν φασι ἐπὶ τὰ δεξιὰ ποιέειν, Ἕλληνας δὲ ἐπ' ἀριστερά· διφασίοισι δὲ γράμμασι χρέωνται· καὶ τὰ μὲν αὐτῶν, ἱρὰ· τὰ δὲ, δημοτικὰ καλέεται (ii. 36.)

[2] Διττῶν γὰρ Αἰγυπτίοις ὄντων γραμμάτων, τὰ μὲν δημώδη προσαγορευόμενα πάντας μανθάνειν, τὰ δ' ἱερὰ καλούμενα παρὰ μὲν τοῖς Αἰγυπτίοις μόνους γινώσκειν τοὺς ἱερεῖς (iii. 3). The reading διττῶν we owe to the ingenuity of Stroth (*Ægyptiaca*, ii., p. 213, note x.). "Sic ex conjectura dedi pro vulgato ἰδίων, quum et res ipsa hoc requirat, et ipse Diodorus *sup.* Lib. i. c. 81 scripserit παιδεύουσι δὲ τοὺς υἱοὺς οἱ μὲν ἱερεῖς γράμματα διττά, τά τε ἱερὰ καλούμενα καὶ τὰ κοινοτέραν ἔχοντα τὴν μάθησιν. Quæ nostro loco plane gemina sunt."

[3] Of this last observation, as far as it regards the Egyptians, Dr Brugsch offers an ingenious explanation in his *Grammaire Démotique*, supposing that the Egyptians contemplated the directions of the *strokes* of the letters, and not the sequence of the letters themselves:—"D'après notre connaissance du démotique, il est évident que cette remarque ne concerne point la direction générale de l'ecriture déjà tracée mais uniquement la manière dont on devait écrire les signes, c'est-à-dire, en les commençant du côté gauche et en les terminant à droite. . . . Il est du reste aisé de s'apercevoir au sujet des signes qui s'étendent sur le papyrus plus que les autres, que l'encre vers la droite est toujours plus faible qu'à la gauche, preuve évidente que l'écrivain a commencé par la gauche et fini par la droite" (pp. 15, 16). This explanation, however, does not seem applicable to the Greek mode of writing. The Egyptians may, however, have considered a papyrus itself as having its own right and left hand like a *person* opposite, and so have spoken of the right and left in precisely the opposite sense to that of the Greeks; an explanation which may be illustrated by our ordinary and military use of the terms in question. The meaning may perhaps be—if we suppose that the Egyptians were joking with Herodotus, and that he did not perceive it—that they considered their own mode of writing *right*, and that of the Greeks *gauche;* a rendering which is authorized by the terms employed.

[4] Tzetzes has also preserved the meaning of certain hieroglyphic ideographs according to Chæremon, an Egyptian priest and historian of the first century of the Christian Era; but he has not given us any theory of the characters, and the fragment is rather valuable as corroborative evidence, having been first noticed long after Young's discovery had been matured, than in the present place. We shall have occasion to refer to it in detail in a later part of this treatise.

[5] As there are similar papyri of the same time in Greek, it is evident that these transcribed words were either untranslatable, or were supposed to lose their power in invocations by translation, and were, therefore, thus distinguished. The following verses from the so-called "Chaldean Oracles" of Zoroaster, may be cited, as illustrating the latter of these two reasons:—

> "Ὀνόματα βάρβαρα μήποτ' ἀλλάξῃς,
> Εἰσὶ γὰρ ὀνόματα παρ' ἑκάστοις θεόσδοτα
> Δύναμιν ἐν τελεταῖς ἄῤῥητον ἔχοντα."—*Cory's Anc. Frag.*, 2d edit., p. 271.

[6] *Papyrus Egyptien Démotique à transcriptions Grecques*, ed. Leemans.

The other methods of interpreting hieroglyphics which have been proposed in modern times will not be here considered, since a full examination of them would occupy too much space in the present article, and since, if the truth of the method of Young and Champollion be proved, all other systems must necessarily fall to the ground.

The Rosetta Stone was discovered in 1799, and brought to England in 1802. In the same year the first step towards deciphering its Egyptian inscriptions was made public by the distinguished French Orientalist, Baron Silvestre de Sacy, who had discovered in the demotic inscription the groups corresponding to Alexander, Alexandria, and Ptolemy,[1] in the Greek. But he was unable to determine the force of the characters composing these groups. This was, however, done by M. Akerblad, who further discovered and resolved other proper names and words in the demotic version, but was stopped in his progress by his suppositions that the demotic system was wholly alphabetic, and that the words expressed by it were in nothing different from those of the Coptic. To M. Akerblad belongs also the merit of having discovered the numerals "first," "second," and "third," in the hieroglyphic inscription, and thus been the first to interpret correctly, on sure grounds, any part of that inscription.

The inquiry was next taken up by Dr Young, who communicated to the Society of Antiquaries, in May 1814, a "Conjectural Translation of the Egyptian Inscription of the Rosetta Stone," published in the *Archæologia*, vol. xviii. (1815). He then applied himself to the study of Coptic, and republished his translation in a revised form in the *Museum Criticum* of Cambridge, 1815. After this, in 1819, he gave the world the result of his researches in the article EGYPT, in the Supplement to the *Encyclopædia Britannica*, vol. iv. The essential part of this article, that is, so much of it as refers to the interpretation of the hieroglyphic and demotic systems of writing is here retained, for reasons which have been already stated. Some remarks are added in notes and subsequent observations, the former distinguished, for fear of mistake, by the writer's initials, to point out in what particulars subsequent discoveries have altered the views of its learned author.

DR YOUNG'S ANALYSIS OF THE TRIPLE INSCRIPTION OF ROSETTA.

Dr Young's analysis of the Rosetta Stone.

The block or pillar of black basalt, found by the French in digging up some ground at Rosetta, and now placed in the British Museum,[2] exhibits the remains of three distinct inscriptions; and the last, which is in Greek, ends with the information, that the decree which it contains was ordered to be engraved in three different characters, the sacred letters, the letters of the country, and the Greek.[3] Unfortunately a considerable part of the first inscription is wanting; the beginning of the second, and the end of the third, are also mutilated; so that we have no precise points of coincidence from which we can set out, in our attempts to decipher the unknown characters. The second inscription, which it will be safest to distinguish by the Greek name *enchorial*, signifying merely the characters *of the country*, notwithstanding its deficiencies near the beginning, is still sufficiently perfect to allow us to compare its different parts with each other, and with the Greek, by the same method which we should employ if it were entire. Thus, if we examine the parts corresponding, in their relative situation, to two passages of the Greek inscription in which *Alexander* and *Alexandria* occur, we soon recognise two well-marked groups of characters resembling each other, which we may therefore consider as representing these names; a remark which was first made by M. de Sacy, in his letter relating to this inscription. A small group of characters, occurring very often in almost every line, might be either some termination, or some very common particle; it must, therefore, be reserved till it is found in some decisive situation, after some other words have been identified, and it will then be easily shown to mean *and*. The next remarkable collection of characters is repeated twenty-nine or thirty times in the enchorial inscription; and we find nothing that occurs so often in the Greek, except the word *king*, with its compounds, which is found about thirty-seven times. A fourth assemblage of characters is found fourteen times in the enchorial inscription, agreeing sufficiently well in frequency with the name of *Ptolemy*, which occurs eleven times in the Greek, and generally in passages corresponding to those of the enchorial text in their relative situation; and, by a similar comparison, the name of *Egypt* is identified, although it occurs much more frequently in the enchorial inscription than in the Greek, which often substitutes for it country only, or omits it entirely. Having thus obtained a sufficient number of common points of subdivision, we may next proceed to write the Greek text over the enchorial, in such a manner that the passages ascertained may all coincide as nearly as possible; and it is obvious that the intermediate parts of each inscription will then stand very near to the corresponding passages of the other.[4]

In this process it will be necessary to observe that the lines of the enchorial inscription are written from right to left, as, Herodotus tells us, was the custom of the Egyptians;[5] the division of several words and phrases plainly indicating the direction in which they are to be read. It is well known that the distinct hieroglyphical inscriptions engraved on different monuments, differ in the direction of the corresponding characters. They always face the right or the left of the spectator, according as the principal personages of the tablets to which they belong are looking in the one or the other direction; where, however, there are no tablets, they almost always look towards the right; and it is easily demonstrable that they must always have been read beginning from the front and proceeding to the rear of each rank. But the Egyptians seem never to have written alternately backwards and forwards, as the most ancient Greeks occasionally did. In both cases, however, the whole of the characters thus employed were completely reversed in the two different modes of using them, as if they were seen in a glass, or printed off like the impression of a seal.[6]

By pursuing the comparison of the inscriptions thus arranged, we ultimately discover the signification of the greater part of the individual enchorial words; and the result of the investigation leads us to observe some slight differences in the form and order of some parts of the different inscriptions, which are indicated in the conjectural translation published in the *Archæologia* and in the *Museum Criticum*. The degree of evidence in favour of the supposed signification of each assemblage of characters may be most conveniently appreciated, by arranging them in a lexicographical form, according to the words of the translation, the enchorial words themselves not readily admitting a similar arrangement; but the subject is not of sufficient interest for the public to make it necessary that this little lexicon should be engraved at length.[1]

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[1] Bunsen erroneously states these names to have been "Ptolemy, Berenice, and Alexander" (*Egypt's Place*, vol. i., p. 315).

[2] The Rosetta Stone was discovered in the year 1799, by a French officer during the repair of Fort St Julien, a little to the north of the town of Rosetta. See art. EGYPT. (R. S. P.)

[3] See preceding page.

[4] Dr Young published the three inscriptions of the Rosetta Stone thus arranged in the *Hieroglyphics* of the Egyptian Society. (R. S. P.)

[5] *Herod.* ii. 36. See preceding page. (R. S. P.)

[6] We have noticed in an earlier place exceptions to this rule. (R. S. P.)

It might naturally have been expected that the final characters of the enchorial inscription, of which the sense is thus determined with tolerable certainty, although the corresponding part of the Greek is wanting, would have immediately led us to a knowledge of the concluding phrase of the distinct hieroglyphical characters, which remains unimpaired. But the agreement between the two conclusions is by no means precise; and the difficulty can only be removed by supposing the *king* to be expressly named in the one, while he is only designated by his titles in the other.[2] With this slight variation, and with the knowledge of the singular accident, that the name of Ptolemy occurs three times in a passage of the enchorial inscription, where the Greek has it but twice, we proceed to identify this name amongst the sacred characters, in a form sufficiently conspicuous to have been recognised upon the most superficial examination of the inscriptions, if this total disagreement of the frequency of occurrence had not imposed the condition of a long and laborious investigation, as an indispensable requisite for the solution of so much of the enigma. This step, however, being made good, we obtain from it a tolerably correct scale for the comparative extent of the sacred characters, of which it now appears that almost half of the lines are entirely wanting, those that remain being also much mutilated. Such a scale may also be obtained, in a different manner, by marking, on a straight ruler, the places in which the most characteristic words, such as *god*, *king*, *priest*, and *shrine* occur, in the latter parts of the other inscriptions, at distances proportional to the actual distances from the end; and then trying to find corresponding characters among the hieroglyphics of the first inscription, by varying the obliquity of the ruler, so as to correspond to all possible lengths which that inscription can be supposed to have occupied, allowing always a certain latitude for the variations of the comparative lengths of the different phrases and expressions. By these steps it is not very difficult to assure ourselves, that a *shrine* and a *priest* are denoted by representations which must have been intended for pictures of objects denoted by them; and this appears to be the precise point of the investigation at which it becomes completely demonstrative, and promises a substantial foundation for further inferences. The other terms, *god* and *king*, are still more easily ascertained, from their situation near the name of Ptolemy.

The most material points of the three inscriptions having been thus identified, they may all be written side by side; and the sense of the respective characters may be still further investigated, by a minute comparison of the different parts with each other. The last line of the sacred characters, with the corresponding parts of the other inscriptions [which the reader will find represented under the head *Specimens of Phrases*], will serve as a fair specimen of the result which has been obtained from these operations.

In thus comparing the enchorial with the sacred characters, we find many coincidences in their forms, by far too accurate to be compatible with the supposition that the enchorial could be of a nature purely alphabetical. It is evident, for example, that the enchorial characters for a *diadem*, an *asp*, and *everliving*, are immediately borrowed from the sacred. But this coincidence cannot certainly be traced throughout the inscriptions; and it seemed natural to suppose, that alphabetical characters might be interspersed with hieroglyphics, in the same way that the astronomers and chemists of modern times have often employed arbitrary marks, as compendious expressions of the objects which were most frequently to be mentioned in their respective sciences. But no effort, however determined and persevering, had been able to discover any alphabet which could fairly be said to render the inscription, in general, at all like what was required to make its language intelligible Egyptian, although most of the proper names seemed to exhibit a tolerable agreement with the forms of letters indicated by Mr Akerblad; a coincidence, indeed, which might be found in the Chinese, or in any other character not alphabetical, if they employed words of the simplest sounds for writing compound proper names.

The question, however, respecting the nature of the enchorial character, appears to be satisfactorily decided by a comparison of various manuscripts on papyrus, still extant, with each other. Several of these, published in the great *Déscription de l'Egypte*, have always been considered as specimens of the alphabetical writing of the Egyptians, and certainly have as little appearance of being imitations of visible objects, as any of the characters of this inscription, or as the old Arabic or Syriac characters, to which they bear, at first sight, a considerable resemblance. But they are generally accompanied by tablets, or delineations of certain scenes, consisting of a few visible objects, either detached, or placed in certain intelligible relations to each other; and we may generally discover traces of some of these objects amongst the characters of the text that accompanies them. A similar correspondence between the text and the tablets is still more readily observable in other manuscripts, written in distinct hieroglyphics, slightly yet not inelegantly traced, in a hand which appears to have been denoted by the term *hieratic;* and by comparing with each other such parts of the texts of these manuscripts as stand under tablets of the same kind, we discover, upon a very minute examination, that every character of the distinct hieroglyphics has its corresponding trace in the running hand; sometimes a mere dash or line, but often perfectly distinguishable, as a coarse copy of the original delineation, and always alike when it answers to the same character. The particular passages which establish this identity extending to a series of above ten thousand characters, have been enumerated in the *Museum Criticum;* they have been copied in adjoining lines, and carefully collated with each other; and their number has been increased, by a comparison with some yet unpublished rolls of papyrus, lately brought from Egypt. A few specimens from different manuscripts will be sufficient to show the forms through which the original representation has passed, in its degradation from the *sacred* character, through the *hieratic*, into the *epistolographic*, or common running hand of the country [as will be seen under the head of *Comparison of Manuscripts*].[3]

It seems at first sight incomprehensible that this coincidence, or rather correspondence, should not be equally observable in the two inscriptions of the Rosetta Stone, which, if the enchorial character is merely a degradation of the sacred, must naturally be supposed to be as much alike as those of the different manuscripts in question; while, in reality, we can but seldom trace any very striking analogy between them. But the enchorial character, having been long used in rapid writing, and for the ordinary purposes of life, appears to have become so indistinct in its forms, that it was often necessary to add to it some epithet or synonym, serving to mark the object more distinctly; just as, in speaking Chinese, when the words are translated from written characters into a more limited number of sounds, it is often necessary, on account of the imperfection of the oral language, to add a generic word, in order to determine the signification, and to read, for example, *a goose bird*, when *a goose* only is written, in order to distinguish it from some other idea implied by a similar sound; and even in English we might sometimes be obliged to say *a yew tree*, in order to distinguish it from *a ewe sheep*, or *you yourself*, or *the letter u*. The enchorial character, therefore, though drawn from the same source, can scarcely, in this form, be called the same language with the sacred hieroglyphics, which had probably remained unaltered from the earliest ages, whilst the running hand admitted all the variations of the popular dialects [sic], and bore but a faint resemblance to its original prototype. Indeed, if it had been completely identical, there could have been no propriety in repeating the inscription with so slight a change of form.[1]

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[1] Dr Young did somewhat towards publishing such a lexicon in the index to the translation of the Rosetta Stone given in the parallel arrangement which he printed in the *Hieroglyphics* of the Egyptian Society. (R. S. P.)

[2] This conjecture is perfectly just, the enchorial inscription giving in its last line the word SUTEN "king," instead of the PTUREMEES (Πτολεμαῖος) of the hieroglyphic inscription. (R. S. P.)

[3] In this passage Dr Young calls hieratic characters enchorial, and linear hieroglyphic, hieratic. These mistakes were natural in the early stages of the inquiry. The manuscripts, accompanied by tablets or scenes, which he mentions, are copies of all or part of the *Ritual* or *Book of the Dead*. (R. S. P.)

The rituals and hymns contained in the manuscripts which have been mentioned, are probably either of higher antiquity than the inscription of Rosetta, or had preserved a greater purity of character, as having been continually copied from older originals.[2] It is also remarkable, that in one of these rolls of papyrus, engraved by Denon, the introduction is in the sacred character, and some of the phrases contained in it may be observed to be repeated in the subsequent part of the manuscript, which is in a kind of running hand, though somewhat less degraded than in most other instances.

It was not unnatural to hope, that the comparison of these different manuscripts would have assisted us very materially in tracing back all the enchorial characters to the corresponding hieroglyphics, as far as the parts of the respective inscriptions remain entire, and even in filling up the deficiencies of the sacred characters where they are wanting; and something has certainly been gained from it with respect to the names of several of the deities; but, on account of the differences which had crept in between the forms of the language expressed by the sacred and the cursive characters, the advantage has hitherto been extremely limited. It seems, indeed, to have been a condition inseparable from the whole of this investigation, that its steps should be intricate and laborious, beyond all that could have been imagined from our previous knowledge of the subject; and that, whilst a number of speculative reasoners have persuaded themselves, at different times, that they were able to read through a hieroglyphical inscription in the most satisfactory manner, beginning at either end, as it might happen, the only monument which has afforded us any real foundations for reasoning on the subject, is more calculated to repress than to encourage our hopes of ever becoming complete masters of the ancient literature of Egypt; although it is unquestionably capable of serving as a key to much important information with respect to its history and mythology.[3] Nor is it by any means impossible, that a careful consideration of other monuments already known, or of such as are now discovered from day to day, may enable us to detect a number of unknown characters, so situated with respect to others which are already understood, as to carry with them their own interpretation, supported by a degree of evidence far exceeding mere conjecture. We are now to proceed to an enumeration of the principal characters which have been rendered intelligible.

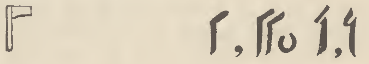
RUDIMENTS OF A HIEROGLYPHICAL VOCABULARY.

A. *Deities.*

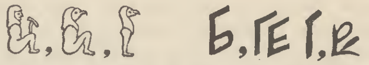
Deities.

1, 2. The word God is always represented in the inscription of Rosetta, and often in many others, by a character resembling a particular kind of hatchet, which is delineated repeatedly at Medinet-Habou as a weapon in the hands of warriors, and is even found among the modern weapons engraved by Denon. (Plate xcv.)[4]

1. GOD *Powerful.*
ⲚⲞⲨϮ



2. GOD *judge.*



This character is frequently exchanged, in parallel passages of different manuscripts, or of the same, for a figure sitting or standing without distinct arms or feet, either with a human head or a hawk's head; or sometimes, by a deviation from the correct nature of an abstract or general term, with the heads of different animals, according to the character of the deity to whom it is applied.[5] But in the inscription of Rosetta this symbol appears to be exclusively appropriated to the gods in their *judicial* capacity; and it occurs several times in the term meaning *lawful* (No. 151), [which will be afterwards explained]. This interpretation is also fully justified by the testimony of Plutarch, that "the figures of *judges* were represented without hands."[1]

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[1] Excepting the *implied* statement that determinatives were unknown to the hieroglyphic system, though used in the hieratic, this whole paragraph, if we apply it to the true enchorial, is remarkably accurate and just, and shows far higher knowledge than one would have supposed could have been attained at the time when it was written. (R. S. P.)

[2] The *Ritual* itself had a most ancient origin, as already noticed, but there are copies of all periods, the later of which, although exhibiting changes, are yet purer in their characters than the contemporary inscriptions. (R. S. P.)

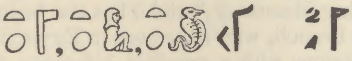
[3] Long after this Chevalier Bunsen wrote in his *Egypt's Place* (Eng. trans., vol. i., p. 267, published in 1848), "There are inscriptions, such as those on the obelisks, and whole pages in the *Book of the Dead*, which can now be read and explained, as regards their substance at least; as can also the greater part of the hieroglyphic inscription on the Rosetta Stone, by the assistance of the Greek texts [sic]. Champollion, in fact, made out the essential import of both the Egyptian texts before his visit to Egypt. Still we confidently maintain that no man living is competent to read and explain *the whole* of any one section of the *Book of the Dead*, far less one of the historical papyri." This is not strictly correct, for at the time this was written there was at least one scholar who could, now there are at least four who can, read and explain some of the short chapters of the *Book of the Dead*; yet it must be admitted, that for the most part the ancient Egyptian records in both the sacred and the vulgar characters are understood in their substance rather than in their minute details. This is seen at once from the consideration that while different scholars agree as to the general sense of any inscription, they widely differ as to its details. The alleged difficulty as to the interpretation of the historical papyri arose from neglect more than from the imperfect condition of many of them. The neglect has been in great measure repaired since the remark of Chevalier Bunsen, quoted above, was written, by the exertions of Mr Heath and M. de Rougé. (R. S. P.)

[4] The examples given as of enchorial characters by Dr Young are taken indiscriminately from the enchorial and hieratic texts, for he supposed the two to be enchorial, as already noticed. The result of this is not any positive error, for the earliest enchorial writing is scarcely distinguishable from hieratic, but it is liable to produce confusion. The later forms of demotic are to be regarded as typical of that mode of writing, the earliest are nearly identical with the typical forms of hieratic. (R. S. P.)

[5] The hatchet and the bearded human seated figure (usually distinguished by particular generic emblems, and by the length and form of the beard), are ideographic equivalents and generic determinatives of the word NETER, "a god," of which the hatchet forms the initial character with the force of N. The hawk-headed and other brute-headed figures, or the man-headed figures, with specific emblems, usually represented sitting, but sometimes standing, are the ideographic equivalents and specific determinatives of the names of different gods and goddesses. On the use of determinatives, see *infra*, section iii. (R. S. P.)

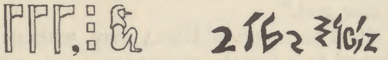
3. A Goddess is denoted by the hatchet or sitting figure, with the addition of the female characteristic, generally as a termination; but sometimes the simple character is applied to gods and goddesses indifferently.

3. GODDESS.
ϯⲛⲟⲩϯ



The semicircle and oblique oval,[2] distinguishing the feminine gender, are observable in almost all well-marked names of females found in different tablets; and the crooked line, which corresponds to them, in the enchorial character of the stone of Rosetta, may be distinguished at the end of each of the five names of females that occur in the inscription. Occasionally the characteristic is prefixed, and this position agrees better with the Coptic ᴛɪ, which distinguishes a female. Nor must we omit to observe, that a semicircle seems to answer to the ᴛ in some other cases, and is always expressed in the running hand by the character which Mr Akerblad calls ᴛ or ᴅ, and which is also exactly the Syriac ᴛ. The asp or basilisk standing erect is a symbol of divinity, which occurs on the green sarcophagus called the tomb of Alexander, and elsewhere, instead of the more ordinary character. In a few instances, the semicircle is found without the oblique oval (No. 57).

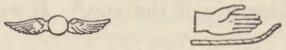
4. GODS.
ϩⲁⲛⲛⲟⲩϯ



4. The plural, Gods, is formed by repeating the character three times, or by placing three dashes after, or sometimes before it. In the enchorial inscription, the dashes are united into a crooked line, and are placed in this instance both before and after the principal character; but, in general, the second line is straighter than the first. The dual is expressed by a double character only.[3] (No. 57.)

5. A winged globe, sometimes flattened as if intended for an egg, but often coloured red, is very commonly represented as hovering over a hero, and generally occupies the lintel of some of the doors of a temple.

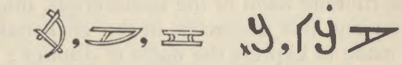
5. *Agathodæmon.*
ⲓϧⲛⲟⲩϥⲓ ?



A globe nearly similar is also sometimes connected with the head and tail of a serpent, bearing the symbol of life, which is the common characteristic of a deity. There can, therefore, be no objection to considering these representations as belonging to the Agathodæmon, or Chnuphis of the Greek authors;[4] and the same symbol is sometimes found in the text of an inscription, in the neighbourhood of the pictorial representation. Its sense may therefore be considered as tolerably well ascertained; but the evidence being somewhat indirect, the name is inserted in smaller characters, the same distinction being also observed in other instances. Mr Bruce informs us, in his letter to Mr Wood, that in some parts of the Tunisian dominions, serpents are still regarded as a kind of good angels. The Chnubis, or Chnumis, of the amulets, is generally represented as a serpent with a human head, or with that of a lion;[5] and the former combination is not uncommon in the tablets of the manuscripts; but the hieroglyphic denoting it is a long undulated line, totally distinct from this character.

6. The symbol, often called the Hieralpha, or sacred ᴀ, corresponds, in the inscription of Rosetta, to Phthah, or Vulcan, one of the principal deities of the Egyptians.[6]

6. PHTHAH.
ⲡⲧⲁϩ



A multitude of other sculptures sufficiently prove, that the object intended to be delineated was a plough or hoe;[7] and we are informed by Eusebius, from Plato, that the Egyptian Vulcan was considered as the inventor of instruments of war and of husbandry. In many other inscriptions, the pedestal or pulley[8] is used indifferently for the plough. Horapollo tells us that Vulcan was denoted by a beetle;[9] and the Monticælian obelisk of Kircher has the plough on three sides and the beetle on the fourth. Horapollo, however, is seldom perfectly correct;[10] and the names of different divinities are frequently exchanged on the banners of the same obelisk; nor is there any clear instance of such an exchange of the plough for the beetle as occurs perpetually in the case of the pedestal. The beetle is frequently used for the name of a deity whose head either bears a beetle, or is itself in the form of a beetle;[11] and in other instances the beetle has clearly a reference to generation or reproduction, which is a sense attributed to this symbol by all antiquity; so that it may possibly sometimes have been used as a synonym for Phthah, as the father of the gods. The plough is very rarely found as the name of a personage actually represented; and it is difficult to say under what form the Egyptian Vulcan was chiefly worshipped; but on the tablet of a Horus of bad workmanship, belonging to the Borgian Museum, he is exhibited with a hawk's head, holding a spear; whilst in the great ritual of the *Déscription de l'Egypte* (Antiq. ii. pl. 72, col. 104), he seems to be represented by a figure with a human head; an exchange, however, which is very common in some other cases, with respect to these two personifications, though it does not extend to the substitution of the heads of different animals for each other.

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[1] The passage here referred to relates to certain statues at Thebes, and therefore not *necessarily* to the general mode of representing a judge, whether by a statue or image, or by a hieroglyphic. (R. S. P.)

[2] The semicircle and egg, called by Dr Young "the semicircle and oblique oval," form a determinative of the names of goddesses, and the semicircle alone is the sign of the feminine singular. (R. S. P.)

[3] There is no dual in either dialect of the ancient Egyptian, or in the Coptic. See *infra*, section iii. (R. S. P.)

[4] The winged globe, or Her-het, is held to correspond to the Agathodæmon of the Greek writers, and the ram-headed god Num to the Chnuphis. (R. S. P.)

[5] The inscriptions of the Gnostic amulets, although they doubtless contain remains of ancient Egyptian magic, show so much foreign influence that it is best not to deduce anything from similarities we may observe in them to the old religion of Egypt. The Gnostic papyri, though more Egyptian than most of these, are yet too markedly characterized by the same foreign influence to be considered as veritably Egyptian. (R. S. P.)

[6] This is a mistake; the character in question, reading MAR and MEE, signifies to love, &c., but occurring on the Rosetta Stone in connection with the name of Ptah in the expression MEE-PTEH, "Beloved of Ptah," it was supposed, in the comparison with the Greek inscription, to be the name of that divinity. The word MAR deserves some attention, since it offers more significations than are known to belong to most other Egyptian words, and whether these be all significations of the root alone or not, they illustrate the different significations of which a root was susceptible, whether in its primitive or derivative forms. MR (we adopt this orthography since we cannot be certain that the same vowel was used in all the significations), primarily—1, to bind, envelope; 2, an island (surrounded by water); 3, a pool (surrounded by land); 4, a frontier, boundary; 5, *tropically*, to love, to kiss. (R. S. P.)

[7] The character is a hoe: for the form of it and the plough, see *Anc. Egypt.*, 2d series, vol. i., p. 40. (R. S. P.)

[8] This exchangeable character is a receptacle for water. (R. S. P.)

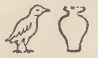
[9] *"Ηφαιστον δὲ γράφοντες, κάνθαρον και γύπα ζωγραφοῦσιν· Αθηνᾶν δὲ, γῦπα καὶ κάνθαρον. δοκεῖ γὰρ αὐτοῖς ὁ κόσμος συνεστάναι ἐκ τε ἀρσενικοῦ καὶ θηλυκοῦ. ἐπὶ δὲ τῆς Ἀθηνᾶς τὴν γῦπα γράφουσιν. οὗτοι γὰρ μόνοι θεῶν παρ αὐτοῖς, ἀρσενοθήλεις ὑπάρχουσι* (*Horapollo Nilous*, lib. i., cap. xii., ed. Cory, p. 29). We can scarcely suppose that the passage is corrupt, and that Horapollo really wrote, as Cory suggests, and as Dr Young seems to have also conjectured, that the Egyptians represented Ptah by a beetle, and Neith by a vulture, for the context shows that a double symbol was employed to denote the androgynous character of these divinities, and Horapollo elsewhere attributes to these signs, respectively, the significations of male and female (lib. i., cap. x., xi.). The beetle is an emblem of Ptah (Vulcan), but also and properly of the god Tar. (R. S. P.)

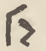
[10] This remark is an instance of that discriminating judgment by which Dr Young showed himself so much in advance of his predecessors, and most of his contemporaries. The character of Horapollo's work has been already noticed. (R. S. P.)

[11] Tar. See *Ancient Egyptians*, vol. vi., pl. 25, pt. 2. (R. S. P.)

7. Ammon, the Egyptian Jupiter, is sufficiently identified by a combination of evidence of various kinds, although no single link of the chain extends very far. A figure with a ram's head is denoted, both on the green sarcophagus and on the temple at Elephantiné, by a water jar, sometimes, but not always, accompanied by a bird.[1]

7. AMMON.
ⲁⲙⲟⲩⲛ

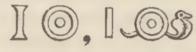


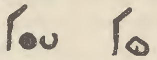


Now, a water jar of this form is constantly converted, in the running hand of the manuscripts, into a character like a *z*; and this character, in the enchorial text of Rosetta, is made to express the name of Jupiter; a fact which confirms the testimony of the Greek authors, who considered the Egyptian Jupiter as having been represented with a ram's head. A similar figure is found at Edfou (*Apollinopolis Magna*), and at Esneh (*Latopolis*). The temple at Edfou seems to have been dedicated by Amenophis or Memnon;[2] and he appears to be called "lover of Ammon,"[3] that is, Miamun, which is not unlike the name Memnon.

8. The common astronomical diagram for the sun, ⊙, seems to have been adopted by the Latin astrologers from their masters in Egypt; since it is not very probable that both should have employed a point in the centre of the circle without some communication with each other, the circle alone having been mentioned by some of the Greek authors, who say that it was the symbol of the sun.

8. PHRE.
ⲫⲣⲏ

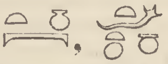


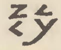


The deity Re, or Phre, is indicated by this character, followed by an upright bar; and the circle is often enveloped in the coil of the body of a serpent; an oval and an arm also often follow the circle.[4] The enchorial name of the sun is extremely like that which corresponds in the manuscripts to this hieroglyphic. And a similar circle, with rays diverging from it, though seldom exactly in straight lines (No. 160), is used in the sense of "enlightening," or "rendering illustrious;" and it has also been observed by some of the French, who have been in Egypt, to stand in several inscriptions with a manifest reference to light. The circle occurs also as a part of the terms month and day[5] (No. 178, 179). In the great Hieratic Ritual, and in some other manuscripts, this name of Phre occurs very frequently under or near the tablet which contains a representation of the sun shining, as well as under the next to it, which exhibits a head rising out of a lotus,[6] an emblem mentioned by Plutarch as relating to the sun, which here is made to spring from the pedestal (No. 6), as the sun is said to have been the offspring of Phthah. Whatever plant this lotus may have been, it certainly does not much resemble the nelumbo of the East, which some imagine to have been the original emblem of fertility.[7] The name Phre is almost the only intelligible combination of letters that ever occurs on the Abraxas or amulets; and the monster to which it relates has generally radiations from its head, and is surrounded by six stars.[8] The tablets of the sun in the manuscripts exhibit also little genii worshipping him, each of which is always marked "star god."

9. The name of Rhea may, without impropriety, be assigned to a female personage very commonly accompanying the sun, and distinguished by many of his attributes; [thus]:

9. RHEA.
ϯⲫⲉ ?





although the evidence would have been somewhat more conclusive if the name had been found attached to the figure of the mother in the tablet of the birth of Isis. On the coffins of the mummies, this personage is generally represented with outstretched wings, and in other tablets without wings; but she carries in both cases a circle on her head, emblematic of the sun.[9] If we considered the analogy of the hieroglyphical name only, we should be disposed to interpret it as meaning the wife or sister of Ammon.

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[1] This hieroglyphic name Num, here not perfectly accurately represented, since the jar should be one-handled, is that of Kneph or Chnuphis, not Ammon, whose name is written in the hieroglyphics Amen. The mistake which Dr Young here sanctions had its origin in that of the Greeks and Romans who confused the two divinities, making them to be the same as their Jupiter, and always ram-headed. Amen, however, is always man-headed. The ancient error may have arisen from the fact that the ram-headed god of the Great and Little Oases, Jupiter Ammon, was called Amen-Num, *i.e.*, Ammon-Chnuphis, or Hammon-Cenubis. (R. S. P.)

[2] The temple at Adfoo is a Ptolemaic structure dedicated to Her-het. See art. Egypt. (R. S. P.)

[3] The title Mee-Amen, signifying beloved of Amen, is given to many kings. It may have been one of those which the Greeks supposed to correspond to Memnon, which there is little reason to suppose to have been an Egyptian name. Lepsius conjectures that Memnonia, a name given to a famous temple of Rameses II. at Thebes, and another of the same king, and his father Sethee I. at Abydos, has its origin in the Egyptian Mennu, "structures," a word always used when temples are intended (*Chronologie der Ægypter*, vol. i., p. 277). (R. S. P.)

[4] The disk, or circle with a dot, is the iconographic representation of the sun, and the straight line which sometimes follows it is the sign of the masculine singular. The arm A is also occasionally added to the disk as a phonetic complement, the iconographic sign then becoming phonetic. The name of the sun and the divinity personifying it, is RA, or with the article PARA or PRA, whence the name Pharaoh, פַּרְעֹה, for the kings bore this name as representatives of the sun. (R. S. P.)

[5] As a determinative of time. (R. S. P.)

[6] The two representations here mentioned are the tablets or vignettes of the eightieth and eighty-first chapters of the *Ritual*. The title of the former is RA EN ART TARU EM NETER ERTA TEP KES ER HAR KEEKU, "The chapter of the making transformations into a god giving the hour which is to the path of darkness;" and the title of the latter RA EN ART TARU EM SESHNEE, "The chapter of the making transformations into a lotus." These relate to some of the transformations of the deceased in the other state; and the same phrase is used for birth, as M. de Rougé has shown (*Tombeau d'Ahmès*, p. 109), which seems to indicate that the Egyptians held the doctrine that man's soul returned to a human body after a certain period spent either in the other world or on the earth in the bodies of various brutes. (R. S. P.)

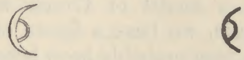
[7] On the lotus, see art. Egypt. (R. S. P.)

[8] See note 5, preceding page.

[9] The goddess Nutpe, here called Rhea, is the wife of Seb (Chronus), and mother of Osiris, Isis, Aroëris, Typhon, and Nephthys. She is represented on the mummy-cases as the protector of the deceased, who in taking the form of Osiris became her child. Thus the inscription of the mummy-case of Men-ku-ra (Mycerinus), the fourth king of the Fourth Dynasty (B.C. *cir.* 2300), reads thus:—"HESAR SUTEN SHEBT MEN-KU-RA ANSH TET MES EN TPE SHER NUTPE SHA [SEB ?] PESESHES MUTEK NUTPE HAREK EM RENS EN SHTE [EN] TPE ERATNES UNEK EM NE TERENSHETFUK SUTEN SHEBT MEN-KU-RA ANSH TET,"—Osiris, king of Upper and Lower Egypt, Menkura ever-living, born of Heaven, child [of] Nutpe, flesh [of Seb ?], thy mother Nutpe spreads over thee in her name of the expanse of heaven, she has granted [that] thou art as a god against thine adversaries [O !] king of Upper and Lower Egypt Menkura, ever-living" (Vyse's *Pyramids*, vol. ii., p. 94). Whether or not the name of the goddess Nutpe signifies the "abyss of heaven," in which case she would be the feminine form of Enpe (Empe), the Emeph of the

10. Ioh, the Moon, is not a deity of very frequent occurrence; but the character is easily interpreted, both from its form, and from its being found in a different position, as a part of the word month (No. 179).

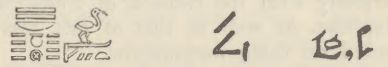
10. IOH.
ⲡⲓⲟϩ



At Denderah this character is accompanied by the epithet God, and without any female termination, as well as in several passages of an epistolographic manuscript sent home by Mr Bankes; a circumstance which is favourable to the opinion that Ioh was considered as masculine in mythology[1] as well as in grammar, just as Men or Lunus was sometimes made masculine by the Greeks and Romans; the fact, however, is not absolutely decisive of this question, since the character is not accompanied by the delineation of any personification of the deity.

11. The historical description of the god Thoth, or Hermes, as the scribe or secretary of Osiris, and the inventor ot writing, sufficiently identifies him with the person who is perpetually represented standing before Osiris, and writing with a quill or a style[2] on a square or oblong tablet. He has always the head of an ibis, and this bird, standing on a perch, constitutes his hieroglyphical name, as the ibis is known to have been the emblem of Thoth. The hieroglyphic for letters (No. 103) is also frequently found among his titles; and all these circumstances abundantly confirm the opinion of his true character, which Zoega and others had already advanced from conjecture only.

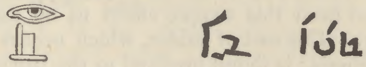
11. THOTH.
ⲑⲱꙋⲧⲑ



The enchorial name is very much disfigured, but the manuscripts exhibit a character which may serve to supply the connecting link, and another abridgment of the name which deviates still more widely from the original, being simply the common substitute for a feather, which here seems to stand for the whole bird, or perhaps merely for a feather which is often found projecting from the end of the perch. Next to Osiris, we find that Thoth is of more frequent occurrence than any other deity in the great ritual; and it is probable that the mummies of the ibis, which are so commonly found, were preserved in honour of him.[3] The semicircle with two oblique dashes, under the perch, seems to correspond to the epithet "great and great" of the Rosetta inscription; this character being generally significative of a dual.[4] The scale with eight dashes and two other characters is also very frequently employed as an epithet, and sometimes as a synonym of Thoth; it seems to mean "Dispenser of the eight treasures, or laws, of the country," for Diodorus informs us that the principal laws of Egypt were contained in eight books.[5]

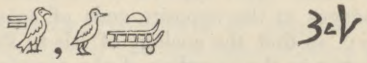
12. The name of Osiris is found,[6] with the epithet "divine," in a great majority of all the mythological inscriptions that have yet been discovered; so that this circumstance alone is sufficient to show that it must have been that of the principal deity of Egypt.

12. OSIRIS.
ⲟꙋⲥⲓⲣⲓ



The enchorial character of the inscription of Rosetta is readily identified, and it agrees perfectly well with that of the manuscripts, answering to the eye and the throne; so that the manuscripts here completely supply the want of that part of the stone which contained the name in the sacred characters. This name is also universally annexed to the great figure which is found at the end of almost all the manuscripts, and on the coffins of mummies, holding a hook and a whip or fan,[7] and of which the small detached images are also extremely common. In the sculptured inscriptions, the eye generally precedes the throne; in the running hand of the manuscripts, and on the coffins of some mummies, apparently of later date, the eye sometimes follows. Plutarch had perhaps been rightly informed respecting this character; but by a mistake, which was easily committed from a want of perfect recollection, he has called it "an eye and a sceptre;" and this combination has not been recognised as the name of a deity, though a symbol something like it occurs in some of the tablets. The pictured delineation of Osiris has indifferently a human head or that of a hawk,[8] but never that of any other animal. The tear (No. 100) seems also sometimes to have been used as an emblem of Osiris, as well as of Apis and Mneuis, who were considered as representations of him. The name is found perpetually on monuments of all kinds as an epithet of a departed person; and this is one great reason of the frequency of its occurrence.

13. ARUERIS.



13. Arueris, the Apollo of the Egyptian mythology, is sufficiently identified by the comparison of various inscriptions with the fragment of Hermapion, preserved by Ammianus Marcellinus, as the translation of the inscription on a particular obelisk, with which, however, it does not exactly agree, although its style completely resembles that of the Egyptian inscriptions in general, and the beginning corresponds perfectly well to the beginning of almost all

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so-called Hermetic Books, the second part of her name is the word "heaven"—and here Tpe, "Heaven," and "Nutpe" are the same. "The expanse of heaven" reminds us of the Hebrew רָקִיעַ, improperly translated in our authorized version "firmament" (Gen. i. 6), after the Septuagint rendering στερέωμα. "The "adversaries" or "accusers" are constantly mentioned in the *Ritual* as those against whom the deceased prayed Thoth to justify him as he had justified Osiris. (R. S. P.)

[1] The only divinity who bears the name of the moon is a form of Thoth, or Hermes, sometimes called A-AH or the Moon, at other times A-AH TET, Moon-Thoth. Shuns (Chuns) the son of Amen and Mut is also a lunar divinity. (R. S. P.)

[2] The instrument for writing here mentioned is not a style, but usually or always a reed-pen: it is possible that it may occasionally be a brush. "Of the quality of the pencils they used for drawing and painting, it is difficult to form any opinion. Those generally employed for writing were a reed or brush, many of which have been found with the tablets or inkstands belonging to the scribes; and with these, too, they probably sketched the figures in red and black upon the stone, or stucco of the walls. To put in the colour, we may suppose that brushes of some kind were used; but the minute scale on which the subjects are indicated in the sculptures prevents our deciding the question" (Wilkinson's *Ancient Egyptians*, vol. iii., p. 314). (R.S. P.)

[3] The ibis was sacred to Thoth, and therefore mummified like the other sacred animals. (R. S. P.)

[4] The name of Thoth probably reads TET; the so-called mark of duality, indicating the repetition of the alphabetic character T represented by a semicircle. There is no dual in either ancient Egyptian or Coptic, as we have already mentioned. (R. S. P.)

[5] The title of Thoth given in the woodcut is, if we exclude the first two characters, NEB SHMEN . . . "Lord of the City of Eight," Hermopolis Magna, the modern El-Ashmooneyn. (R. S. P.)

[6] The name of Osiris reads Hes-ar, which confirms the statement of Hellanicus, preserved by Plutarch, that the Egyptians pronounced it Ἥσυρις not Ὄσιρις (*De Isid. et Osir.*, cap. 34). (R. S. P.)

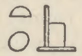
[7] Instead of the crook and flail of Osiris, the small figures of deceased persons in his character bear a hoe and flail, and a seed-bag. This, according to Mr Birch's explanation, is done to represent the deceased as a labourer in the Elysian Fields. (R. S. P.)

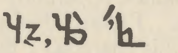
[8] Osiris is always represented with a human head, excepting in the compound character of Ptah-Seker-Hesar, in which case the head is that of a hawk. (R. S. P.)

the obelisks in existence, supposing only the hawk to be part of the name of Arueris; which is, besides, an inference extremely probable, from the tablets of several of the obelisks representing a deity characterized by a hawk with two bars,[1] and styled the son of another personage who seems to be the sun, as Apollo is called by Hermapion, and Arueris by Plutarch. Mr Hamilton has also given us a Greek inscription at Ombos, in which Arueris is made synonymous with Apollo; although the hieroglyphics which have been copied from this temple afford us no assistance in the inquiry. The sort of ladder, which occurs as a second name of Arueris,[2] is found prefixed to the hawk in its usual form, on the obelisk at Wanstead figured by Gordon, and on the frieze of Montagu and Ficoroni (*Hieroglyphics of the Egyptian Society*, 7 Eo p; 9 Lk); and it follows it on a statue of Pococke (vol. i., p. 212). Arueris is commonly represented either with a human head, or with that of a hawk, bearing a disc, as that of the sun is also generally depicted; and in plate 138 of Denon, the two deities seem in some measure confounded. The Egyptian name may be interpreted "evening sun," as emblematic of the repose of victory —ER RUHI RE.

14. ISIS, the sister and wife of Osiris, is very naturally denoted by the throne with the female termination [thus]:

14. ISIS.
ⲎⲤⲒ, ⲐⲈⲤⲒ ?

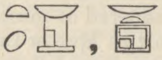


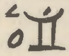


and, in more than one instance, the female figures, which have been long recognised as representations of Isis by other attributes, are distinguished by bearing the throne on the head, which is a common mode of characterizing the different personages of the tablets.[3] The manuscripts, again, enable us to discover the connecting link between the sacred and enchorial characters, and to supply the defects of the stone of Rosetta; though the resemblance is somewhat too imperfect to have satisfied us without their assistance. The goddess, thus distinguished, is very generally represented as standing at the head or feet of a corpse, with another female figure opposite to her; and we find the same personages at the opposite ends of several of the sarcophagi;[4] so that the analogy of Isis to Proserpine, and her character as the guardian of the remains of the dead, are sufficiently consistent with these representations. On a scarabæus brought from Egypt by Mr Legh, and in a hieroglyphic inscription at Philæ, she appears to be called the offspring of Phthah.[5] She often bears in her hand a sceptre forked at the foot, with a lotus for its head, while Osiris has more commonly a similar sceptre with the head of an animal; but these attributes are sometimes assigned to other deities.[6] In one of the boats on the green sarcophagus, and on Letheuillier's mummy, both in the British Museum, she is personified as a basilisk. Mr Hamilton has published some Greek inscriptions from Philæ, and from the small temple at Dendera, which show that Isis was the principal deity of these temples; and the hieroglyphics, as far as they have been copied, are precisely of the same import. The great temple at Karnak seems also to have been dedicated to Isis, and probably the small southern temple.[7] On a medal of Greek workmanship in the Borgian Museum, we have a figure of Isis, with the word THĒSI,[8] which may probably have been intended for TIESI, the Egyptian name with the feminine article.

15. The constant companion of Isis can be no other than NEPHTHE.[9]

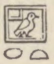
15. NEPHTHE.





Her name somewhat resembles that of Isis, with a scale or basin annexed to it, but the square surrounding the throne is completed, and the scale is sometimes detached from it, with a [semi] circle interposed; and, in this form, the name comprehends one of the characters denoting a temple[10] (No. 87). It seems also to be a head of Nephthe that is found at Dendera and elsewhere, supporting a little temple or shrine, in the place of the capital of a column; nor is it improbable that the temple at Dendera was dedicated to Nephthe, for the Greek inscription has Aphrodite, which is mentioned by Plutarch as a synonym of Nephthe.[11] It is true that the birth of Isis is represented on one of the ceilings, but it does not therefore follow that Isis was the principal goddess of the temple. A head bearing a shrine is not an uncommon ornament of a sistrum; and this agrees perfectly with the remark of Plutarch, that the head of Nephthe, as well as that of Isis, was sometimes represented on these instruments.

16. BUTO.



16. The emblem of a bird in a cage, which is often found in the manuscripts, accompanied by the figure of a child, seems to indicate the character of a *nurse*, and may without inconvenience be interpreted as relating to the goddess *Buto*, the nurse of Horus and Bubastis; though it would perhaps have been more correct to engrave the name in smaller letters, as denoting some degree of uncertainty.[12] On the sarcophagus called the Lover's Fountain, in the British Museum, she is delineated with a hawk's head; in the western temple at Philæ she has a human head with a horned head-dress, and she sits near Isis and Horus, a circumstance which strongly confirms the propriety of the denomination.

17. The enchorial name of HORUS seems to be derived from the figure of a hawk followed by the character de-

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[1] These hieroglyphics form a name of Ra. (R. S. P.)

[2] The character here called a ladder is the second hieroglyphic of the second name in the wood-cut above. The name reads Atum, and is applied to a deity of Hades. (R. S. P.)

[3] The name of Isis reads HES. (R. S. P.)

[4] The female divinities who are thus represented as mourners, are Isis and her sister Nephthys. (R. S. P.)

[5] This is a mistake. Isis is a child of Seb. (R. S. P.)

[6] The gods usually carry the sceptre with an uncertain animal's head; the goddesses, that with a lotus. (R. S. P.)

[7] The great temple at El-Karnak was dedicated to the Theban triad, Amen-ra, Mut, and Chuns; and the principal temple to the south of that great edifice, to Chuns. The latter appears to be the one here called "the small southern temple." (R. S. P.)

[8] Inscriptions of this kind on coins are frequently tooled, having been added by the cinque-cento forgers; and the one here mentioned is probably such, although it is of course impossible to pronounce on this matter without an inspection of the coin itself. (R. S. P.)

[9] The proper orthography of this name is Nephthys. (R. S. P.)

[10] This name reads NEBT-EE or NEFT-EE, "the lady of the house;" the latter reading is based on the supposition that Dr Hincks is right in making the complementary letter of the first sign sometimes F and not B. (R. S. P.)

[11] Νέφθυν, ἣν καὶ Τελευτὴν καὶ Ἀφροδίτην, ἔνιοι δὲ καὶ Νίκην ὀνομάζουσιν (*De Isid. et Osir.*, cap. 12). The Egyptian Venus was, however, Athor, not Nephthys, and it is to the former goddess that the famous temple at Dendera was dedicated, and it is her head which adorns the capitals of its columns. (R. S. P.)

[12] The hieroglyphic name here given is that of Athor, and may be read TEE-HER or perhaps EET-HER, the abode of Horus, an explanation entirely in accordance with Plutarch's, for he says that Ἄθυρι signifies οἶκος Ὥρου κόσμιος (*De Isid. et Osir.*, cap. 56). In this passage Plutarch makes Αθυρι to be but a name of Isis, and it must be admitted that the two goddesses are closely connected. (R. S. P.)

noting Isis; an arrangement which agrees very well with the supposition that his usual denomination was Horsiesi.[1]

17. HORUS.
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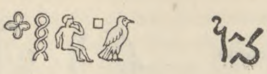
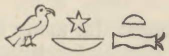


The figure of the infant (No. 133), the chain, and the knot, clearly form a part of the name on a Horus engraved by Montfaucon (*Ant. Expl.*, tom. ii., p. 302), and on an obelisk from Bosc in the Supplement of the same work. In some cases a feather, following the infant, seems to supply the place of the bird, as in Caylus (*Recueil*, tom. iv., pl. 13).

18. PAAMYLES.



18. Paamyles, mentioned by several authors as the Priapus of Egypt, is sufficiently distinguishable by his usual attributes. He is often figured with one hand only, which is elevated towards the angle of a kind of whip or fan suspended above him. At Edfou he is once denoted in an inscription by a figure like that of the tablets; and in another place by a distinct name,[2] much resembling that of a female deity, found on some of the cases of the mummies, and who might consequently be called *Paamylia*.

19. NILUS.
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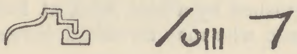
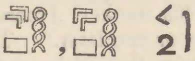


19. The Nile seems to have been reckoned among the deities of Egypt, and the character which appears to be appropriate to a river (No. 82) is found occasionally in the tablets, followed by a vessel and a spiral (Nos. 7 or 9, and 201), which seem, indeed, to make a part of the name, and accompanied by epithets of respect. This character has already been considered by Kircher and others as representing a nilometer; and the deity in question can only be distinguished by the name Nilus.[3]

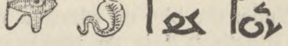
20. The sacred characters denoting Apis are pretty clearly determined by the triple inscription; the enchorial name is perfectly so.[4]

20. APIS.



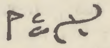
If, however, any doubt remained on the subject, it would be removed by an examination of the inscriptions on four vases found by Paul Lucas (*Voyage dans la Turquie*, vol. i., p. 346, Amsterdam, 1720, in 2 vols. 12mo), at Abousir, the Busiris of the ancients; that is, the Be Oshiri,[5] or sepulchre of Osiris, as Diodorus very properly translates it. There is a received tradition that Apis was worshipped and buried here, and Lucas established its truth by finding the mummy of a bullock in the catacombs.[6] Now, all the inscriptions on the vases end with a bullock preceded by this character, though the angles are turned in a different direction from those of the inscription of Rosetta; so that the two forms of the character seem to have been used indifferently. With this latitude, we have no difficulty in identifying the name, as it occurs in almost every line of the inscriptions on the great sarcophagus of granite formerly at Cairo, called the Lover's Fountain, and now in the British Museum; which there is some reason to suppose, from the frequency of this name, may have been intended for receiving a mummy of the bull Apis; although it must be confessed, that in several other monuments the names of the deities are introduced in a manner somewhat similar, with an evident relation to the designation of some human being whom they are intended to commemorate.[7]

21. MNEUIS.



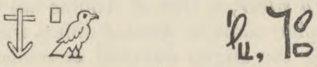
21. The enchorial name of Mneuis is very completely ascertained by the inscription of Rosetta, and from a comparison of different passages in the manuscripts there is reason to infer that it was intended as an imperfect representation of a basilisk and a tear,[8] emblems which are repeatedly found in the great ritual, connected with the figure of a bullock.

21*. Damalis.

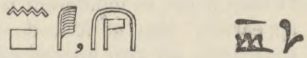


21*. The sacred cow, in the manuscripts sent home by Mr Bankes, is denoted by a serpentine line with two dots, followed by the term goddess. We may venture to distinguish her by the temporary name *Damalis*. That of Io would imply too great identity with the Greek mythology.[9]

22. Hyperion.



23. Cteristes.



22, 23. In the tablets representing the judgment of the deceased we generally find two personages standing by the balance, and apparently weighing his merits; one with the head of a hawk, the other with that of a wolf,[10] and seeming to officiate as the good and evil genius of the person. The former, denoted by a hawk with a bar, and sometimes also a spear, appears, from various monuments, to have some relation to the Sun or to Horus, and may therefore be called *Hyperion;* the other is often observed to be employed in the preparation of a mummy, and may be called from this occupation *Cteristes*, or the embalmer. He is also frequently represented on the coffins of mummies and elsewhere under the form of a wolf sitting on a kind of altar; and he seems to be an immediate minister of Osiris. His hieroglyphical name is a feather, a wavy line, and a block;[1] or a hatchet under a sort of arch.

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[1] Horus the Younger is frequently termed HER-SA-HES, "Horus, son of Isis," to distinguish him from Aroëris, HER-UR, "Horus the Elder," and Harpocrates, HER-PA-SHRUT (CHRUT), "Horus the Child." The hieroglyphic name given in the text is that of Harpocrates, the enchorial that of Horus simply, meaning Horus the Younger, for the simple name Horus applies to this divinity. (R. S. P.)

[2] The Egyptian name of this divinity, a bolt on a stand, is usually read Khem, but its sound cannot be considered certain. At Thebes he was worshipped as Amen-ra-Khem, or Amen-ra-ka-mut-f, the latter name first rightly read by Mr Birch as "Amen-ra, who is male and female." The hieroglyphics given in the text have nothing to do with Khem. (R. S. P.)

[3] The hieroglyphic character does not represent a nilometer but an adze: its proper signification when employed as an ideograph is "approved," or something very similar, as in the prenomen of Rameses II. The group spoken of by Dr Young in the text, with a character which he does not mention, the wavy line, preceding the adze and with the vase and chicken, the homophone of the spiral, with the determinatives of time and heat or fire, also not mentioned, following it, is rendered by Dr Brugsch "the hot season" (*Récherches Nouvelles*, p. 62, pl. iv., no. 13, b., c.). (R. S. P.)

[4] This name, reading HAPEE, is that of the sacred bull Apis, of one of the four genii of Amenti (Hades) whose names occur on the so-called Canopic vases, and it is also the commencement of the name of Nilus, usually read HAPEE-MU. (R. S. P.)

[5] The proper etymology of the name of Busiris is doubtless PA-HESAR, "the [tomb] of Osiris." (R. S. P.)

[6] It is not far from this Busiris that the sepulchre of the bulls Apis has been discovered by M. Mariette. Art. Egypt.

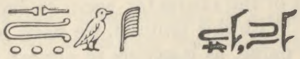
[7] The word here mentioned is that of the person for whom this sarcophagus was made, HAPEE-MEN, "Apis the Established." The bulls Apis were buried in sarcophagi of much larger dimensions than this. (R. S. P.)

[8] The hieroglyphic characters do not compose the name of Mnevis. (R. S. P.)

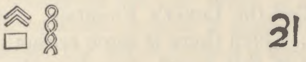
[9] It is very probable that Io is connected with Egyptian mythology. The name Io may be traced in AAH, the moon, or in AH, a cow, more probably in the latter. (R. S. P.)

[10] Horus and Anubis. (R. S. P.)

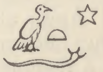
24. Tetrarcha.



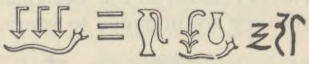
25. ANUBIS.



26. MACEDO.

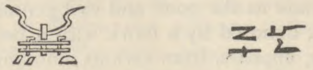


27. Hieracion.

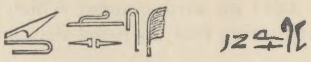


24–27. Under the bier on which a mummy lies, and in many other situations near the person of the deceased, we find representations of four deities who seem to be concerned in the operation of embalming, and who might even be supposed to preside over the different condiments employed, their heads frequently serving as covers for four jars, of the kind sometimes called Canopi.[2] They may also very properly be considered as attendants of Isis, who seems to be a still more important personage on such occasions. The first of the four has generally a human head, and may be called *Tetrarcha;* his name contains a sort of forceps, and a broken line.[3] The second and third have respectively the heads of a dog or baboon, and of a wolf;[4] and they agree very satisfactorily with the well-known character of ANUBIS, and with that of MACEDO, his companion, mentioned by Diodorus as having a wolf's head, [and] whose name may possibly have some relation to MANCHAT, *a worker in silver*, as that of Anubis has to NUB, *gold*.[5] The hieroglyphic name of Anubis differs from that of Apis only in having the angles directed immediately upwards, a circumstance which is not so indifferent to the signification as it at first appeared;[6] that of Macedo has a vulture with a star, and sometimes an arm instead of the vulture. The fourth of these deities is represented with the head of a hawk, and may therefore be called *Hieracion*, and he is denoted by a water jar, with three plants somewhat resembling leeks or onions.[7]

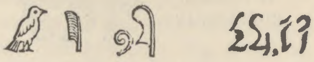
28. Cerexochus.



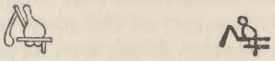
29. Bioxiphus.



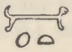
30. Platypterus.



31. Mastigias.



32. Soraea.

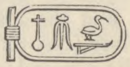


28–32. Amongst the many hundreds of deities who are represented in various inscriptions and sculptures, some of the most remarkable are two personages with the heads of wolves, the first characterized by a sort of raised frame or banner, and a pair of horns, which may be expressed by the pseudonymous or temporary term *Cerexochus*,[8] and the second by a half bow and a sword or knife, whence he may be called *Bioxiphus;* a figure with a human head, generally wearing a feather on it, and denoted by a broad feather reversed, which is implied in the name *Platypterus;* another wearing a cap with a whip in it, who may be called *Mastigias;* and a fifth in the form of a female, distinguished by a bier, who, at Edfou, bears a tear on her head, and who may be called *Soraea*.

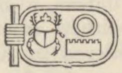
B. *Kings.*

Kings.

33. Thuthmosis.



34. Mesphres.



33, 34. We are informed by Pliny that the Alexandrian obelisk was erected by Mesphres or Mestires, the reading of the different manuscripts being different;[9] and since no king of the name Mestires is mentioned by other authors, we may consider this *Mesphres* as the Mesphres or Mesphris who succeeded his mother Amersis about 1700 B.C., or perhaps a century or two later.[10] The hieroglyphical name of his father contains that of the god Thoth, and may therefore possibly have been intended for the *Thuthmosis* of the chronologers, who is said to have been the grandfather of Mesphres.[11] The obelisk at Alexandria, now called

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[1] This is the hieroglyphic name of Anubis, the characters composing which are the reed (A), the wavy line (N), and the mat (P), as in the woodcut: to these is sometimes added the chicken, to express the medial vowel (U). The name reads ANUP. The head of Anubis is that of a jackal. (R. S. P.)

[2] These are the four genii of Amenti, children of Osiris, who presided over the parts of the body which were removed in the process of embalmment, and placed in the jars of which the lids had the forms of their heads. (R. S. P.)

[3] The name of this first genius is AMSET. (R. S. P.)

[4] The heads of the two genii here mentioned, HAPEE and SU-MUTF, are respectively those of a cynocephalus and a jackal, not "of a dog or baboon, and of a wolf." (R. S. P.)

[5] The name of Anubis has nothing to do with that of gold, which is a distinct root. (R. S. P.)

[6] This is the same as the name of Apis, as already mentioned. (R. S. P.)

[7] This name probably reads KABHSNUF. (R. S. P.)

[8] This divinity is HEP-HERU, "the guardian of the paths" [of the sun]. Like Anubis, he is jackal-headed, and is sometimes represented by a jackal alone, as on the top of the funereal tablets, where Anubis and he are thus represented.

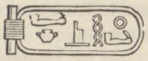
[9] The Egyptian names in Pliny are so corrupt that it is frequently impossible to trace their original forms. "Trabes ex eo [syenite] fecere reges quodam certamine, *obeliscos* vocantes, Solis numini sacratos. Radiorum ejus argumentum in effigie est; ita significatur nomine Ægyptio. Primus omnium id instituit Mesphrês [*var.* Mespheres], qui regnabat in Solis urbe, somnio jussus; hoc ipsum inscriptum in eo; et-enim sculpturæ illæ effigiesque quas videmus Ægyptiæ sunt litteræ. Postea et alii excidere reges. Statuit eos in supra dicta urbe Sesothes [*var.* Sothis] quattuor numero, quadragenum octonum cubitorum longitudine: Rhamsesis autem, quo regnante Ilium captum est, cxxxx (*var.* quadraginta) cubitorum (*Hist. Nat.*, lib. xxxvi., cap. viii., § 14, ed. Sillig). Comp. *Herod.* ii., cap. 111, on the two obelisks set up by Pherôn, the son of Sesôstris, at the temple of Heliopolis, in gratitude for the recovery of his sight, and *Diod.* i., cap. 59, where the story told by Herodotus is related of Sesoôsis II., who corresponds to the Pherôn of the older historian. (R. S. P.)

[10] The name here read Mesphrês is the prenomen of Thothmes III., who is not the Mesphrês of Manetho, but the Misphragmuthôsis (Mesphrês-Tethmôsis?) Its sound is probably MEN-TAR-RA, or MEN-TA-RA. Mesphrês is the fifth king of Manetho's Eighteenth Dynasty, and Misphragmuthôsis the sixth, respectively the Thothmes II. and Thothmes III. of the monuments, and their chronological period is about the middle of the fifteenth century before the Christian Era. (R. S. P.)

[11] Dr Young always supposes the second name of a king—perhaps because the phrase "son of the sun" intervenes between it and the first—to be the name of his father. The title "son of the sun" is, however, applied to the second name as a prefixed title, not as a title

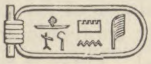
Cleopatra's Needle, like almost all others which contain three lines on each side, exhibits different names in the middle and the outer lines. From this circumstance, as well as from the greater depth of the sculptures, which is generally observable in the middle line, there is reason to suppose that this line stood at first alone, and that the two on each side were added by a later monarch.[1] The Lateran obelisk, however, is remarkable for exhibiting the name of Mesphres on all the lines of the different sides.[2] The Constantinopolitan obelisk has only one line on each side, with the name of Mesphres, the son of Thuthmosis.[3] The same name is also found on the gateway of the fifth catacomb at Biban-el-Molouk,[4] on a pillar of the palace at Karnak, and in a splendidly-coloured bas-relief on one of the interior architraves of the gallery; as well as on a seal of Denon, pl. 98, and on some others brought from Egypt by Mr Legh.

35. Misphragmuthosis.

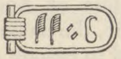


35. The Isean obelisk of Kircher has a "son of Mesphres, favoured by Phthah;" we must therefore distinguish this king by the name *Misphragmuthosis*, who is recorded as the son and successor of Mesphres.[5]

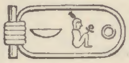
36. Tithous.



37. Eoa.



38. MEMNON.
ⲁⲙⲉⲛⲱⲫ



36–38. A multitude of ancient Greek inscriptions identify the statue of Memnon, celebrated by all antiquity for its musical powers, which Strabo says he witnessed in person though he could not very positively decide that the sound proceeded from the statue rather than from some of the bystanders. In one of the inscriptions we find the word *Phamenoth*,[6] not as a date, but as a synonym of Memnon, which must be considered as identical with the Phamenoph given by Pausanias as his Egyptian name,[7] and with the Ammenoph or Amenophis of Manetho or others, which differs from it only as wanting the article. There is, however, some doubt to which Amenophis this statue properly belongs.[8] Manetho makes Memnon the eighth king of the Eighteenth Dynasty, who may be called Amenophis the Second;[9] but Marsham brings him down to the Ammenephthes of Manetho, or Amenophis the Fourth, and principally because he thinks that only a successor of Sesostris could have been well known in Asia; and he even supposes him to have been later than Homer, who, he says, never mentions him, though Hesiod calls him the son of Tithonus and Aurora. But, in fact, the name of Memnon does occur in the *Odyssey*, where Ulysses alludes to his beauty in a conversation with the shade of Achilles; and Hesiod could scarcely have mentioned a king as descended from a deity that was not considerably earlier than his own time; so that the tradition of Manetho seems to be preferable to the mere conjecture of Marsham. At the same time, we cannot well call him Memnon, the son of Thuthmosis, the name of the father not agreeing with that of this king; and there is another circumstance which seems to lead us to the third Amenophis, intermediate between these two extremes, who was the son of Ramesses Meiamun, or Ramesses, the lover of Ammon;[10] which is that Amenophis himself appears to have built a temple to Ammon in the isle of Elephantiné, and is called Meiamun in several of the hieroglyphical inscriptions still existing there. So that there is little doubt that the name Memnon must have been derived from Meiamun.[11] Besides the different statues of the Memnonium, we find monuments of the same personage in almost every part of Egypt, though they are much more frequent at Thebes and in its neighbourhood. The name is marked on all the lion-headed goddesses of black granite which are now in the British Museum, and on some others which are in possession of Mr Bankes. The first of this series having been purchased, as Bruce informs us, for a large price, by Donati, for the king of Sardinia, the inhabitants were induced to take some pains in digging the others out of the sand. The building called by the French the tomb of Osymandyas bears also the name of Memnon;[12] and it is

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connecting the two names. The first name is now called the prenomen, the second the nomen. Thus in the present case the nomen Tet-mes or Thoth-mes, "born of Thoth (Hermes)," follows the prenomen Men-tar-ra. The earliest kings have no prenomens. (R. S. P.)

[1] The standing and fallen obelisks at Alexandria have in their centre lines the name of Thothmes III., and in their lateral lines that of Rameses II., while that of a later king appears in small additional inscriptions exterior to the others and near the base. (R. S. P.)

[2] This obelisk is the largest known, being upwards of 105 feet in height, and having been originally upwards of 108, exclusive of course of the modern pedestal and ornaments. It bears the name of Thothmes III. (R. S. P.)

[3] The obelisk in the Hippodrome at Constantinople bears the name of Thothmes III. (R. S. P.)

[4] This is a mistake, the oldest tomb and name in the two valleys of kings' sepulchres at Thebes being those of Amenoph III., son of the fourth and last Thothmes, unless indeed the unplaced king Skha-ee or A-ee be of an earlier period. (R. S. P.)

[5] In Manetho's list Misphragmuthôsis is the successor of Mesphrês, and in Josephus' version, his son. The royal name given by Dr Young is not, however, that of this sovereign, but a blundered imitation of another name. (R. S. P.)

[6] The inscriptions give Αμενωθ, and Φαμενωφ (*Mod. Egypt and Thebes*, vol. ii., p. 162). (R. S. P.)

[7] Ἀλλὰ γὰρ οὐ Μέμνονα οἱ Θηβαῖοι λέγουσι, Φαμένωφα δὲ εἶναι τῶν ἐγχωρίων, οὗ τοῦτο ἄγαλμα ἦν. ἤκουσα δὲ ἤδη καὶ Σέσωστριν Φαμένων εἶναι τοῦτο τὸ ἄγαλμα, ὁ Καμβύσης διέκοψε (*Paus. Att.* i., 42). Comp. the *Paschal Chronicle*—Ὁ δὲ αὐτὸς (Καμβύσης) καὶ τὸν Ἀμμενῶφιν, ὃς Μέμνων νομιζόμενος εἶναι καὶ λίθος φθεγγόμενος, τέμνει, ὑφορώμενος γοητείαν τινὰ εἶναι ἐν αὐτῷ, ὡς ἱστορεῖ Πολύαινος Ἀθηναῖος (*Chron. Pasch.* i., p. 270, ed. Dind.).

[8] The name is that of Amenoph III., whom the two colossi, the Vocal Memnon and the corresponding one, represent. He is called Amenôphis by Manetho, and is the eighth sovereign of his Eighteenth Dynasty. (R. S. P.)

[9] Manetho omits the second Amenoph, and the third is therefore the second in his list. (R. S. P.)

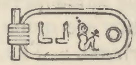
[10] Amenoph III. is here misplaced. He was son of Thothmes IV., and reigned long before the first Rameses. The Rameses Miammous, properly Miammun, of Manetho, is Rameses II., grandson of the former king of the same name. (R. S. P.)

[11] Few would now propose to find an etymology of Memnon in Egyptian. The whole story of Memnon is one distinct from Egyptian history. He was an Asiatic if a really historical personage, and his name is probably either Greek or Assyrian. The Greeks after the time of Herodotus, and still more the Latins, took little care to distinguish between the Eastern and the Western Ethiopians: it was enough that Memnon was an Ethiopian for them to seek for traditions of him in Egypt, and the Egyptian priests, with a readiness that has made them in more cases than one causes of confusion in history, told their inquisitive Greek visitors that the half-Ethiopian Amenoph was the Memnon of the Trojan War. But after a time, either through the carelessness of the priests or the hasty conjectures of the Greeks and Romans, every king who had a name or title resembling Memnon was confounded with him, and the edifices which he raised called Memnonia. Of the latter appellation we have noticed Dr Lepsius' ingenious, though we cannot but think improbable, explanation.

[12] This temple is the Rameseum of El-Kurneh, or palace-temple of Rameses II., in Western Thebes. This king was called Mee-amen Rameses, a name which in this case was corrupted into Memnon. (R. S. P.)

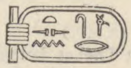
remarked by Strabo, that Memnon and Ismendes may probably have been the same person. The name is also found in the grottos at Biban-el-Molouk,[1] on some statues representing Osiris, and in some inscriptions at Ombos, as well as on a seal of Denon (pl. xcviii.) Mr Bullock has presented to the British Museum a scarabæus of very hard stone, on which we find the name of Memnon, together with that of his father and mother, whom we may call, in order to preserve the mythological analogy, *Tithous* and *Eoa*, although without asserting that this Tithous was the builder of the Labyrinth, which some authors have attributed to a king named Tithoes, and others to Ismendes.[2] The mother's name occurs also alone, as "the goddess mother," on the back of a beetle in Gordon's *Mummies* (plate xxii.), a circumstance which removes the doubt that might otherwise arise from the want of the female termination in the name; the father's is found on a square seal in the possession of Mr Legh. There is another copy of the inscription of Mr Bullock's scarabæus, on a scarabæus belonging to Mr Palin, which had long been used by a Greek priest at Athens for stamping the paschal bread (Dubois, *Pierres Gravées*, Paris, 1817, pl. v., n. 5). The beautiful head lately brought from the Memnonium to the British Museum has only a part of the father's name remaining, which does not appear to be that of the father of Memnon, though the first three characters are the same; but the fourth is the pedestal representing Phthah; and a similar name is found on some other colossal statues and obelisks remaining in Egypt, as well as on a smaller figure of red granite brought by Mr Hamilton from Elephantiné.

39. Amenses.

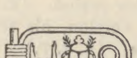


39. In the principal name on the obelisk at Karnak, the final scale of the name of Memnon is exchanged for a pair of arms stretched upwards; a variation which may be expressed by calling it Amenuses or *Amenses*, from SHESH, a pair.[3] The father's name is also a little like that of Tithous; but that the difference is constant may be inferred from its separate occurrence on a seal brought home by Mr Legh, a lion's head making a part of it in both instances. The true name and date of this personage must be considered as wholly unknown, though the resemblance of the name to Memnon makes it convenient to place them together. In Mr Boughton's minute golden image, engraved in the *Archæologia*, the name appears to be the same, but with the synonymous substitution of the hatchet for the judge.

40. Heron.

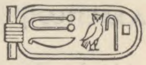


41. Remesses.

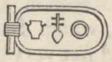


40, 41. The obelisk at Heliopolis has every mark of considerable antiquity, and the shortness and simplicity of its inscription is appropriate to a remote period. Pliny says that Mitres or Mestires first erected obelisks at Heliopolis; he also mentions Sothis, and apparently Ramesses, as having left similar monuments of their magnificence in the same place. The principal name upon the obelisk now remaining at Matareah may also be observed in several other inscriptions, but with the substitution of two other names for that of the father, so that the name of the son must probably have belonged to many different individuals; a circumstance which, as well as the sounds belonging to the different characters, agrees very well with Ramesses; for we have RE, *the sun*, MES, *a birth*, and SHESH, *a pair*, so that we may venture to call it *Remesses;* and we may take *Heron* for the father of the first Remesses, from Hermapion, though it is possible that he may be the Armais of Manetho; but we have scarcely sufficient evidence to appropriate to him that name.[4] Another Remesses seems to have been a son of Sesostris; a third Ramesses follows Ammenephthes in Manetho, and agrees with the Rhampsinitus of Herodotus, and the Remphis of Diodorus, who is mentioned as the successor of Proteus; and this may, perhaps, have been the Remesses of the friezes of Montagu and Ficoroni (*Hieroglyphics*, 7 Ou. 9 If.), who seems, from the resemblance of the different parts of the work, to have been nearly contemporary with Sesostris.[5] (*Hieroglyphics*, 7 H. I.) There is also another Remesses on the Lions at the fountain of Aqua Felice, near the baths of Diocletian at Rome, the name of whose father is a little like the name supposed to belong to Arsinoë (No. 60).

42. Sesostris.



43. Pheron.



42, 43. The obelisk erected by Augustus in the Campus Martius is said by Pliny to have been the work of Sesostris;[6] and there are sufficient documents of its identity with that which had long remained buried near the Monte Citorio, and of which figures have been given by Zoega and others. The inscription was supposed, in the time of Pliny, to contain a compendium of the physical and philosophical learning of the Egyptians; but, in order to make this opinion credible, it would be necessary to admit that the princes of earlier days entertained very different ideas from those which have since been prevalent respecting the comparative importance of the abstract sciences, and of national prosperity and martial glory. If Sesostris was the son of Amenophis, he cannot have been the reigning king mentioned in this obelisk. But it may safely be attributed to *Pheron*, the son of *Sesostris*, who, according to Herodotus, erected two obelisks; and the occurrence of the name of Sesostris as the father may be considered as sufficiently conformable to the testimony of Pliny.[1] The same names are found, with a slight variation, on a small statue of basalt, very highly finished, now standing in the British Museum; and Denon has copied them from an inscription in the Memnonium (pl. cxviii.)

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[1] The tomb of Amenoph III. is in the Western Valley of the Tombs of the Kings at Thebes. (R. S. P.)

[2] Another scarabæus of this king is interesting as one of the few Egyptian monuments, excluding the small mummy-shaped figures, of which more than one copy has been found, and on account of the remarkable character of its inscription, which gives the name and titles of Amenoph III. and his Queen Teey, and the parentage of the latter, as well as the extent of the king's dominions. After the mention of Teey occur these words: REN EN TEF-ES YUAÄ REN EN MUT-ES TUAW HEMT PU ENT SUTEN NESHT TEP SHTEEF. . . . . . . ER KERAY MEH . . . ER NEHAREENA—"The name of her father Yuaä, the name of her mother Tuaw, wife [she] is of the strong king, the extreme [of] his boundary southward to Karay, northward to Nehareena" (Rosellini *Mon. Stor.*, No. xliv., 1). Karay is supposed to be Coloë, in Ethiopia; and Nahareena is held to be Mesopotamia, the Aram-naharaim of the Scriptures. (R. S. P.)

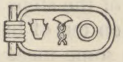
[3] The name given as that of Amenses is the prenomen of a queen, Numt-amen, who reigned conjointly with Thothmes III. Manetho's Amenses is the Aähmes of the monuments, the wife of Thothmes I. (R. S. P.)

[4] The names here called Remesses and Heron are the prenomen and nomen of Usertesen or Sesertesen I., the first king of Manetho's Twelfth Dynasty. (R. S. P.)

[5] This king is Nectanebo II., the third king of the Thirtieth Dynasty, who has the same prenomen as Usertesen I., and the nomen Neshtnebf or Neshtnef. (R. S. P.)

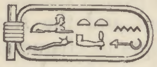
[6] Sesothis or Sothis, not Sesostris. "Is autem obeliscus, quem divos Augustus in circo magno statuit excisus est a rege Semenpserteo, quo regnante Pythagoras in Ægypto fuit, lxxxv pedum et dodrantis, præter basim ejusdem lapidis; is vero quem in Campo Martio novem pedibus minor a Sesothide" [or Sothide] (Plin. *Hist. Nat.*, lib. xxxvi., cap. viii., § 14). (R. S. P.)

44. Nuncoreus.



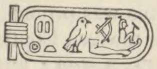
44. *Nuncoreus*, according to Diodorus, was another son of Sesostris:[2] his name occurs also in Pliny, and we may consider him as the son of Sesostris mentioned in Mr Montagu's friezes.[3] The name is also found at Philæ, and, with a slight variation, on an altar of basalt figured by Caylus (*Recueil*, tom. i., plate xix.), now in the King's Library at Paris. The remains of the same name may also be observed on a block, apparently of white sandstone, in the British Museum, which is figured by Norden, in its old situation, as a part of the foundations of Pompey's Pillar at Alexandria; and it occurs on a fragment of a statue brought by Mr Hamilton from Thebes.

45. Proteus.

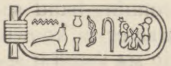


45. The name of *Proteus*, or Certus, otherwise Ammenephthes, is only known as the predecessor of one of the kings named Ramesses; and we may safely employ it for the father of the Remesses of the friezes of Montagu and Ficoroni, the whole of which are remarkable for the excellence of their workmanship.[4]

46. Amænuphthes.

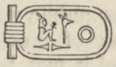


47. Anysis.

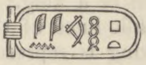


46, 47. Until we obtain evidence of a more positive nature, we may give to the two kings mentioned on the sarcophagus of green breccia the names of *Amænuphthes* and *Anysis*, supposing them to have lived about the time of Amenephthes, or Amenophis the Fifth, and his successor Osorchon. The father's name might, without difficulty, be read "Mænuphthah," supposing some titles to follow it.[5] There are also two obelisks of the same king, brought from Cairo, which stand near the sarcophagus in the British Museum; and the style of the workmanship somewhat resembles that of the times of Sesostris and his immediate successors. It has been observed that neither of the names can well be Alexander's, since that of the father is repeated much more frequently than that of the son, which could not have happened if it had been meant for Philip; and Alexander had no son who could have been mentioned in his sarcophagus.[6] Nor is it at all probable that Alexander should have erected any obelisks at Memphis or in its neighbourhood. The god Ammon is nowhere mentioned among the titles of the king, and holds only an inferior rank among the innumerable deities represented in the tablets. We find both the names, without any addition, on a dovetail of copper (engraved in Lord Valentia's *Travels*), which was found at Behbeit, the Atarbechis or Aphroditopolis of the ancients, situated on the branch of the Nile that runs to Damietta.[7]

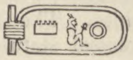
48. Psammetius.



49. NECHAO.

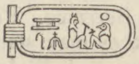


50. PSAMMIS.

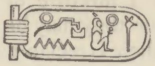


48–50. We learn from Pliny that the Flaminian obelisk now standing near the Porta del Popolo at Rome, which was the smaller of the two formerly in the Circus Maximus, placed there by Augustus, and used as the gnomon of a dial, was the work of Senneserteus or Semnesyrteus, who reigned in Egypt at the time when Pythagoras visited it. This king seems to have been the same with Psammuthis or PSAMMIS; and the authority of the evidence is so much the stronger, as the period in question is not extremely remote. The father of Psammis, according to Herodotus, was Necos or NECHAO. The two names occur on all the middle lines of the obelisk; and that of the father on the pillar of a colossal Isis in the *Supplement* of Montfaucon. The Sallustian obelisk, which seems to have been partly copied from the Flaminian, has them both. In the middle lines of both the obelisks at Luxor we find a name much resembling that of Psammis, which we may therefore call PSAMMETIUS, conjecturing that it may have belonged to Psammetichus, who reigned a little earlier.[8] The father's name is not unlike in its import to that of Nechao, both implying *approved by Phthah;* and it is remarkable that in Manetho's series the predecessor of Psammetichus is also Nechao.

51. Mænuphthes.



52. AMASIS.



51, 52. Among the most common of all the names of the kings of Egypt, on a great variety of monuments, are those which were mistaken by Kircher for a sort of amulets or charms, which he denominated the Mophthomendesian tablets. They occur alone on three small obelisks only, the Medicean, the Mahutean, and the Monticælian of Kircher; but they are found in the external lines of the Alexandrian, the two at Luxor, the Flaminian, and the Sallustian, while none are ever found exterior to them.

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[1] The name is that of Psammetichus I. of the Twenty-sixth Dynasty, written Psemetik. (R. S. P.)

[2] Diodorus Siculus does not mention Nuncoreus, but Pliny does. Perhaps Dr Young supposes this king to be the same as the Uchoreus of whom Diodorus speaks, but he was not a son of Sesostris. (R. S. P.)

[3] This name is the prenomen of Psammetichus II., of the Twenty-sixth Dynasty. (R. S. P.)

[4] The name read Proteus is Neshtnebf or Neshtnef, that of Nectanebo II. of the Thirtieth Dynasty. The friezes of Montagu and Ficoroni, the former of which is in the British Museum, are in bad style, though carefully executed. The earlier portions of the former are of the Egyptian Renaissance under the Twenty-sixth Dynasty, the later ones of its decline, to which the latter seems wholly to belong. (R. S. P.)

[5] These names are the nomen and prenomen, for the name is placed first in the woodcut of a king Her-nesht-heeb, who has been usually supposed to be Amyrtæus, the sole king of the Twenty-eighth Dynasty. Dr Hincks, however, conjectured him to be Manetho's first Nectanebo, the head of the Thirtieth Dynasty, and his correctness has been proved by the discoveries of M. Mariette (Lepsius, *Ueber eine Hieroglyphische Inschrift am Tempel von Ædfu, Abhandl. der K. Akad.*, 1855, p. 74). (R. S. P.)

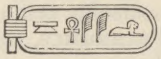
[6] This is not strictly correct: either Alexander Ægus, the posthumous legitimate son of Alexander, or Hercules, his illegitimate son, might have been mentioned on a sarcophagus executed in Egypt after his death. (R. S. P.)

[7] The village here called Behbeit, but properly Bahbeyt el-Hagar, marks the site of the ancient Iseum, and near it may be seen the remains of a magnificent temple, the earliest name in which is that of Her-nesht-heeb. Perhaps this is the very temple of Isis which Nectanebo was commanded to build in the dream related in the papyrus bearing the title "Nectanebo's Dream." (R. S. P.)

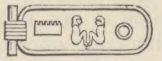
[8] The names rendered Psammis and Nechao are the prenomen and nomen of Menptah Sethee I. (Sethos), head of the Nineteenth Dynasty; and the name represented by Psammetius is a form of the prenomen of Rameses II., the son and successor of Sethee I. (R. S. P.)

They must, therefore, necessarily be attributed to one of the latest kings of Egypt; and there is none so likely to have made such a display as AMASIS, a man of considerable magnificence, and at the same time of a cautious and artful character. Indeed we have no alternative left but to choose between him and some of the kings who revolted against the Persians, and who do not appear so likely to have had leisure or finances for public works of splendour. His father's name, like that of Nechao, contains the character denoting Vulcan, and it may be called *Mœnuphthes;* but he was not the son of a king.[1] Both the names are found in one of the middle lines of the Flaminian obelisk; and on that side the king is represented in the tablet as doing homage to his predecessor, who occupies the place of honour on the other sides. The father's name seems to occur on the belt of a colossal statue in the palace at Karnak. On a fragment of stone in the British Museum the names are repeated in various directions, as if it had belonged to a floor or a ceiling. They also occur on a statue, considerably mutilated, in the attitude of kneeling; and in Montfaucon's *Supplement*, on the back of a colossal Isis, which seems also to have been begun by Psammis. On the eastern colossus at Luxor there is a name which might be taken either for that of Amasis or for that of the pseudonymous Psammetius; but the sitting figure is somewhat different. The victor in the naval combat at Medinet-Habou,[2] who appears also frequently at Ombos, considerably resembles them both. Lord Mountnorris has a rough seal with the name of Amasis only, the epithet god being prefixed in a smaller character. The names also occur on a small obelisk lying at Tsan, the ancient Tanis, of which a sketch was brought home by Dr Merion.

53. Ptoleberius.



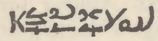
54. Discozygus.



53, 54. We find at Karnak the name of a king somewhat like Psammis, that of his father resembling a compound of Ptolemy and Berenice. Perhaps they are not very correctly copied, but they may stand, under the temporary names of *Discozygus* and *Ptoleberius* as specimens, somewhat singular, of a mixture of different dynasties; and in this point of view they may be placed between the old Egyptian kings and their Grecian conquerors.[3]

55. ALEXANDER.

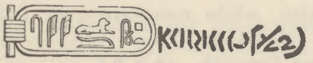
ⲁⲗⲉⲝⲁⲛⲇⲣⲟⲥ



55. The name of ALEXANDER has not yet been identified in the sacred characters; but it will appear hereafter that a knowledge of the enchorial form may possibly contribute very materially, at some future time, to assist us in determining it.[4]

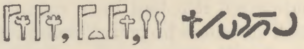
56. PTOLEMY.

ⲡⲧⲟⲗⲉⲙⲉⲟⲥ



56. There can be no doubt whatever respecting the signification of the name of PTOLEMY, as it occurs on the stone of Rosetta; but it is not quite so easy to determine its identity in some other cases, where it may possibly have been modified by contraction, mutilation, or combination. In this and a few other proper names, it is extremely interesting to trace some of the steps by which alphabetical writing seems to have arisen out of hieroglyphical; a process which may indeed be in some measure illustrated by the manner in which the modern Chinese express a foreign combination of sounds, the characters being rendered simply *phonetic* by an appropriate mark, instead of retaining their natural signification; and this mark, in some modern printed books, approaching very near to the ring surrounding the hieroglyphic names. The enchorial name of Ptolemy appears at first sight to be extremely different from the hieroglyphical; and it would have been impossible to deduce the one from the other, without a knowledge of the epistolographic forms of the separate characters, as ascertained by a comparison of the manuscripts. The beginning and end are obviously parts of the ring which, in the sacred character, surrounds every proper name,[5] except those of the deities. The square block and the semicircle answer invariably in all the manuscripts to characters resembling the P and T of Akerblad, which are found at the beginning of the enchorial name. The next character, which seems to be a kind of knot, is not essentially necessary, being often omitted in the sacred characters, and always in the enchorial. The lion corresponds to the LO of Akerblad, a lion being always expressed by a similar character in the manuscripts; an oblique line crossed standing for the body, and an erect line for the tail. This was probably read, not LO, but OLE; although, in more modern Coptic, OILI is translated, a *ram;* we have also EIUL, a *stag;* and the figure of the stag becomes in the running hand something like this of the lion. The next character is known to have some reference to *place*, in Coptic MA; and it seems to have been read either MA, or simply M; and this character is always expressed in the running hand by the M of Akerblad's alphabet. The two feathers, whatever their natural meaning may have been, answer to the three parallel lines of the enchorial text, and they seem in more than one instance to have been read I or E; the bent line probably signified great, and was read OSH or OS; for the Coptic *shei* seems to have been nearly equivalent to the Greek *sigma*. Putting all these elements together, we have precisely PTOLEMAIOS, the Greek name; or perhaps PTOLEMEOS, as it would more naturally be called in Coptic.[6] The slight variations of the word in different parts of the enchorial text may be considered as expressing something like aspirations or accentuations.

57. SOTERES.



57. The appellation SOTERES, as a dual, is well marked in the inscription of Rosetta, and the character, thus determined, explains a long name in the temple at Edfou, which must mean "the two saviour gods," with various titles of honour, such as "the agents of Phthah, the em-

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[1] The names read Mænuphthes and Amasis, are the nomen and prenomen of Rameses II., the second king of the Nineteenth Dynasty. (R. S. P.)

[2] This king, the builder of the great temple of Medeenet-Haboo, is Rameses III., of the Twentieth Dynasty. (R. S. P.)

[3] These two names are incorrectly copied. (R. S. P.)

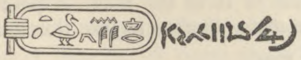
[4] The enchorial name here given is that of Alexander the Great, since it forms, with the addition of the determinative for city, the name of Alexandria on the Rosetta Stone. The Alexander of the hieroglyphics is the *fainéant* Alexander Ægus, in whose name the first Ptolemy governed. (R. S. P.)

[5] The ring surrounds the names of royal personages alone—always of kings and queens, and sometimes of princes and princesses. The names of private persons sometimes contain that of the monarch under whom they were born, and hence, perhaps, arose Dr Young's mistake. (R. S. P.)

[6] The characters of the name of Ptolemy are all simply alphabetic, not syllabic in any case. They read, in the example given, in the hieroglyphic form, PTURMEES or PTULMEES, and in the demotic, PTULMEES. At this late period the use of syllabic signs was almost, if not wholly, disused in foreign proper names. (R. S. P.)

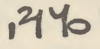
blems of triumph, the approved of Phre, the favoured of the Nile, the venerable consorts in empire."

53. BERENICE

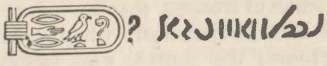


58. The wife of Ptolemy Soter, and mother of Philadelphus, was Berenice, whose name is found on a ceiling at Karnak, in the phrase, " Ptolemy and . . Berenice, the saviour gods." In this name we appear to have another specimen of syllabic and alphabetic writing combined, in a manner not extremely unlike the ludicrous mixtures of words and things with which children are sometimes amused; for, however Warburton's indignation might be excited by such a comparison, it is perfectly true that, occasionally, the sublime differs from the ridiculous by a single step only. The first character of the hieroglyphic name is precisely of the same form with a basket represented at Biban-el-Molouk, and called, in the description, *panier à anses ;* and a basket, in Coptic, is BIR. The oval, which resembles an eye without the pupil, means elsewhere *to*, which in Coptic is E ; the waved line is *of*, and must be rendered N ; the feathers I ; the little footstool seems to be superfluous ; the goose is KE, or KEN. Kircher gives us KENESOÜ for a goose, but the ESOÜ means gregarious, probably in contradistinction to the Egyptian sheldrake, and the simple etymon approaches to the name of a goose in many other languages. We have, therefore, literally Birenice ; or, if the N must be inserted, the accusative Birenicen, which may easily have been confounded by the Egyptians with the nominative. The final characters are merely the feminine termination.[1] The enchorial text affords us a remarkable instance of the diversity which was allowed in the mode of representing the same name. The first character has not the least resemblance to the basket; but the first and second together are very commonly used in the manuscripts, as a coarse representation of a boat, which was called BARI, or possibly BERE ; for it is doubtful whether Kircher had any other authority than that of Diodorus for BARI, and the word BEREZOUTS is used for another vehicle. The enchorial N may possibly have been derived from a horizontal line, turned up at one end. We have then the three dashes for the I, and the two angles seem to have answered to the KE, for a bird is not uncommonly scribbled in some such manner ; so that we have either Barinice or Berenice, by a combination somewhat different from the former.

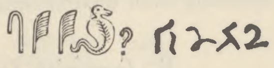
59. PHILADELPHUS.



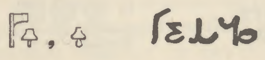
60. ARSINOE.



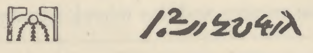
61. EUERGETES.



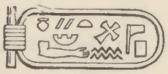
62. PHILOPATOR.



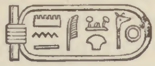
63. EPIPHANES.



64. PHILOMETOR.



65. Cleopatrides.



59–65. The temple at Ombos was dedicated, as we find from the Greek inscription copied by Mr Hamilton, " in the name of the divine Ptolemy Philometor and Cleopatra, and their children, to Arueris Apollo, and the other gods of the temple, by the infantry and cavalry of the nome." We may therefore expect to find in it the names of these sovereigns, together with those of some or all of the earlier Ptolemies ; and, accordingly, we are able to determine, without difficulty, some epithets which seem to be characteristic of this and the two preceding reigns ; but hitherto nothing has been observed that can be considered as so clearly denoting either Philadelphus and his queen Arsinoë, or Euergetes and his Berenice, although some assistance might have been derived, in identifying them, from the enchorial text of Rosetta. We have, however, in the same temple, a name, evidently compound, in which a basilisk is followed by two feathers and a bent line ; and to judge from a comparison of the enchorial text with the manuscripts, a basilisk ought to be the emblem of Euergetes.[2] The part of the name preceding it is, however, not Berenice, and must, therefore, in all probability, be Arsinoë, the daughter of Euergetes. But it seems impossible to attempt to compare the characters employed with the sounds ; since they sometimes occur in an inverted order, which the sounds could not do. Indeed, the name seems to be very often repeated in situations where its most essential parts seem to be a quadrant of a circle, two feathers, and a bent or broken line ; in other places, as at Denderah, the bird, the hand, and the oval, are added ; and it is not impossible that the quadrant may have been meant as a representation of a lentil, which in Coptic is ARSHIN, and which alone may have been sufficient to identify the name. It occurs in the celebrated zodiac of Denderah, and very frequently at Philæ, and it may possibly, hereafter, lead us very readily to discover the hieroglyphical name of *Philadelphus.*[3] That of Philopator is satisfactorily ascertained by the assistance of the character employed for *father* in the Rosetta Stone, though that character is much mutilated, and could not have been positively determined without this coincidence. The name is found in the great temple at Edfou still more distinctly than at Ombos, and it occurs several times at Karnak. Epiphanes is never distinguished in any other inscription by the characters appropriated to him in that of Rosetta (No. 121) ; but we continually find a synonymous emblem, which is employed in the Rosetta Stone to signify *enlightening*, where the Greek translation has Epiphanes ; and this character, placed between two hatchets facing each other, can only have meant the *illustrious deity*, or *deities.*[4] In this form the name occurs very frequently at Philæ, and in the great temple at Edfou, where it seems to be the latest name. For the Philometores we have a character which occurs in some other monuments, and means apparently *mother*, the name containing it being found several times in the temple at Ombos.[5] At Kous, or Apollinopolis Parva, there is another Greek inscription of the Philometores and their children ; but in the hieroglyphics copied by Denon, the names of the sovereigns seem to be wanting, and that of a young prince only remains, a colossal statue of whom is figured by Montfaucon in his *Supplement*, having the same name in the belt, with the addition of *the son of King Ptolemy ;* it will, therefore, be justifiable to distinguish this personage by calling him *Cleopatrides.*[1] The divine honours which are so often attributed in these inscriptions to the reigning sovereigns, afford us an explanation of the Greek inscriptions to the *Synthronous gods of Egypt*, which repeatedly occur; and of the description *Fraternal gods*, as, indeed, Philadelphus and his queen are called in the Greek inscription of Rosetta.

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[1] The name of Berenice reads, in the hieroglyphic and demotic forms given in the woodcut, BERENEEKA. As in the name of Ptolemy Dr Young was in error in reading some of the characters composing it to be syllabic. (R. S. P.)

[2] This is no name or title of a king. (R. S. P.)

[3] The hieroglyphic name given as that of Arsinoë, is a form of Autocrator incorrectly copied, but the demotic name is that of this queen. (R. S. P.)

[4] The proper title for Epiphanes, HER, occurs in the Rosetta Stone ; the hieroglyphic title in the woodcut is part of the prenomen of Physcon, but it is sometimes also given as a title to Epiphanes. (R. S. P.)

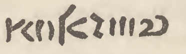
[5] This name is the prenomen of Auletes. (R. S. P.)

C. *Private Persons.*

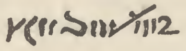
Private persons.

66–71. We find the names of six individuals expressed in the enchorial text of the inscription of Rosetta, though they are wanting in the distinct hieroglyphics; but, as they are clearly ascertained by the context, they are of considerable value in tracing the approach of the hieroglyphic to alphabetic writing. These are, AËTUS, PHILINUS, DIOGENES, PYRRHA, AREIA, and IRENE.

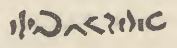
66. AËTUS.



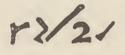
67. PHILINUS.



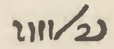
68. DIOGENES.



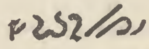
69. PYRRHA.



70. AREIA.

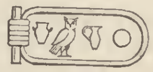


71. IRENE.



In Diogenes and Areia we discover no traces of the ring which is the usual characteristic of proper names; and, on the other hand, we find occasionally, in some of the manuscripts, the parts of the ring applied to a title of Osiris, which is more regularly written without any such distinction.

72. Ramuneus.

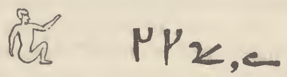


72. A name of a private individual is inserted from a sarcophagus in the British Museum, engraved by Alexander in his *Egyptian Monuments.* Its form is not that of a parallelopiped, but more accommodated to the shape of the body. The pseudonymous appellation *Ramuneus* has been derived from the elementary characters already observed in the names of RE and AMUN.[2]

D. *Animals.*

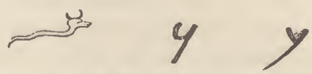
Animals.

73. A MAN.
ρωμι



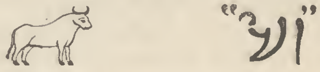
73. A figure sitting on the ground, and stretching out one hand, seems to imply simply a MAN or person, which is certainly the sense of the enchorial character that commonly answers to it in the manuscripts; but in composition the figure often appears to lose this sense.[3]

74. HIM.
ϥ,ⲙⲙⲟϥ

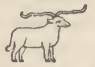


74. The horned snake, creeping along, is clearly meant, in some parts of the inscription of Rosetta, for HIM or IT; although it has other senses in composition. It is very remarkable that the enchorial character, and that of the manuscripts, resembling a Y, approaches extremely near to the Coptic F, which also means *him;* and HOF, or HFO, is the Coptic term for a snake; so that this coincidence seems to afford us another trace of the origin of the alphabet.[4]

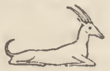
75. BULLOCK.
ⲉϩⲉ



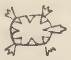
76. RAM.
ⲱⲓⲗ



77. ANTELOPE.

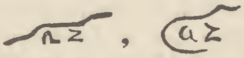


78. TORTOISE.
ⲉϥⲱⲧ



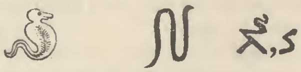
75–78. The BULLOCK, the RAM, the ANTELOPE, and the TORTOISE, are proved to be sometimes representations of the things which they resemble, by their occurrence in inscriptions accompanied by tablets; though some of them have probably elsewhere a metaphorical sense.[5] The ram is often represented with two pairs of horns; the one natural, the other imaginary.

78*. CROCODILE.



78*. The CROCODILE is identified by a very distinct drawing in a manuscript sent home by Mr Bankes, and is repeatedly designated in the text by a figure representing it. The deity with a crocodile's head is a separate personage, and is denoted by a figure of the same animal with the tail turned under it.[6]

79. BASILISK.
ⲟⲩⲣⲟ

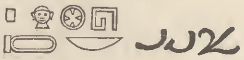


79. The asp or BASILISK is so coarsely represented in the stone of Rosetta, that the object intended by it could not have been conjectured without a comparison with other inscriptions; the context was, however, sufficient to determine its meaning from the examination of this monument alone.

E. *Inanimate Objects.*

Inanimate objects.

80. EGYPT.
χημι



80. The essential parts of the name of EGYPT seem to be the square and the wheel, signifying *splendid land.*[7] In

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[1] This is the prenomen, incorrectly copied, of Philadelphus. (R. S. P.)

[2] This is the prenomen of Amasis of the Twenty-sixth Dynasty. (R. S. P.)

[3] The principal uses of this character are as determinative of proper names of men and the like, and for the affixed pers. and poss. pronouns of the 1st sing. for the masc. (R. S. P.)

[4] The horned snake or cerastes is a common alphabetic sign for the letter we have represented by F, both in its hieroglyphic and its demotic form; from the latter originated the Coptic character for the same letter. It is also used for the affixed pers. and poss. prons. 3d sing. masc. (R. S. P.)

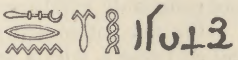
[5] Thus the bull signified "male," and the ram "soul," in a tropical sense. (R. S. P.)

[6] The crocodile-headed god is named Sebak, and his usual symbol is a crocodile standing upon a shrine. (R. S. P.)

[7] The character here called a wheel, is the determinative of the names of Egypt and those of Egyptian districts, cities, and the like. The character which precedes it in the hieroglyphical group in the woodcut is the sign for *h*, which may here have an ideographic use. The two signs appear in this place to denote Egypt. (R. S. P.)

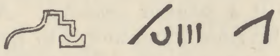
addition to these, or their rudiments, the enchorial word has at the beginning a character which generally answers to an arm holding a feather, or to the flame of a lamp, an emblem which seems also to relate to Egypt in one of the lines of the inscription of Rosetta. A flame and a heart are mentioned by Horapollo and by Plutarch as employed in the name of *Egypt;* but a word occurring so frequently is very likely to have been expressed in a variety of ways. The exact combination of characters generally used on the stone has not been observed in any other inscription.

81. MEMPHIS.
ⲙⲉϥⲓ



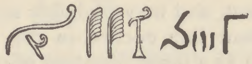
81. The name of MEMPHIS cannot be determined without some uncertainty; the line of hieroglyphics in which it is contained being in several respects obscure.[1]

82. RIVER.
ⲓⲁⲣⲟ, ⲓⲟⲣ



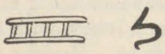
82. The character supposed to denote the Nile as a deity must also sometimes be understood as merely meaning a RIVER; and there is reason to think that the Nile itself was generally called by the Egyptians *the river* only. The enchorial character used to denote both the Nile and a river, or canal, sufficiently resembles the hieroglyphic to favour this interpretation; and it is in some degree confirmed by the occurrence of the character alone on a water-jar of Peiresc, delineated in Kircher's *Œdipus*, and, together with other characters, on the five vases found by Paul Lucas at Abousir. By accident, Kircher appears, in this single instance, to have been right in one of his conjectures; for he calls this character a nilometer, and considers it as emblematic of the Nile.

83. GREEK.
ⲟⲩⲉⲓⲛⲓⲛ



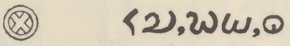
83. The word GREEK, in Coptic UININ or OUEININ, in Thebaic OUEEIENIN, supposed to have been derived from *Ionian*, seems to exhibit in its form something like an imitation of the sound. The curve on a stem is sometimes exchanged for the term *divine*, and appears to mean *glory*, in Coptic OOU or OŪ, which is nearly the sound attributed by Akerblad to the enchorial character, a little like the Hebrew U. The feathers, as in Ptolemy and Berenice, may be read I or EI, having the three dashes to express them, as usual, in the enchorial text; the serpent is ENEH, *ever;* and the hat, which looks a little like a plough, is equivalent to the waved line (No. 177), and must be read N; so that we have very accurately OUIENEHN, which seems to be near enough to OUEININ to justify us in considering these characters as phonetic.[2]

84. COUNTRY.
ⲓⲟϩⲓ, ⲕⲟⲓ



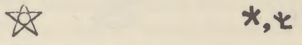
84. The ladder is well marked as meaning COUNTRY. It may perhaps be intended to represent a field with its divisions; but it is uncertain whether or not it is the same symbol that enters into one of the names of Arueris (No. 13), the sculptures of the Rosetta Stone being by no means highly finished.[3]

85. LAND.
ⲕⲁϩⲓ



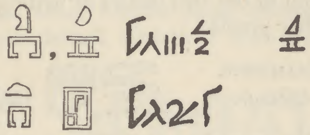
85. It is remarkable that the wheel, signifying LAND, had been noticed by the Jesuits as resembling the old Chinese character for the word *field;* but this is the only one of a multitude of similar conjectures which has been justified by more complete evidence (*Phil. Trans.* 1769, pl. xxviii.)[4]

86. STAR.
ⲥⲓⲟⲩ



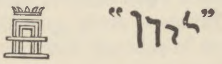
86. The star is shown, by inscriptions accompanying the zodiacs, to relate to a real STAR. It has also elsewhere a figurative sense, meaning an attendant or *ministering spirit.*[5]

87. TEMPLE.
ⲉⲣⲫⲉⲓ



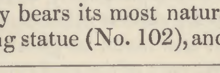
87. The open square is found in both the combinations of characters which are most commonly used for expressing a TEMPLE; the feather signifies ornament or consecration, the oblong figure either the sacred inclosure or a sacred seat, the character for a god being sometimes placed within it.[6] The feather is occasionally converted into an inclined oval, the square being at the same time a little altered; a difference which may be observed in other inscriptions as well as in the Rosetta Stone.

88. SHRINE.



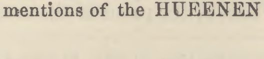
88. The character representing a SHRINE so much resembles the object which it denotes, that it was the most readily identified of all that are found on the stone of Rosetta. The character signifying a *priest* was the second; and the combination of both afforded a full confirmation of the truth of the explanation. The enchorial character for a shrine is derived from the sitting statue which always accompanies it.

89. HABITATION.
ⲏⲓ



89. The open square, occurring in HABITATION as well as in *temple*, must probably have meant *house* or *building*, or possibly *stone* only.

90. THRONE.
ϩⲉⲙⲥⲓ



90. The THRONE, or chair of state, occurs in a great variety of tablets. It evidently bears its most natural signification in the character denoting statue (No. 102), and in some other

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[1] The hieroglyphic group here given is not the name of Memphis; the demotic is, however, rightly attributed, and reads, like the hieroglyphic equivalent, MEN-NUFR, "the good abode," Plutarch's ὅρμον ἀγαθῶν (*De. Is. et Osir.* cap. 20). (R. S. P.)

[2] The characters given by Dr Young are not those for "Greek," which immediately follow them on the Rosetta Stone, and it may be observed that the first of them is inaccurately copied. The hieroglyphic name reads HUEENEN, and must rather be regarded as sprung from a common origin with the Greek Ἴωνες, perhaps from the Hebrew יאין, since it is found in the inscriptions of the Eighteenth and Nineteenth Dynasties, as the name of a conquered country or people. The earliest of these mentions of the HUEENEN known to us is of the reign of Thothmes IV., B.C. *cir.* 1400. (R. S. P.)

[3] This signification of country, or rather region, is correct. (R. S. P.)

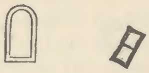
[4] The oldest Chinese characters having been originally ideographs, present some similarities with the Egyptian hieroglyphics; but these may be fairly regarded as accidental, and we cannot venture to reason on anything but the circumstance that both nations used ideographic characters. (R. S. P.)

[5] The proper signification of this ideographic sign is "a star," the tropical "a god." (R. S. P.)

[6] The "open square" signifies a "house" or "abode," for it represents the ground-plan of a house or room: with the addition of an ostrich feather, the symbol of truth and justice, or of a hatchet, the symbol of divinity, it stands for a temple. (R. S. P.)

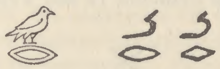
instances; but it appears to bear, in some inscriptions, the metaphorical sense of a residence or habitation.[1]

91. COLUMN.
ϫⲏⲣⲓ.ⲑⲟⲩⲟϯ



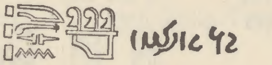
91. The COLUMN, or pillar, is too much like the object it denotes to allow us to doubt respecting its meaning, considering the sense of that part of the inscription of Rosetta in which it occurs.[2]

92. DIADEM.
ϫⲗⲟⲙ



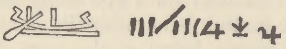
92. The characters denoting a DIADEM are sufficiently determined by the first inscription of the stone; and they so much resemble the corresponding passages of the enchorial text, that we can scarcely hesitate to admit the intimate connection of the two modes of writing without seeking for any further proofs.

93. ORNAMENTS.
ⲥⲉⲗⲥⲱⲗ

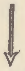


93. The sacred ORNAMENTS are expressed by three feathers fixed to a bar, which appears to be held by two arms. The remaining part of the character occurs very frequently as a sort of termination, and seems to answer to . . *ments.*

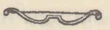
94. SHIP.
ⲃⲁⲣⲓ



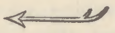
95. SPEAR.
ⲛⲁⲃⲓ,ⲙⲉⲣⲉϩ



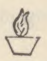
96. BOW.
ⲫⲓϯ



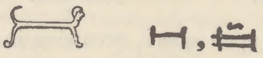
97. ARROW.
ⲥⲟⲑⲛⲉϥ



98. CENSER.
ⲙϣⲓⲣ

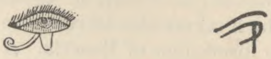


99. BIER.
ⲥⲗⲏ



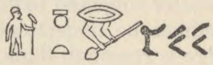
94–99. The boat or SHIP, the SPEAR, the BOW, the ARROW, the CENSER, and the BIER, are sufficiently identified by the comparison of various tablets with their inscriptions. The *ship* occurs frequently as denoting the sacred boats, in which the representations of the deities are conveyed, though they are not always accompanied by water. But it has been observed that the Egyptians attributed ships rather than chariots to the sun and moon as gliding smoothly through the skies. The first part of the enchorial word, which has been supposed to be a B, is evidently identical with the character always found in the manuscripts written in the running hieroglyphics as the first part of the delineation of a ship. It is remarkable, that in the inscription at Esne, as copied by the French, the point of the arrow is turned towards the back of the bowman, instead of being directed towards the enemy.

100. TEAR.
ⲉⲣⲙⲏ



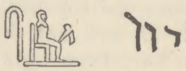
100. The TEAR, in some of its representations, is very clearly expressive of the thing intended; and this resemblance, together with its frequent attendance on a corpse and a bier, is sufficient to explain its sense. It occurs also sometimes within a border as a peculiar deity; but it seems to be much more commonly emblematical of Osiris, of Apis, or of Mneuis. It is not unfrequently found as a detached figure, in a kind of pottery, with a green glazing, and may perhaps have been worn, instead of a mourning ring, as a memorial of a departed friend. It has most commonly been called the *equi sectio,* and supposed to represent a horse's head, or the rostrum of a ship, while the ingenious Kircher has made it a *phallus oculatus.* Among the antiquities collected by Lord Mountnorris in Egypt is an eye seen in front, and apparently shedding a tear.

101. IMAGE.
ⲥⲙⲟⲧ,ⲙⲟⲛⲕ



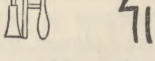
101. The character for an IMAGE seems to mean *a wrought man:* the hands, connected with an eye, appear to be holding an oar as an emblem of *labour.* The same character, with a slight variation in the form of the eye, means a rower (No. 136).

102. STATUE.
ⲓⲛⲓ?ϣⲕⲟⲩⲓ?



102. The sitting STATUE has no character to imply wrought; but it is followed by a bent line which seems to be a term of respect, and may probably answer to OSH, or *great.* The same bent line occurs on the great sarcophagus of green breccia as a personification of one of the qualities of Osiris, probably his *magnificence.* It is often exchanged in the manuscripts for the divided staff; and both are represented in the running hand by a figure like a 9 or a 4. In the enchorial text this character seems sometimes to be expressed by a single line, either straight, or bent sideways into an angle like part of a K. A similar *divine statue* is decreed to "King Nuncoreus, the son of Sesostris," on Mr Montagu's frieze. (See *Hieroglyphics,* 7 S l.)

103. LETTERS.
ⲥϧⲁⲓ



103. LETTERS are denoted by a character which seems to represent some of the materials employed in writing, and which is indeed not extremely unlike an inkstand figured in Caylus's *Recueil,* and consisting of two parallel tubes at some distance from each other, with a cover connected by a chain instead of a hinge. Besides the very well marked passage in the Rosetta Stone, the character occurs in many manuscripts near the representation of a Thoth employed in writing; and the enchorial character corresponding to it is also found in the term [*hierogrammatists* or] *sacred scribes* at the beginning of the inscription.[3]

104. Weight.
ϣⲓⲉ

104. In the numerical tablet of the great French work,

---

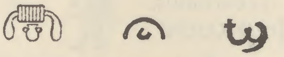
[1] The signification of this character, which represents a *seat* and not a throne, is "seat:" thus, when combined with the ostrich feather, it forms the compound word "seat of judgment," or "hall of justice." In No. 102 it has no signification, being merely the seat of the figure. (R. S. P.)

[2] This ideograph represents a stela, and in the Rosetta Stone is the determinative of the word HAY, a stela, lit. "a thing set up." (R. S. P.)

[3] The scribe's implements signify "to write, engrave, sculpture, a scribe," &c., and serve to determine the word S-SHEE, "to write," &c. (R. S. P.)

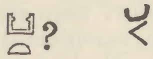
believed to have been found at Karnak, a character may be observed which frequently precedes a numeral, and which resembles a weight with its handle. Hence we may conjecture, with considerable probability, that it represents some *weight* of unknown value.

105. GOLD.
NOYB



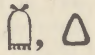
105. The enchorial character for GOLD is perfectly well determined; and its resemblance to a little vase under a sort of arch is so strong that we may safely attribute the same sense to this hieroglyphic, although it appears to be wanting in one or two passages of the sacred inscription of Rosetta, where it ought to be found.[1] In the great ritual we observe this character immediately preceding a shrine, as if a *golden shrine* were intended; and, in several other places, it is connected with a number, as if it meant *pieces of gold;* for instance, in the green sarcophagus, with the number 360. Sometimes, also, it appears to be used in a metaphorical sense as a complimentary epithet of a monarch, or perhaps in allusion to his riches. Thus, on the black frieze of Nuncoreus, we have over the king's figure the characters, "Joy, Life, Stability, Power, *Riches*, Like the Sun, for ever." (*Hieroglyphics*, 7 p.)

106. SILVER.
ϩⲁⲧ



106. Near to the character for gold, in the margin of the great ritual, is a sort of open box, supported on a flagstaff; and a similar box, with a semicircle under it, seems to mean SILVER, at least it considerably resembles the enchorial character for silver, which is perfectly well ascertained.

107. Offerings.

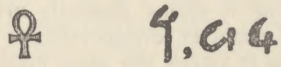


107. We find, in several inscriptions, representations of objects which are also observable in the tablets accompanying them, although it is difficult to say for what they are intended. Two of these are copied from the frieze of Ficoroni and Montagu (*Hieroglyphics*, 9 okl, Rskl, 7 LMq). The former seems to be a sort of cloak, with a fringe at the bottom; and the latter is a little like a pear; but this character does not occur so clearly in the inscription.

F. *Attributes and Actions.*

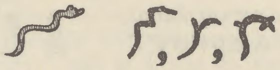
Attributes and actions.

108. LIFE.
ⲱⲛϧ, ⲁϩⲓ



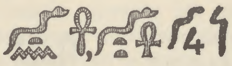
108. The *crux ansata*, sometimes called the Key of the Nile, is usually employed as a symbol of divinity; but its correct meaning is LIFE, as Lacroze rightly conjectured, although his opinion respecting the origin of the character is inconsistent with the form of its oldest and most accurate delineations; and there is no one instance in which it is so represented as to stand in any relation to a sluice or a watercock. According to Socrates and Rufinus, the Egyptian priests declared to their Christian conquerors under Theodosius, who were going to destroy the Serapeum at Alexandria, that the cross, so often sculptured on their temples, was an emblem of the life to come.[2] This passage has been understood by some authors as relating rather to the cross without a handle, which is observable in some rare instances, and indeed twice on the stone of Rosetta; but this symbol appears rather to denote a protecting power than an immortal existence. It happens, perhaps altogether accidentally, that one of the contractions for the word *God*, which are commonly used in Coptic, approaches very near to this character, except that the arms of the cross are within the circle.

109. ETERNITY.
ⲉ̀ⲛⲉϩ



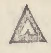
109. ETERNITY is represented simply by a serpent rising in an oblique arch, and without horns; the serpent devouring its tail, and making a ring, is never found as an Egyptian emblem. Horapollo says that eternity was denoted by a serpent having its tail hidden under its body, and that such serpents were called *uræi*, meaning in Greek *basilisks*, which agrees very well with the sense of the Coptic URO, *king;* but this description answers better to the *asp* of the inscription of Rosetta, which has also some relation to the representations of the deities, though it does not exactly mean immortality.[3]

110. IMMORTAL.
ⲉⲧⲟⲛϩ ⲉ̀ⲛⲉϩ



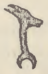
110. The cross with the serpent is a very common epithet in the sense of everliving, or IMMORTAL, or ÆONOBIUS; the waved line is in general a preposition, or a termination, meaning *of*, *to*, or *for;* and it appears to be synonymous with the hat (No. 177). Almost all authors have very hastily taken for granted that this character must relate immediately to water wherever it occurs, although we find it repeatedly in every line of the inscription of Rosetta, where water is not once mentioned. The fact, however, is, that its prototype seems to have been a stream of water, or of any other liquid, flowing *from* a vessel, and poured *on* some other object; and that the idea of the liquid was completely dropped in the general employment of the character, whilst that of the *connection* only was retained; and the hat or cap being also similarly forgotten, whilst its connection with the head of the wearer only was suggested by its figure. In this compound character we have two particles nearly alike, the semicircle and the line; for that they cannot be very different is shown by the occasional substitution of two semicircles for the combination. One of them seems to serve for the connection between life and eternity, "life *for* ever;" and the other to make the new compound an adjective, "liv*ing* for ever."[4]

111. JOY.
ϩⲙⲟⲧ? ⲣⲁϣⲓ?



111. The triangle or pyramid occurs very commonly among other emblems of prosperity and happiness; and it is found in the frieze of Montagu and Ficoroni in the decided sense of an offering or a present in general, while in another place it is made an offering in its own form; so that we can only interpret it as signifying JOY, or pleasure, or prosperity.[5] (*Hieroglyphics*, 7 Mqr, Uqr; 9 Re, Rl; 7 Uq, Urs.)

112. POWER.
ϫⲟⲙ



112. POWER appears to be indicated by a sceptre having the head of an animal, which is often placed in the

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[1] The hieroglyphic character signifies "dilation of the heart," and has no connection with the first of the two enchorial ones, which is rightly supposed to bear the meaning of "gold." (R. S. P.)

[2] The so-called *crux ansata* is simply an emblem of life. There is no doubt that this is the symbol spoken of, and it may be observed that it is seen at the head of some early Christian inscriptions instead of the cross. (R. S. P.)

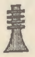
[3] The basilisk, or asp, is a symbol of royalty. (R. S. P.)

[4] The hieroglyphic groups, though neither of them correct in the last character, which should be a thick straight line, signify "living for ever." (R. S. P.)

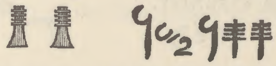
[5] This sign signifies "to give, a gift, offering," &c. (R. S. P.)

hands of the deities, and often stands with the cross the pyramid, and the altar, as an emblem of the blessings attendant on the favourites of the gods. It is seldom used in the text of inscriptions, but it occurs once in that of Rosetta.[1]

113. STABILITY.
ⲧⲁϫⲣⲟ

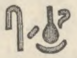


114. ESTABLISHED.
ⲧⲁϫⲣⲏⲟⲩⲧ



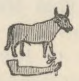
113, 114. Stability is denoted, on the Rosetta Stone and elsewhere, by the altar, which seems to have been fixed in the ground as a column. When repeated it makes the verb ESTABLISH; but it often occurs singly, and not uncommonly as an unconnected emblem, accompanied by other characters of similar import; and it is sometimes found as a detached figure formed of glazed porcelain. The two altars are very conspicuous objects in some of the epistolographic manuscripts, and are very useful in comparing them with the hieratic; but the word employed in the enchorial inscription of Rosetta seems to be derived from a different origin.[2]

115. STRENGTH.
ⲁⲙⲁϩⲓ



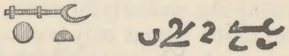
115. A drop or club over a basin, followed by a bent line, seems to mean GREAT STRENGTH, though it is difficult to say what the character is meant to depict. In some other places it seems somewhat to resemble a kind of head-dress.

116. MIGHTY.
ϫⲟⲣ



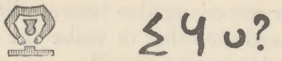
116. The bullock and the arm, which generally occur at the beginning of the inscriptions on the obelisks, agree very well with the epithet MIGHTY in the translation of Hermapion. The arm is, in many other instances, used in compound characters.

117. VICTORY.
ϭⲣⲟ



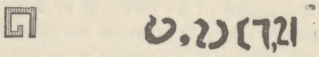
117. Victory is denoted by a branch, perhaps a palm-branch, with a semicircle and a circle, sometimes preceded by the waved line.[3]

118. FORTUNE.



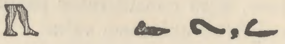
118. The character signifying FORTUNE somewhat resembles that which denotes *gold* (No. 105); but instead of the arch we have an angular line, which seems to be intended for a pair of arms grasping the vase. The whole assemblage approaches also a little to the form of a pocket, or purse, as it is frequently delineated.[4]

119. SPLENDOUR.
ϣⲟⲩ, ⲟⲩⲱⲓⲛⲓ

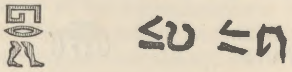


119. The open square, bent inwards, clearly means SPLENDOUR or glory, though it is uncertain what object it is intended to represent. In some cases a crescent seems to be substituted for it, as if it bore some relation to the sun, and the moon afforded a parallel sense.[5]

120. BEARING.
ϥⲁⲓ

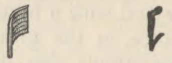


121. ILLUSTRIOUS.
ⲫⲉⲣⲓⲱⲟⲩ

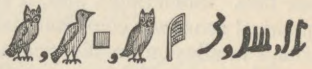


120, 121. Illustrious is expressed, in the inscription of Rosetta, by the open square, for *splendour*, the oval, which signifies addition or respect, making it a kind of superlative, and the pair of legs, which very naturally convey the idea of BEARING, or possessing; so that the whole makes the epithet Epiphanes.[6] This assemblage is, in some of the manuscripts, very commonly followed by a bird, or its equivalent, a half arch, apparently serving as an intensitive.

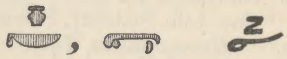
122. HONOUR.
ⲧⲁⲓⲟ



123. RESPECTABLE.
ⲙ̀? ⲙ̀ⲡϣⲁ?

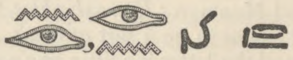


124. VENERABLE.
ⲛⲓϣⲧ? ⲛⲁⲓⲁⲧ?



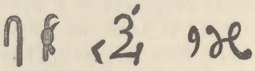
122-124. The feather,[7] when alone, seems to imply HONOUR, as well as when accompanied by a man stretching out his arm, or by a bird. The bird also frequently stands alone in similar passages,[8] and must be translated RESPECT, or RESPECTABLE. The block with the bird has also manifestly the same sense in the great ritual, and the vase with the bowl is so nearly synonymous with it that we can only translate it VENERABLE;[9] and these characters are frequently exchanged for a sort of bench, with a dash under it, a symbol which may, however, possibly have been deduced from some different origin. The sense of the feather is peculiarly illustrated by its occurrence with a drop or club, a serpent, and a line, at the beginning of a great variety of inscriptions, apparently signifying *immortal honour to.* (See No. 172).

125. RITE.
ⲡⲉⲧⲥϣⲉ



125. The eye, either with or without the pupil, and either preceded or followed by the undulated line, has a sense somewhat similar to all these, and is often employed at the beginning of the honorary inscriptions. On the Rosetta Stone it means distinctly RITE or adoration. The enchorial character corresponding to it expresses also simply *doing;* as in Greek the same word signifies *to do* and *to sacrifice.*[10]

126. WORSHIP.
ϣⲁⲙϣⲉ



126. Worship, or the Greek THERAPEIA, is denoted by a very unintelligible character, resembling a kind of capstan, which is frequently delineated in the boats of the tablets, if it is not intended for some emblematical figure

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[1] This sign is held to mean "purity, pure." (R. S. P.)

[2] It is doubtful what this sign represents, but its signification of stability is unquestionable. (R. S. P.)

[3] This group, which is most fully written with the waved line before the branch, which, it may be noted, is not a palm-branch, reads NESHT, and signifies "strength, strong, victory, victorious." (R. S. P.)

[4] This is an incorrect rendering. (R. S. P.)

[5] This sign is used as the initial of the word HER, "manifested," corresponding to Ἐπιφανὴς, as in the Rosetta Stone (No. 121). (R. S. P.)

[6] The legs are simply the determinative of the word mentioned in the previous note, written with the open square bent inwards, or meander, the mouth, here called the oval, and the legs. This determinative follows words relating to motion, and is therefore applied to this, of which the primary signification is "to come out." (R. S. P.)

[7] This character is a reed, denoting the vowel A. (R. S. P.)

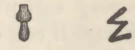
[8] The reed and owl, or owl alone, denote the prep. AM or M, "in," &c. (R. S. P.)

[9] This is the isolated personal pronoun, 1st sing. com. "I." (R. S. P.)

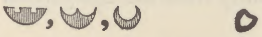
[10] The eye signifies "to make" or "do." At the commencement of a proscynema, followed by the waved line, it should be read "made by," that is, "this act of adoration is made by ——." (R. S. P.)

erected in the boats.[1] On the great green sarcophagus, the long bent line is a snake, and the point projecting upwards from the middle is a sword. But these resemblances afford us little or no assistance in tracing the connection between the whole emblem and its sense.

127. FATHER.
ⲓⲱⲧ

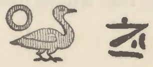


128. MOTHER.
ⲙⲁⲩ



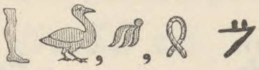
127, 128. The character denoting FATHER,[2] is found in some of the inscriptions of the Ptolemies in such circumstances that it might as easily be supposed to mean mother; but, by means of Mr Bullock's scarabæus, compared with some other monuments, another character having been determined for MOTHER,[3] it became easy to identify the symbol for father on the Rosetta Stone, where it had been a little injured, and imperfectly copied in the engravings.

129. SON.
ϣⲏⲣⲓ



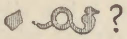
129. The frequent occurrence of the Egyptian goose or sheldrake, with a circle over it, between two proper names, sufficiently points out the meaning of these characters, which can only relate to the connection between them, and which must naturally mean SON. The circle may perhaps be intended for an egg; but in the painted sculptures the disc is red and the circumference light.[4] The enchorial character nearly resembles the form in which some kinds of birds are usually expressed in the manuscripts (Nos. 22, 130). Mr Bailey has also observed the occurrence of the bird between two proper names, and has identified it with the CHENALOPEX mentioned by Horapollo as employed to signify son, on account of its courage in defending its offspring. This quality might rather have been expected to lead to its adoption as a symbol for a parent; but its existence in the bird in question is confirmed by the observations of modern naturalists respecting the sheldrake (the *tadorne* of Buffon), which has generally been considered as the chenalopex, and resembles very accurately the best of the hieroglyphical delineations of the bird, although the colours, as exhibited in the *Déscription de l'Egypte*, are not correctly natural.

130. ATTENDANT.
ⲃⲱⲕ? ϣⲫⲏⲣ?

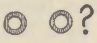


130. The same bird, with a leg or a dash instead of a circle, seems to mean a minister or ATTENDANT, especially in several parts of the inscriptions on the Lover's Fountain.[5] There are also some other characters which seem to be nearly synonymous with these; one of them may possibly be meant for a *tail*, implying a follower, as SAT and SA are nearly alike in Coptic; another is sometimes worn as a collar, perhaps implying subjection, and meaning servant.

131. DAUGHTER.
ϣⲉⲣⲓ

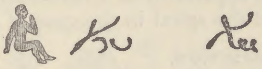


132. SONS.
ⲛⲓϣⲏⲣⲓ



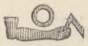
131, 132. Instead of the usual character for *son*, we sometimes find, between two names, a serpent with a globe substituted for the bird, and an oval for the circle; and the context seems to require that the meaning of these symbols should be a DAUGHTER, but probably with some particular character of royalty or divinity;[6] and at Philæ we find a dual, meaning SONS or descendants, as a son and a daughter, expressed apparently by two circles only.

133. CHILD.
ⲁⲗⲟⲩ

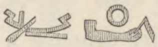


133. A CHILD, or *infant*, is represented by a figure bent as if sitting, and putting his finger on his lip.[7] This is sufficiently established by the triple inscription; but it is still further confirmed by a plate of the *Déscription de l'Egypte* (*Antiq.* tom. ii., pl. lxxxvi., fig. 1), in which a figure of this kind is represented as immediately derived from the father, who seems to be inspired by a beetle entering his mouth. The manuscripts afford us here some valuable steps by which the enchorial character is connected with the distinct hieroglyphics. Another figure, which is elsewhere used as corresponding to a beetle, is also found in the enchorial text in the sense of son or offspring.

134. DIRECTOR.
ⲣⲉϥⲥⲟⲩⲧⲉⲛ?

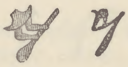


135. STEERSMAN.
ⲣⲉϥϩⲉⲙⲓ



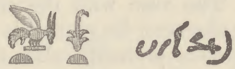
134, 135. A circle, with an arm holding an angular line, means a DIRECTOR.[8] The angular line is intended for part of a rudder; and the same character, with the addition of the figure of a boat, denotes the pilot or HELMSMAN, as is obvious from many parts of the green sarcophagus. The circle and arm are also found in the character denoting *dedicate* (No. 150).

136. ROWER.
ⲣⲉϥⲃⲟⲥⲉⲣ?



136. A pair of arms holding an oar, and connected by a sort of sector, signifies a ROWER, and possibly also a labourer, or workman in general, as in *image* (No. 101).

137. KING.
ⲟⲩⲣⲟ



137. A stem of a plant, perhaps a reed, followed by an insect like a wasp or ichneumon, but probably intended for a bee, and by two semicircles, is the complete emblem for a KING; but the reed is often used alone in the same sense, and the insect sometimes occurs without the reed.[9] Plutarch says that a king was denoted by a leaf, THRION; and

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[1] It is doubtful what this character represents. Its signification, whether with or without the siphon as a complement, is "servant." (R. S. P.)

[2] These signs do not signify "father," a word which is written phonetically, with characters reading ATF. (R. S. P.)

[3] This character is often used for "wife," but not "mother," and reads HEMT. The vulture signifying, in its primary tropical sense, "female," is commonly employed as a symbol for "mother," with the addition of the sign of the feminine. (R. S. P.)

[4] These characters signify "son of the sun," a title usually preceding the second ring of an Egyptian king's name containing the nomen. The goose stands for "son," and the disk for "sun." The preposition "of," which would be in this case written with the wavy line, is rarely expressed in the group. (R. S. P.)

[5] The goose followed by the leg is the name of the god SEB, Chronus, the father of Osiris, written phonetically. (R. S. P.)

[6] This group means son of the sun, the egg being used for the word son, and the sun being represented by a combination of the uræus, or basilisk, with the disk. (R. S. P.)

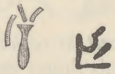
[7] The sense of this character is rather "child" than "son," but it is certainly employed in the latter signification. (R. S. P.)

[8] This is near the signification, which, however, has not been precisely defined. The symbol above the arm is a sieve, standing for the sound SH, and the object held in the hand is a flail.

[9] This group reads SUTEN-SHEBT, "king of Upper and Lower Egypt;" the title "King of Upper Egypt" being denoted by the abbreviation ST, the reed and semicircle, and the title "King of Lower Egypt," by the symbolic sign, a "bee" or "wasp," and semicircle. (R. S. P.)

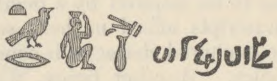
Horapollo tells us that a bee signified a people obedient to a king; hence this symbol might be interpreted *king of men.* Ammianus Marcellinus, however, asserts, more simply, that a king was denoted by a bee. It appears from the manuscripts that the beginning of the enchorial character, which Mr Akerblad read PHU, is derived from the elementary traces representing the reed, the semicircle, a waved line, and a sitting deity, meaning *the divine king;* an assemblage which often occurs on the green sarcophagus, and elsewhere, as applied to a royal person. The remainder of the enchorial character seems to represent a termination consisting of a semicircle and a vessel, which is often added to a name, apparently as a demonstration of respect, like the vessel and the spiral in the case of the god Nilus (No. 19).

138. CONDITION.
ⲙⲉⲧ . . .



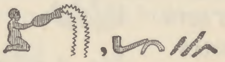
138. CONDITION, or subjection, is denoted by a character which somewhat resembles an altar with an offering of flowers, but which might also be intended for the cup of a flower with an insect hovering over it.

139. KINGDOM.
ⲙⲉⲧⲟⲩⲣⲟ



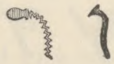
139. In the term KINGDOM, the crown is figuratively employed for its wearer; a metaphor common in many modern languages.

140. LIBATION.
ⲱⲧⲉⲛ ⲉ̀ⲃⲟⲗ

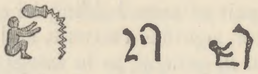


140. The character denoting a LIBATION is very indistinctly traced in the sacred inscription of Rosetta, so that it would have been impossible to explain its original form without the assistance of other hieroglyphical monuments.[1] The long water-jar, out of which the kneeling figure is pouring a divided stream, somewhat resembles those which a modern Egyptian woman is seen carrying in a plate of Mr Legh's second edition.

141. CEREMONY.
ϣⲗⲏⲗ?

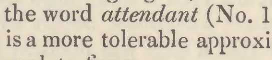


142. PRIEST.
ⲟⲩⲏⲃ, ϩⲟⲛⲧ



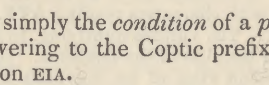
141, 142. The vase with the stream, which frequently occurs in the character for PRIEST, is sometimes found alone, and must therefore probably relate to some particular CEREMONY performed by the priests, approaching to the nature of a libation. On the Stone of Rosetta the line is a simple curve, not waved; nor is the vase more distinctly represented. Instead of the sitting figure, a foot is sometimes substituted, as in the word *attendant* (No. 130); and the enchorial character is a more tolerable approximation to this form than to the complete figure.

143. PRIESTHOOD.
ⲙⲉⲧⲟⲩⲏⲃ



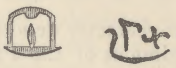
143. PRIESTHOOD is simply the *condition* of a *priest;* the character prefixed answering to the Coptic prefix MET, and to the Greek termination EIA.

144. SACERDOTAL.
ⲛⲧⲉ ⲛⲓϩⲟⲛⲧ



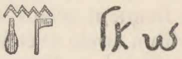
144. The ornaments of the head are very generally used as indicating the person by whom they are worn; and flowers, probably those of the lotus, are frequently found on the heads of the priests, as well as in the inscriptions which accompany them. In the inscription of Rosetta the sense SACERDOTAL agrees very well with the context where this character occurs, though it cannot be deduced with absolute certainty from the comparison with the Greek.[2]

145. ASSEMBLY.
ϣⲁⲓ



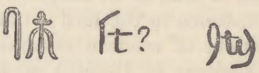
145. It is by no means easy to explain why the figure like a buckle should clearly mean an ASSEMBLY.[3] Perhaps, however, the upper part may originally have been a crescent, implying monthly; and the scale or basin below is occasionally found supporting some offerings, which are set upright in it; so that the whole may have meant *a monthly exhibition.*

146. SACRED.
ⲟⲩⲁⲃ



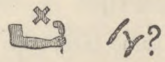
146. The character *god* is made an adjective by the addition of the waved line, and of the long drop, which seem simply to convert it into the term SACRED; or, if the drop has any other meaning, it can only relate to worshipping or honouring, as the character prefixed in the enchorial text, which is equivalent to the scale or basin, is elsewhere employed to signify *honour* or *attention.*[4] In some other instances, a circle and a waved line seem to be employed in a similar manner, for connecting one character with another like substantive and adjective.

147. CONSECRATED.
ⲑⲟⲩⲱⲧ



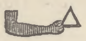
147. An epithet implying CONSECRATED or dedicated is composed of a trident, or triple branch or root, followed by a bent line. It occurs very commonly near the beginning of inscriptions, on obelisks, and elsewhere.[5]

148. GIVE.
ϯ



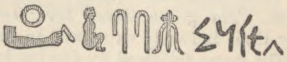
148. A little oblique cross, over an arm with a feather, seems to mean to GIVE, and perhaps to fight and to defend, as, in Coptic, the word TI has both these senses. It is often preceded by a circle and a semicircle.

149. OFFER.
ⲉⲛ, ⲓⲛⲓ



149. The hand bearing the triangle or pyramid (No. 111), manifestly means, in the friezes of Montagu and Ficoroni, to OFFER, as an oblation to a deity.[6]

150. DEDICATE.
ⲧⲁϩⲟ



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[1] The first character means primarily a "pure person," and then a "priest;" and the characters under Nos. 141, 142, have the same signification. (R. S. P.)

[2] This hieroglyphic stands for the letter H, in the passage referred to. (R. S. P.)

[3] See section i., *supra.* (R. S. P.)

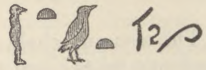
[4] This group is part of the expression "of sacred words" in the Rosetta Stone. It is imperfect in consequence of the omission of the three lines, indicating the plural, after the tongue, not drop. (R. S. P.)

[5] These hieroglyphics form a syllabic group, reading MES, "born," as in the royal name Tetmes, commonly called Thothmes, and the like. (R. S. P.)

[6] The hand bearing a pyramidion or triangle signifies to "give," or "offer." (R. S. P.)

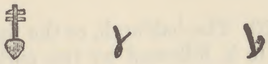
150. In the inscription of Rosetta, we find the word DEDICATE expressed by a bent line and a sitting figure, with the circle, and the arm holding the rudder (No. 134); the character already interpreted *consecrated*, precedes, but it is not absolutely certain that it belongs to the same phrase.

151. LAWFUL.
ⲑⲙⲏⲓ

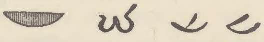


151. The term LAWFUL is naturally enough derived from a deity in his judicial capacity; the figure is preceded by a bird, placed between two semicircles, which must here mean *according to*, answering to the termination *ful*.[1] Sometimes a curved line, supported by a stem, is substituted as a synonym for the figure of the judge.

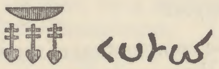
152. GOOD.
ⲛⲁⲛⲉ



153. BESTOWING.
ⲉⲧϯⲛ̀ϩⲙⲟⲧ

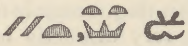


154. MUNIFICENT.
ⲣⲉϥⲛⲁⲛⲉϥ



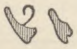
152–154. The character representing GOOD strongly resembles the figure of a lute, depicted in the chamber of the harps, among the catacombs, and may have alluded to the pleasing sound of music. The plural, with the scale or basin, which implies BESTOWING, makes the epithet EUCHARISTUS, which in Greek is somewhat ambiguous, meaning either grateful or MUNIFICENT. The latter, however, must be its sense in this inscription, because *good gifts* or *delights* may be plural, but *gratitude* not so easily.[2] The lute is also found denoting good in other parts of the inscription. The enchorial character for the scale could scarcely have been suspected to be derived from it, without the assistance of the manuscripts, which constantly exhibit an intermediate form, intended, perhaps, to comprehend one of the lines supporting the scale.

155. GREAT.
ⲛⲓϣϯ, ⲛⲁⲁ



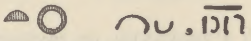
155. The semicircle, with two oblique dashes, seems to mean GREAT in the name of Thoth, who is called, in the Greek inscription of Rosetta, Hermes the *great and great;* while, in other places, this character seems almost always to convey the sense of a dual. The enchorial epithet of Thoth is a little like the crown with two semicircles, which is most frequently found among the titles of Osiris, especially when he sits in judgment.[3]

155*. UPPER and LOWER.



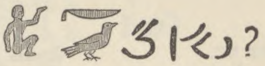
155*. The two kinds of hats, worn by the different deities, seem to be intended by the characters of the Rosetta Stone which express the UPPER and LOWER regions or countries. These two characters are also found together in the green sarcophagus as the names of two goddesses; and they occur together in one or two passages of some of the manuscripts, and in an inscription at Philæ, so that, although the representation is very indistinct in the particular case of the Rosetta Stone, there is little doubt that the cap of Osiris meant, in this case, *superior*, and that of Hyperion and other personages *inferior*.

156. OTHERS.
ⲕⲉϫⲱⲟⲩⲛⲓ



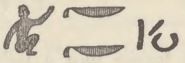
156. A circle and a semicircle stand, in several passages of the inscription of Rosetta, for OTHERS, or remaining.

157. CALLED.
ⲉⲧϫⲱ



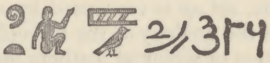
157. Possibly the bowl and the bird together mean *say* or *call*, and the figure of a man may serve to make the passive CALLED.

158. DECLARATION.
ⲱϣ, ϩⲱⲡ



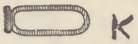
158. The second bowl, substituted for the bird, does not appear very essentially to alter the sense, which is still a thing *said* or proclaimed, a DECLARATION, or a decree.

159. MANIFEST.
ⲉⲧⲥⲟⲩⲉⲛ



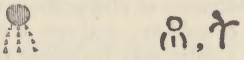
159. The characters denoting MANIFEST seem to have some analogy to *called*, though their derivation is obscure. The first character may either be intended for the country (No. 84), or for a kind of flag or banner

160. NAME.
ⲣⲁⲛ



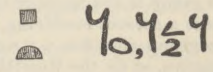
160. The ring, which implies a NAME, and which elsewhere distinguishes proper names, seems to be an imitation of the label, called a "phylactery" in the Greek inscription of Rosetta, on which the name of a figure was usually distinguished.[4]

161. ENLIGHTENING.
ⲣⲉϥⲉⲣⲟⲩⲱⲓⲛⲓ



161. A disc, with rays descending from it, is one of the few characters in which the form gives us some assistance towards determining the sense, which is found to be ENLIGHTENING;[5] though the Egyptians do not seem to have been very correct in their delineation of the motion of light, which they make to diverge in curved lines, like those described by a common projectile. (See Nos. 8, 63.)

162. LOVING.
ⲙⲁⲓ, ⲙⲉⲛⲣⲏⲧ



162. The square block, the semicircle, and the chain,

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[1] This hieroglyphic group signifies a "statue," also a "ceremony." (R. S. P.)

[2] The lute is "good" (NUFR), the basin (NEB), "lord," and "all:" the thrice-repeated lute is not a plural in the group given in the woodcut, but a kind of superlative, and the whole reads "thrice good," or "very good, lord." (R. S. P.)

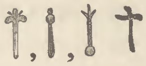
[3] The semicircle and two inclined lines signify twice, as in the epithet of Thoth, "twice great," where it follows the sceptre, meaning "great." We have shown in the present essay, that the Egyptians had no dual. The second group from the left, in the woodcut, means "foreign country." (R. S. P.)

[4] This sign is the determinative of the word REN, "name," and within it were inclosed royal names. (R. S. P.)

[5] This character is a generic determinative of words signifying "light," and the like. (R. S. P.)

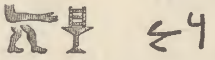
are employed very clearly in the sense of LOVING or beloved; the Coptic MAI.[1] In the enchorial character the square and semicircle seem to be sometimes transposed, and sometimes changed into an oval.

163. PRESERVER.
ⲉⲑⲛⲟϩⲉⲙ

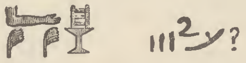


163. PRESERVER, or saviour is represented by a sort of trefoil, with a long stem, which answers to a cross or obelisk in the enchorial text; but, in other passages, the character takes the form of a still simpler club; and in others, again, it has something like a bulbous root.

164. SET UP.
ⲧⲁϩⲟ ⲉ̀ⲣⲁⲧ



165. PREPARE.
ⲥⲉⲃⲧⲉ

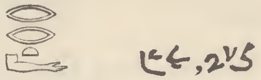


164, 165. A frame like a ladder, supported by a stem, occurs sometimes as a part of a head-dress, but it is difficult to say if it represents any other object. Followed by an arm, and a pair of legs, it signifies SET UP, and this combination of characters is of very frequent occurrence;[2] sometimes also the bent line or divided shaft forms a part of it. In Coptic, *set up* is expressed by *set on foot*, which seems to retain the analogy of the hieroglyphical character. The substitution of a pair of feathers for the legs, however, does not appear materially to alter the sense; the context, where it occurs, requiring the word PREPARE or construct.[3]

Relations.

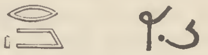
G. *Relations.*

166. IN ORDER THAT.
ϩⲓⲛⲁ



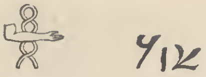
166. Two ovals, with a semicircle and an arm, very clearly signify IN ORDER THAT. The ovals seem to mean to or *for*, and the arm action or *doing*, as our own *that* seems to be allied to the German *that*, which means *deed*. The same combination of characters appears to denote in another passage *to add to;* and one of the ovals is sometimes omitted.[4] The Coptic may be either HINA or ETHBE.

167. WHEREVER.
ⲡⲓⲙⲁ.ⲉⲟⲩⲙⲁ

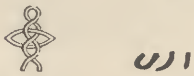


167. The symbols employed in the sense WHEREVER seem to mean separately *at*, *in*, *one*, or *in*, *place*, *one*;[5] and, transposing the two last, we may make a very good Coptic word E-U-MA.

168. AND.
ⲟⲩⲟϩ

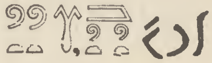


169. ALSO, WITH.
ⲛⲉⲙ



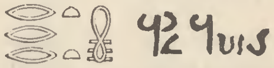
168, 169. The arm and chain signify AND or ALSO; and the oval sometimes takes place of the arm, without much variation of the sense: this combination is also found in the sense of *with*, or *together with*. The elementary ideas seem to be *put*, *with*, or *add*, *with*.[6] Between the names of Ptolemy and Berenice at Karnak the arm and chain are separate.

170. MOREOVER.
ⲛϩⲟⲩⲟ



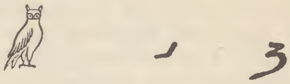
170. The half arch, or the fork, which is perfectly equivalent to it, followed by two curls and two semicircles, mean MOREOVER;[7] the reduplication probably resembling that of many of the Coptic verbs, which generally imply a continued action.

171. LIKEWISE.
ⲙⲡⲁⲓⲣⲏϯ



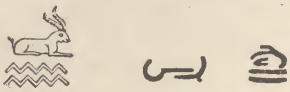
171. The combination of the loop or sling with two semicircles and three ovals means very clearly LIKEWISE. The loop seems to represent a bucket, intended for one of a pair, to be carried on a pole, as they are frequently delineated in the tablets; so that it must mean a *companion;* and accordingly we find it in a very common epithet of a king, on obelisks and elsewhere, with a circle and a bar, denoting *the companion of the sun*, or simply *resembling the sun*.[8] In the enchorial character for *likewise* the symbols seem to be transposed, and the loop is doubled.

172. IN.
ϧⲉⲛ, ⲉϩⲟⲩⲛ

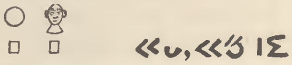


172. An owl, signifying IN, seems to be nearly synonymous with the half arch, which is also sometimes to be understood in the sense of *all*. Both these characters occur also in many instances where they can only be considered as marks of respect, and not very essential to the sense; and in this they resemble the Coptic prefix M, which is a particle not very distinctly intelligible, nor capable of being translated. It is also not a little remarkable, that the M of Akerblad's alphabet is the enchorial character which answers to both of these symbols.[9] (See No. 123.)

173. UPON, AT.
ϩⲓ, ⲉϩⲣⲏⲓ



174. OVER, ON.
ⲉϫⲱ



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[1] This group is the name of the Egyptian Vulcan, PTEH, commonly called Ptah, or Phthah. (R. S. P.)

[2] This is a correct rendering, but the legs are a determinative of motion or its results. (R. S. P.)

[3] This group signifies a "stele" or "tablet," *i.e.*, "a thing set up." It should be followed by the representation of a tablet, as a determinative, as on the Rosetta Stone. (R. S. P.)

[4] This group, with one "oval," is rightly rendered "in order that." (R. S. P.)

[5] This group reads ERMA, and means literally "towards the place," and thence "where." (R. S. P.)

[6] Both these groups, reading respectively HA and HER, signify "and, also;" but it must not be concluded that they are identical on the principle of the omission of the final R mentioned in the subsequent sketch of grammar (section iii.), for the vowel is one that is probably long or guttural, and not like that elided before R. (R. S. P.)

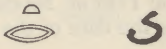
[7] These groups both signify "equally, likewise." (R. S. P.)

[8] The sign here called a loop or sling, signifies "like, as," SHA, and is usually written with the reed (A) as a complement: with the two semicircles it means "similarly." The group mentioned here as this sign, with the circle (disk) and bar (masculine sign), means "resembling the sun, like the sun." (R. S. P.)

[9] The hieroglyphic character and second enchorial character are the same, and stand for the letter M, frequently employed for the preposition mentioned in the text. The first enchorial character corresponds to a usual form of the chicken U, but may represent the owl in carelessly written manuscripts. (R. S. P.)

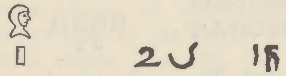
173, 174. A hare over two waved lines is employed, either alone or together with a head, dash, circle, and dash, which have separately a similar sense for UPON, OVER, or *at*;[1] and it is remarkable that a similar relation exists in Coptic between EHREÏ and EJO, JO, or DCHO, also meaning a head. The enchorial character, in some of its forms, is manifestly a coarse imitation of an animal. The head is always represented in the manuscripts by a character nearly like a Greek Σ; and this may possibly have been the origin of the Coptic letter JANJIA, if it was derived from a hieroglyphic; but it is equally probable that it may have been intended for a combination of a *delta* and a *chi*.[2]

175. FOR.
ϣⲁ



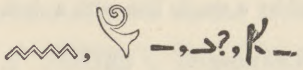
175. A semicircle and an oval mean FOR, as relating to time.[3]

176. BY THE.
(ⲕⲁⲧⲁ),ⲛⲧⲉ?



176. A ball, with two short appendages, one narrower than the other, occurs several times on the Rosetta Stone, and seems to have been intended for a head seen in profile, which is often found on other monuments. This character, together with a dash, seems to signify BY THE, or *each;* for instance *every* year, or *every* month.[4]

177. OF, TO.
ⲚⲦⲈ,Ⲛ

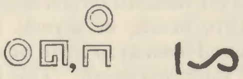


177. The hat, interposed between "an image" and "the king," can only mean OF, or FOR. It is often substituted, in passages which are frequently repeated, for the waved line, each being probably equivalent to the Coptic NTE, or rather N;[5] which also sometimes makes an adjective of a substantive, as NNUB, golden, from NUB, gold. (See Nos. 58, 83, 140.)

Time.

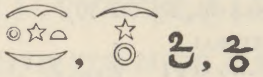
H. *Time.*

178. DAY.
ⲉϩⲟⲟⲩ.ⲙⲉⲣⲓ



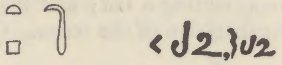
178. A DAY seems to be very naturally expressed by *splendour* of the *sun*, or sunshine.[6] (See Nos. 119, 8.)

179. MONTH.
ⲁⲃⲟⲧ



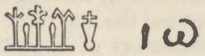
179. A crescent turned downwards, with a star and the sun, makes up the character signifying a MONTH; to which a semicircle and a scale or basin are sometimes added.[7] Horapollo says that a month is denoted by a palm branch, or by an inverted crescent; but the crescent is too indistinct on the Stone of Rosetta to have allowed us to recognise it without the assistance of the collateral inscriptions.

180. YEAR.
ⲣⲟⲙⲡⲓ



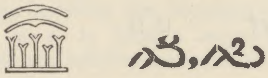
180. A YEAR is denoted by a bent line with a little projection from the middle, which seems to represent a plant with an annual shoot or bud; it is commonly followed by a semicircle and a block or dash.[8]

181. THOUTH.
ⲑⲱⲟⲩⲧ

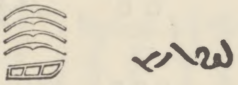


181. There is some little uncertainty respecting the exact limits of the characters denoting the first month, THOYTH. The name seems to have some relation to gathering the harvest, and the emblem is probably intended for a field of corn; and, perhaps, as the year is said to have begun originally with the dog-days, the appropriation of this character to the first month may have been contemporaneous with the origin of the calendar.[9]

182. MECHIR.
ⲙⲉⲭⲓⲣ

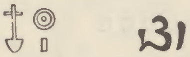


183. MESORE.
ⲙⲉⲥⲱⲣⲏ

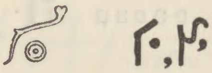


182, 183. The sixth month, MECHIR, is remarkable for having half as many crescents as the twelfth, MESORE.[10] This relation would without doubt be further illustrated if we could discover anything like a calendar among the immense mass of Egyptian literature which is still in existence. The manuscript which Montfaucon calls a calendar, merely because it is divided into twelve columns, has no pretensions to the name.

184. FIRST DAY.
ⲥⲟⲩⲁⲓ



185. THIRTIETH.
ⲥⲟⲩ ⲙⲁⲡ



184, 185. The symbol for the sun seems to be employed in the designation both of the FIRST DAY of the month, the NEOMENIA of the Greek inscription, and of the last, or THIRTIETH DAY.[11] Of the characters following the sun, the one seems to mean good, or rather *new*, as in Thoyth, the month of the new year; the other *old* or *last*. This character might be taken for a serpent, or for a branch of a tree; but it seems more probable that it is intended for the *tail* of an animal, since it occurs in several passages of the manuscripts as representing a tail; and the tail of the month is sufficiently expressive of the sense. (See No. 130.)

---

[1] The hare and two waved lines, UNN, represent the substantive verb "to be," but the second N does not occur except in its participle present. The next group is wrongly represented, the circle being a false copy of a head in profile. It is a compound preposition, "above," lit. "on," or "over, the head." (R. S. P.)

[2] This Coptic letter is derived in its form from the hieratic representation of the crocodile's tail, a hieroglyphic sign for K. (R. S. P.)

[3] This group, followed by the palm-branch, determinative of the year and seasons, signifies a "season, time." (R. S. P.)

[4] The character for "each" is a kind of loop, and has no relation to the head in profile, which, when alone, signifies "first," &c., and with the straight line or bar, usually a "head," as may be seen by the literal rendering of the compound preposition mentioned in note 1, above. (R. S. P.)

[5] The waved line and crown of Lower Egypt, are here rightly held to be homophones. They represent the preposition EN or N, "of," &c. (R. S. P.)

[6] The first character is alphabetic (H) or syllabic, the second, a determinative, in the first group; the second group is inaccurately given. The whole word for day is HAU. (R. S. P.)

[7] Both these characters are used for month in the Rosetta Stone. (R. S. P.)

[8] The first sign of this group is a palm-branch, and should have a notch in the middle of the outer side. The third is usually the disk, though the square occurs in its place. (R. S. P.)

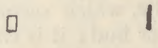
[9] The dagger stands for "first" in this group, "month" is understood, and the second hieroglyphic is the sign of the first season of the Egyptian year. Into the original character of these seasons, as indicated by the signs representing them in the hieroglyphic writing, we have not space here to enter. (R. S. P.)

[10] This group is the name of the second month, the two crescents here meaning "second month" of the first season, or Paopi. (R. S. P.)

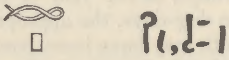
[11] The signs rendered "first day," mean "last day," which is equally the signification of the group rendered "thirtieth day." The character usually translated "good," properly signifies "perfect;" hence perfect in form, "beautiful," perfect in character, "good," perfect in time, "complete," and thence "last." (R. S. P.)

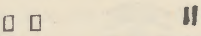
Numbers.

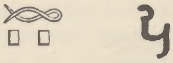
I. *Numbers.*

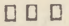
186. ONE.
ⲟⲩⲁⲓ, ⲟⲩⲓ


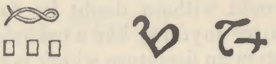
186. UNITS are denoted by short lines, like the Roman I. Mr Akerblad first noticed the first three numerals in the last line of the sacred characters of Rosetta, where the Greek text is deficient, and the words "first and second" only remain; and this observation alone was sufficient to prove that the hieroglyphical characters related to a real language, and were not simply ornamental decorations, as some persons have imagined.

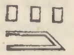
187. FIRST.
ϩⲟⲩⲓⲧ


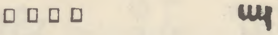
188. TWO.
ⲥⲛⲁⲩ, ⲥⲛⲟⲩϯ


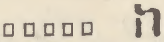
189. SECOND.
ⲙⲁϩⲥⲛⲁⲩ


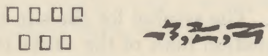
190. THREE.
ϣⲟⲙⲧ


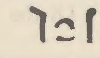
191. THIRD.
ⲙⲁϩ ϣⲟⲙⲧ


192. THRICE.
ϣⲟⲙⲧ ⲛⲥⲟⲡ


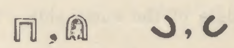
193. FOUR.
ϥⲧⲟ


194. FIVE.
ϯⲟⲩ


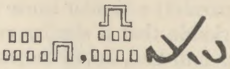
195. SEVEN.
ϣⲁϣϥ


196. EIGHTH.
ⲙⲁϩϣⲙⲏⲛ


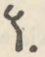
187–196. The twisted line distinguishing the ORDINAL NUMBERS answers to the Coptic MAH, which is prefixed to the cardinals in the same sense: in the enchorial text the corresponding character follows the number. The THREE points are more commonly employed when they follow a word, to make it plural; but when they signify a numeral they are generally placed immediately above some other character; and in the enchorial inscription this numeral is distinguished by making the lines oblique and joining them.

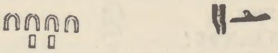
197. TEN.
ⲙⲏⲧ, ⲙⲏϯ


197. For the number TEN we have a Greek *pi*, either square or rounded, not only in the inscription of Rosetta, but in many other places.

198. SEVENTEEN.
ⲙⲉⲧϣⲁϣϥ


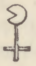
198. We find the number SEVENTEEN occurring twice as a date in the inscription of Rosetta; the Greek text, in another part, alluding to the same period, has *eighteen;* and the enchorial words are too indistinctly marked to allow us to judge of the identity or diversity of the two numbers; but the difference of a day is of no consequence, since the festival of the "assumption of the kingdom" may easily have begun on the 17th of Mechir, and continued to the next day, which is the date of the decree.

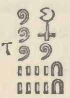
199. THIRTY.
ⲙⲁⲃ


200. FORTY-TWO.
ϩⲙⲉⲥⲛⲁⲩ


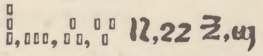
199, 200. The enchorial character for THIRTY, applied to years, seems to be the same as is elsewhere used in the sense of the *thirtieth day;* but the numbers are almost always confused in the running hand, and exhibit several deviations from the regular system of the sacred characters. The number FORTY, for example, in the remarkable passage relating to the forty-two assessors of Osiris, seems to be denoted by a single line with a dash on it.

201. A HUNDRED.
ϣⲉ

202. A THOUSAND.
ϣⲟ


203. MCDXXVIII.
ϣⲟ ϥⲧⲟ ϣⲉ ϫⲱⲧ ϣⲙⲟⲩⲛ


201–203. The curl, like the figure 9, meaning A HUNDRED, and the notched circle, supported by a cross, denoting A THOUSAND, occur, in several inscriptions, so combined with units and tens, as to leave no doubt respecting the numbers that they represent. This is particularly evident from the consideration of an inscription "believed to have been found at Karnak"[1] (*Déscription de l'Egypte, Antiq.*, tom. iii., pl. xxxviii., fig. 26–30).

204. SEVERAL.
ϩⲁⲛ . . . ⲟⲩⲓ


204. PLURALS are distinguished by writing a character three times, or by putting three dashes after it, and sometimes, perhaps, though very rarely, before it; occasionally also, by repeating a part of a collection of symbols once only. In the manuscripts, the three dashes are generally joined into a crooked stroke, which, in the enchorial inscription, sometimes both precedes and follows the word; while, in other cases, the second stroke is converted into a single vertical line, which serves to limit the extent of the characters meant to be made plural; the representation being so imperfect, that this assistance is more required than in the sacred characters.[2] And it may be observed, that this second mark is never wanting in the enchorial inscription, as it must frequently have been if the character had been alphabetical; since many of the Egyptian plurals end precisely as their singulars do, and even when they differ from them, it is not by the addition of any one uniform termination.

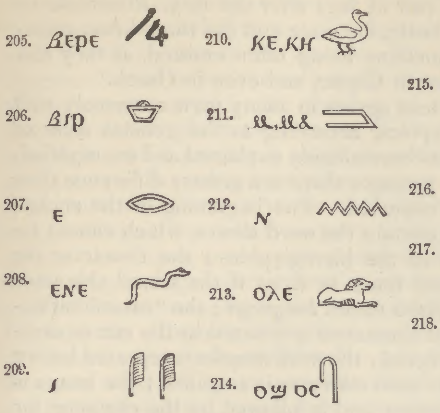
---

[1] All these renderings of numerals are correct, excepting that of No. 192, where the second character does not produce the signification "thrice." (R. S. P.)

[2] This account of the modes of writing the plural is nearly accurate. It will, however, be seen in the subsequent grammatical sketch, that the signs almost always represent the sound U, unless a sign for that sound is given with them. (R. S. P.)

Hieroglyphics. Sounds.

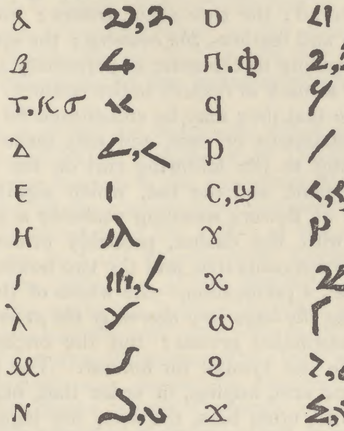
K. *Sounds.*



205–218. The *phonetic characters*, according to the traces which may be discovered in the words *Berenice*, *Ptolemy*, *Greek*, and some others (Nos. 56, 58, 74, 83, 123, 172), will afford something like a hieroglyphic alphabet, which, however, is merely collected as a specimen of the mode of expressing sounds in some particular cases, and not as having been universally employed where sounds were required.[1]

The Supposed Enchorial Alphabet which is subjoined is applicable to most of the proper names in the inscription of Rosetta, and probably also to some other symbols which have been the prototypes of the characters. It is taken from the alphabet of Akerblad, but considerably modified by the conjectures which have been published in the *Museum Criticum*.[2]

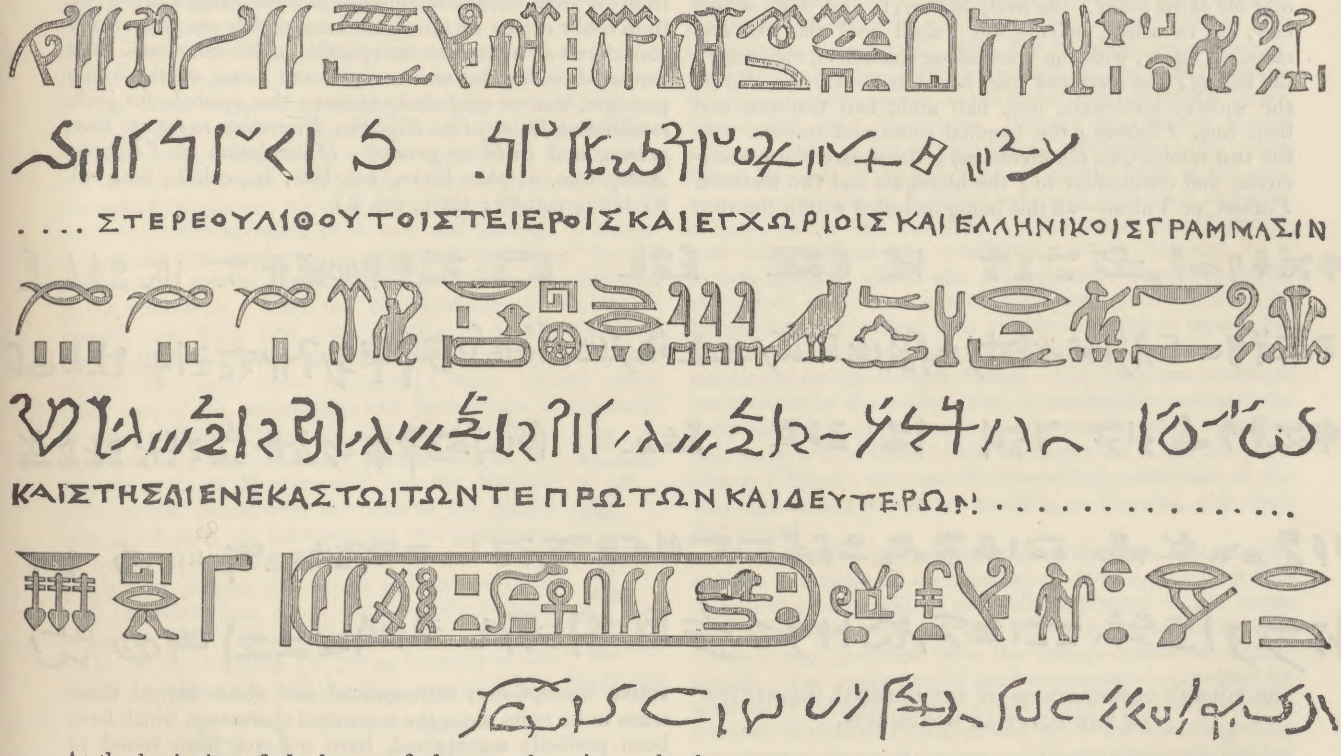
Hieroglyphics.


ⲁ
ⲃ
τ,κ,σ
λ
ε
η
ι
λ
ⲙ
ν
ο
π,φ
ϥ
ρ
c,ϣ
ϒ
χ
ω
ϩ
ⲭ

M. *Specimens of Phrases.*[3]

Specimens of phrases.

The last line of the inscription of Rosetta will serve as a specimen of the way in which the hieroglyphical characters were combined, so as to form a language; and will show at the same time the relation between the sacred and the enchorial texts.


. . . . ΣΤΕΡΕΟΥΛΙΘΟΥ ΤΟΙΣΤΕΙΕΡΟΙΣ ΚΑΙ ΕΓΧΩΡΙΟΙΣ ΚΑΙ ΕΛΛΗΝΙΚΟΙΣ ΓΡΑΜΜΑΣΙΝ
ΚΑΙΣΤΗΣΑΙ ΕΝΕΚΑΣΤΩΙ ΤΩΝ ΤΕ ΠΡΩΤΩΝ ΚΑΙ ΔΕΥΤΕΡΩΝ . . . .

At the beginning of the line we find some obscurity, and a want of perfect correspondence in the two inscriptions; but it is clear that the fork or ladder, the arm and the feathers, mean to *prepare* or procure; then follows *a column;* the wavy line, *of;* the semicircle and two dashes, with the arm, probably *strong* or hard; the block or square below, with its semicircle, *stone;* the loop or knot *wrought* or engraven; the half arch *in* or with; the instrument or case, *writing,* or letters; the wavy line, the hatchet, and drop, with the three dashes making a plural, *appropriate to the gods,* that is, sacred; the case again, *letters;* the hat, *of;* the ladder, arm, and feathers, *the country;* the serpent and bent line, approaching to the sense of perpetuity and greatness, seem to be a mark of respect to the country, though it is barely possible that they may be substituted for the repetition of the instrument or case, and may mean the language, and belong to the following curl on the stem, the feathers, the serpent, and the hat, which signify *Greek.* The head-dress of flowers meaning probably a priest, the following curl with the dashes, probably ornamental or honorary, or perhaps collective, and the two bowls, with the man in the plural, a publication,—the whole of these symbols must express *the honorary decree of the priests, or the decree of the assembled priests;* but the enchorial text seems to include the symbol for honour. The oval, with the semicircle and arm, implies, in order that, or, *in order to;* the fork with cross bars, the arm, the legs, and the snake, *set it up;* the bird, *in;* the three broad feathers over as many open squares, *the temples,* as a plural; the half arch and oval with the plural dashes, *all,* or *of all kinds;* the open square, wheel, scale, head, dash, and ring, *Egypt;* the figure with a vase on his head, *subjection* or *power;* making the whole, *belonging to Egypt,* or *throughout Egypt;* the fork and dash are *in,* or *in all;* the knots or chains, followed by the numbers, *of the first, the second, and the third order;* the oval, half arch, and dash, *wherever,* or *in which,* leaving out "shall be;" the tool and standing figure, with the intervening characters, *the image;* the hat, *of;* the reed and bee, with the semicircles, *King;* the square, semicircle, lion, half arch, two feathers, and bent line, *Ptolemy;* the handled cross and serpent with the two semicircles, *the everliving;* the square block, semicircle, and chain, *dear to;* the hieralpha and two feathers, *Phthah,* or Vulcan—all this being included within the ring or phylactery, together with the name; the open square, the oval, and the pair of legs after the ring, *illustrious* or Epiphanes; and lastly, the scale and the three lutes, *munificent;* the conjunctions being often omitted, as they also very commonly are in Coptic, and even in Greek.[1]

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[1] Of this alphabet, beginning from the left, the first group in the first column is composed of the demotic signs for BR in Berenice, and is out of place here, the second is simply B, the third R, the fourth T, and the last is correctly rendered; the first character in the second column should be the eagle A, the second is M, the third is rightly rendered, the fourth is R, and the last S; and in the third column the last character alone is wrong, for it should be SH. (R. S. P.)

[2] A comparison of this enchorial alphabet, with the latest results of research into these characters, cannot fail to awaken our admiration for the sagacity and judgment of Dr Young. In Brugsch's list of the alphabetic signs, we find a remarkable agreement, and Dr Young's renderings of letters are in few cases wholly wrong. Comp. *Gram. Dém.*, p. 18. (R. S. P.)

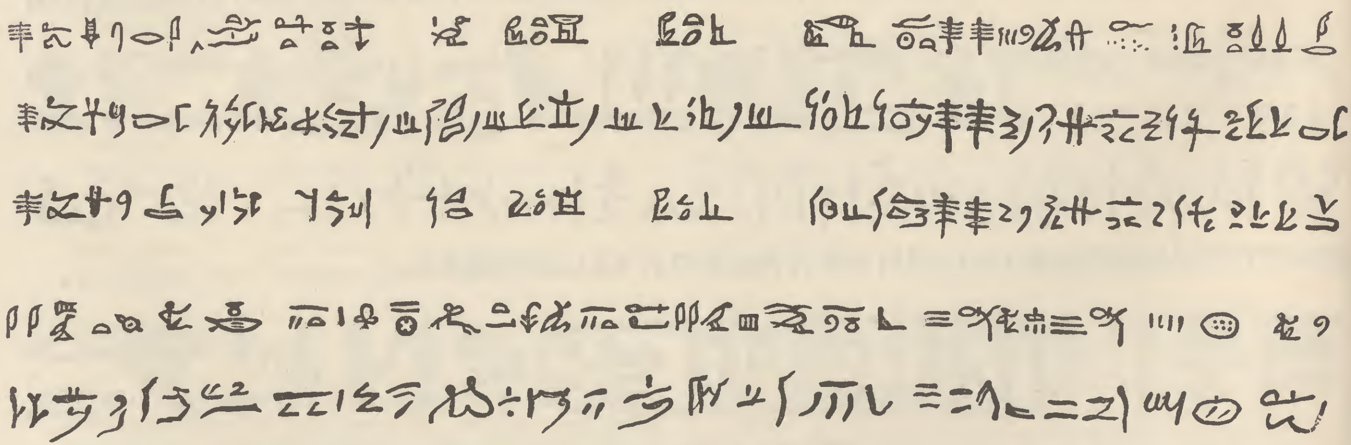
[3] The heading L, here omitted, comprised merely references to additional illustrations now inserted in their proper places. (R. S. P.)

The enchorial text agrees in many parts extremely well with the hieroglyphics, according to the general style of imitation which has been already explained and exemplified, although in some passages there is a greater difference than might have been expected. The beginning of the enchorial line seems to contain the word *decree,* which cannot be found in this part of the hieroglyphics; the character for letters occurs three times in it, as if the sacred character used in the third place meant *language;* the "sacerdotal decree" of the sacred characters is omitted in the corresponding part of the enchorial; the word *temples* is repeated before each numeral; the term *wherever* is amplified; the image is a very coarse imitation, and is followed by the character for a deity, meaning sacred or divine; and, lastly, the name of Ptolemy is omitted, the word king being only followed by "whose life shall be for ever," or a phrase of similar import.

N. *Comparison of Manuscripts.*

Comparison of manuscripts.

The subjoined specimens of a comparison of the different manuscripts, which deviate more or less from the form of distinct hieroglyphics, with others in which those characters are preserved almost entire, though slightly traced, will serve to show the complete identity of the different systems in their original form; the first and fourth lines being taken from the great hieratic manuscript of Strasbourg, and the rest from other copies of the same text, which are universally considered as written in the epistolographic character. We cannot discover the entire connected sense of the whole passages, but we may easily observe the symbols for *gods, established, Osiris, Isis, Nephthe, Hieracion, to set up, four, priests,* and *child* or *prince.*[2] (*Déscription de l'Egypte, Antiq.* tom. ii., plate lxxiv., col. 106; lx., col. 3; lxii., col. 2; lxxii., col. 38; lxvii., col. 2.)



DR YOUNG'S OBSERVATIONS ON THE GENERAL CHARACTER OF THE EGYPTIAN MONUMENTS.

Observations on the Egyptian monuments.

By means of the knowledge of the hieroglyphic characters which has already been obtained, we are fully competent to form a general idea of the nature of the inscriptions on the principal Egyptian monuments that are extant. Numerous as they are, there is scarcely one of them which we are not able to refer to the class either of sepulchral or of votive inscriptions; astronomical and chronological there seem to be none, since the numerical characters, which have been perfectly ascertained, have not yet been found to occur in such a form as they necessarily must have assumed in the records of this description. Of an historical nature we can only find the triumphal, which are often sufficiently distinguishable, but they also may always be referred to the votive; since whoever related his own exploits thought it wisest to attribute the glory of them to some deity, and whoever recorded those of another was generally disposed to intermix divine honours with his panegyric. It has, indeed, been asserted that the Egyptians were not in the habit of deifying any mortal persons; but the inscription of Rosetta is by no means the only one in which the sovereigns of Egypt are inserted in the number of its deities. The custom is observable in monuments of a much earlier age; indeed, in such a country it might be considered as a kind of dilemma of degradation, whether it was most ridiculous to be made a divinity, or to be excluded from so plebeian an assemblage; but flattery is more prone to err by commission than by omission, and consequently we find the terms king and god very generally inseparable. The sepulchral inscriptions, from the attention that was paid in Egypt to the obsequies of the dead, appear, upon the whole, to constitute the most considerable part of the Egyptian literature which remains; and they afford us, upon a comparative examination, some very remarkable peculiarities. The general tenor of all these inscriptions appears to be, as might have been expected from the testimony of Herodotus, the identification of the deceased with the god Osiris, and probably, if a female, with Isis;[1] and the subject of the most usual representations seems to be the reception of this new personage by the principal deities, to whom he now stands in a relation expressed in the respective inscriptions; the honour of an apotheosis, reserved by the ancient Romans for emperors, and by the modern for saints, having been apparently extended by the old Egyptians to private individuals of all descriptions. It required an extensive comparison of these inscriptions to recognise their precise nature, since they seldom contain a name surrounded by a ring in its usual form. Sometimes, however, as on the green sarcophagus of the British Museum, a distinct name is very often repeated, and preceded by that of Osiris; while, in most other instances, there is a certain combination of characters, bearing evident relation to the personage delineated, which occurs, after the symbols of Osiris, instead of the name; so that either the ring was simply omitted on this occasion, or a new and perhaps a mysterious name was employed, consisting frequently of the appellations of several distinct deities, and probably analogous to the real name. That the characteristic phrase, so repeated, must have had some relation to the deceased, is proved by its scarcely ever being alike in any two monuments that have been compared; while almost every other part of the manuscripts and inscriptions is the same in many different instances, and some of them in almost all; and this same phrase may be observed in Lord Mountnorris' and Mr Bankes' manuscripts, placed over the head of the person who is brought up between the two goddesses, to make his appearance before the true Osiris, in his own person, and in his judicial capacity, with his counsellors about him, and the balance of justice before him (*Hieroglyphics*, 5 E F G e f). In this instance the phrase consists of the names of *Hyperion* and the *Sun*, preceded by a block and an arm with an offering; and it may be interpreted, without any violence, "the votary of Hyperion and of Phre." In a small manuscript, engraved by Denon, the part which resembles the characteristic phrase of other manuscripts is followed by the name of a king, which is nearly identical with that of the father of the Pseudomemnon in the British Museum; the one having the hieralpha laid flat, the other the traces of the pedestal, which is equivalent to it.

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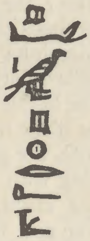
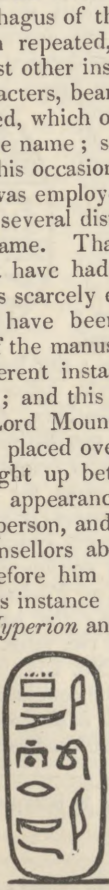
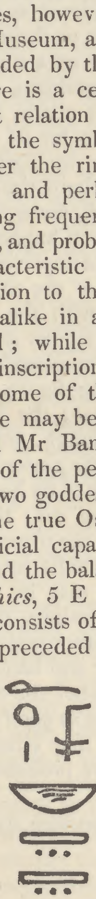
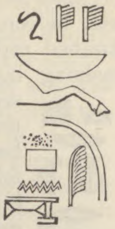
[1] It would occupy too much space to follow Dr Young in this analysis, especially as the Chevalier Bunsen has given an analysis of this extract from the hieroglyphic inscription of the Rosetta Stone (*Egypt's Place,* vol. i., p. 596, *et seqq.*), in accordance with the present state of knowledge. (R. S. P.)

[2] The first extract, given first in linear hieroglyphics, and then in two kinds of hieratic, reads—"[These] are the venerable (?) great [divinities] dwelling in the land of TETTU, Osiris, Isis, Nephthys, Horus, [who] sustains (?) his father. They are placed . ." The second is a mutilated fragment. (R. S. P.)









The tablet of the last judgment, which is so well illustrated by the testimony of Diodorus concerning the funerals of the Egyptians, is found near the end of almost all the manuscripts upon papyrus, that are so frequently discovered in the coffins of the mummies, and, among others, in Lord Mountnorris's hieratic manuscript, printed in the Collection of the Egyptian Society. The great deity sits on the left, holding the hook and the whip or fan; his name and titles are generally placed over him; but this part of the present manuscript is a little injured. Before him is a kind of mace, supporting something like the skin of a leopard; then a female Cerberus, and on a shelf over her head the tetrad of Termini, which have already been distinguished by the names Tetrarcha, Anubis, Macedo, and Hieracion, each having had his appropriate denomination written over his head. Behind the Cerberus stands Thoth, with his style and tablet, having just begun to write. Over his head, in two columns, we find his name and titles, including his designation as a scribe. The balance follows, with a little baboon as a kind of genius sitting on it. Under the beam stand Cteristes and Hyperion, who are employed in adjusting the equipoise; but their names in this manuscript are omitted. The five columns over the balance are only remarkable as containing, in this instance, the characteristic phrase, or the name of the deceased, intermixed with other characters. Beyond the balance stands a female, holding the sceptre of Isis, who seems to be called Rhea, the wife of the sun. She is looking back at the personage, who holds up his hand as a mark of respect, and who is identified as the deceased by the name simply placed over him, without any exordium. He is followed by a second goddess, who is also holding up her hands in token of respect, and whose name looks like a personification of honour or glory, unless it is simply intended to signify "a divine priestess" belonging to the order of the Pterophori mentioned on the Rosetta Stone. The forty-two assessors are wanting in this tablet; and, in many other manuscripts, their number is curtailed, to make room for other subjects; but, in several of those which are engraved in the *Déscription de l'Egypte*, they are all represented, sometimes as sitting figures, and sometimes standing as Termini, with their feet united.

The principal part of the text of all these manuscripts appears to consist of a collection of hymns, or rather homages, to certain deities, generally expressed in the name of the deceased, with his title of Osiris, although the true Osiris is not excluded from the groups which are introduced. The upper part of each manuscript is occupied by a series of pictural tablets; and under them are vertical columns of distinct hieroglyphics, or, in the epistolographic manuscripts, pages of the text, which are commonly divided into paragraphs, with a tablet at the head of each, the first words being constantly written with red ink, made of a kind of ochre, as the black is of a carbonaceous substance. The beginning of the manuscript is seldom entire, being always at the outside of the roll; as the *umbilicus* of the Romans was synonymous with the end. Not far from the beginning, we always find a large tablet, occupying the whole depth of the paper, representing the sun adored by his ministering spirits. In the large hieratic manuscript, which occupies four plates of the *Déscription de l'Egypte*, and which may be considered as a fine specimen of the most highly finished copies, there are at present only four columns remaining before this tablet. It is followed by a short section, with a rubric, which is not very distinctly expressed; after this are thirty-five others, beginning with a long rubric, which is usually followed by the name of a divinity, represented in a neighbouring part of the margin, and which may be supposed to mean something like "Respect and reverence be paid to each of the sacred powers."[1] The next ten sections begin with the rubric of a feather, and a sitting figure raising his hand to his head, as if holding a vase on it, meaning probably "Honour is due,"[2] or belonging to; then follow the name and titles of Thoth or Hermes, and the phrase describing the deceased in the character of Osiris; and afterwards the names of each of a group of deities, represented in the corresponding tablet with an altar and a suppliant before them. These groups are different in the different sections, but they correspond pretty accurately with each other in the various manuscripts; and this hermetic decad is the most constant part of the manuscripts found with the mummies, though a little more extended in some than others (*Hieroglyphics*, 4). After these, we find thirty-five sections, beginning with a drop, a feather, a serpent, and a line; the rubric being immediately followed by the deified name peculiar to the manuscript. This exordium, from the analogy of the term sacred (No. 146), we can have no hesitation in understanding as a derivative of the feather, signifying honour or ornament, and the serpent, signifying perpetuity, and in translating it, "eternal honour,"[3] or respect. A similar sense seems, in other places, to be expressed by the open square or the pyramid instead of the feather; and not uncommonly the hat is substituted for the line, without any variation of the meaning. After these thirty-five sections, we have two others, of which the rubrics are less intelligible, followed by forty-two short ones, which evidently contain the names and titles of as many separate deities, whose figures are commonly represented in the great tablet, near that of Osiris. We may generally observe, among the epithets of each, the term "*from illustrious*" (No. 121); and each section has a second paragraph, beginning with a pair of arms extended, a character which seems occasionally to be used in reference to the equal scales of justice, though on the Stone of Rosetta it appears to signify a kind of temple, so that it may possibly relate to the honours to be paid to these divine judges. With a few additional columns, and with the great tablet of the judgment, the manuscript concludes. It does not contain the figure of the sacred cow, which is the termination of most other manuscripts; nor the agricultural representations, which are frequently found in many of them, especially in that of Lord Mountnorris (*Hieroglyphics*, 3), with the three deities sitting in a grotto under it. The last of these, according to the inscriptions over the two boats, is meant for Arueris, the second apparently for the mother of the sun, and the first for Osiris; and one of the boats carries the steps, which seem to be emblematic of the solar power; the other, the throne or chair of state, which is universally appropriated to Osiris.[4]

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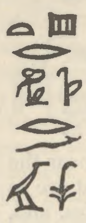
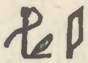
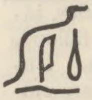
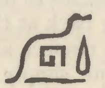
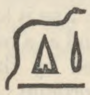
[1] Both males and females, when "justified," received the name of Osiris. (R. S. P.)

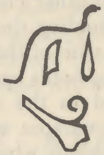






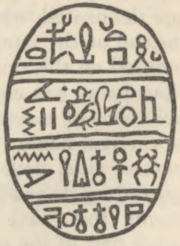






The coffins of the mummies, and the large sarcophagi of stone, are generally covered with representations extremely similar to some of those which are found in the manuscripts. The judicial tablet is frequently delineated on the middle of the coffins; above it are Isis and Nephthe at the sides, and in the middle apparently Rhea with outspread wings. The space below is chiefly occupied by figures of from twenty to thirty of the principal deities, to whom the deceased, in his mystical character, is doing homage; each of them being probably designated by the relationship in which he stands to the new representative of Osiris. In the sculptures, the figures are generally less numerous; the same deities are commonly represented as on the painted coffins, but without the repetition of the suppliant, and in an order subject to some little variation. The large sarcophagus of granite in the British Museum, brought from Cairo, and formerly called the Lover's Fountain, has the name of Apis, as a part of the characteristic denomination.[5] This circumstance, at first sight, seemed to make it evident that it must have been intended to contain the mummy of an Apis, for which its magnitude renders it well calculated; but when the symbols of other deities were found in the mystic names upon various other monuments, this inference could no longer be considered as absolutely conclusive.

Of the votive or dedicatory inscriptions, we find an interesting example on a small scale, in the engraving on the bottom of a scarabæus, very neatly sculptured in a softish steatite, or lapis ollaris, brought from Egypt by Mr Legh. It is remarkable for its simplicity, and for affording an intelligible sense in all its parts. The chain, the semicircle, and the square block, mean clearly [*To*] *the beloved;* the loop supporting a wreath or crown, and the imperfect sitting figure, resemble some of the titles often given to Osiris, and, with the following oval, pretty certainly signify *of the great god;* the throne, the semicircle, and the oval, *Isis;* the sitting figure, *the goddess;* the looped wreath, perhaps *the great;* the bird and circle, *offspring of;* the hieralpha or plough, and the two feathers, *Phthah;* the pillar, perhaps *the powerful*, but it is not distinctly formed; the beetle seems to be here a synonym or epithet of Phthah, as if *the father of all;* the handled cross, *the living;* the lute, *the good;* the pyramid, *the prosperous* or glorious; the ring with the handle seems to be nearly synonymous with the chain, and may be rendered, in conjunction with the line and the hieralpha, *the approved of Phthah*, an epithet found in the inscription of Rosetta; the hatchet is *the deity;* the ring and handle, with the two lutes, approaches near to the symbol for munificent (No. 154), and may be called *delighting in good gifts;* and the concluding ring and staff or hatchet may either mean, *this is dedicated*, or may, with rather more probability, be considered as a reduplica-



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[1] The meaning of this group is difficult to explain. Mr Birch proposed to the writer PETER-REF-SU, "let it be interpreted to him," comparing the first word with the Hebrew. (R. S. P.)

[2] This group signifies "O!" and commences invocations. (R. S. P.)

[3] This group signifies "speech of." (R. S. P.)

[4] On the Ritual see the preface of Lepsius to his valuable edition (*Das Todtenbuch der Ægypter*), and Bunsen, *Egypt's Place*, vol. i., p. 25, *et seqq.* The contents are prayers to be said by the deceased during his journeys in the other world, and descriptions of these journeys. (R. S. P.)

[5] The name of Apis enters into the composition of that of the person for whom this sarcophagus was made, Hapeemen, as already mentioned. (R. S. P.)

tion of the beginning of the line, in an inverted position.[1] It may be remarked, that all the inscriptions on the scarabæi run from right to left, as is most commonly observed wherever the direction was indifferent; so that if they were used as seals, the impression must have assumed the form which is somewhat less usual in other cases.

We have a most valuable example of a dedicatory inscription on a larger scale in the decree preserved on the Stone of Rosetta, which, besides its utility in affording the only existing clue for deciphering the hieroglyphical characters, gives us also a very complete idea of the general style of the records of the Egyptian hierarchy. Of the triumphal monuments the most magnificent are the obelisks, which are reported by Pliny to have been dedicated to the sun; and there is every reason to suppose that the translation of one of these inscriptions, preserved by Ammianus Marcellinus, after Hermapion, contains a true representation of a part of its contents, more especially as "the mighty Apollo" of Hermapion agrees completely with the hawk, the bull, and the arm, which usually occupy the beginning of each inscription. These symbols are generally followed by a number of pompous titles, not always very intimately connected with each other, and among them we often find that of "Lord of the asp-bearing diadems," with some others immediately preceding the name and parentage of the sovereign who is the principal subject of the inscription. The obelisk at Heliopolis is without the bull; and the whole inscription may be supposed to have signified something of this kind: "This Apollinean trophy is consecrated to the honour of King Ramesses, crowned with an asp-bearing diadem; it is consecrated to the honour of the son of Heron, the ornament of his country, beloved by Phthah, living for ever; it is consecrated to the honour of the revered and beneficent deity Ramesses, great in glory, superior to his enemies; by the decree of an assembly, to the powerful and flourishing, whose life shall be without end." It is true that some parts of this interpretation are in great measure conjectural; but none of it is altogether arbitrary, or unsupported by some probable analogy; and the spirit and tenor of the inscription are probably unimpaired by the alterations which this approximation to the sense may unavoidably have introduced.

Of the obelisks still in existence, there are perhaps about thirty larger and smaller, which may be considered as genuine. Several others are decidedly spurious, having been chiefly sculptured at Rome in imitation of the Egyptian style, but so negligently and unskilfully as to exhibit a striking difference even in the character of the workmanship. Such are the Pamphilian, in explanation of which the laborious Kircher has published a folio volume, and the Barberinian or Veranian. In both of these the emblems are put together in a manner wholly arbitrary; and where an attempt is made to imitate the appearance of a name, the characters are completely different at each repetition. The Sallustian obelisk has also been broken, and joined inaccurately, and some modern restitutions have been very awkwardly introduced, as becomes evident upon comparing with each other the figures of Kircher and of Zoega. Another very celebrated monument, the Isiac table, which has been the subject of much profound discussion, and has given birth to many refined mythological speculations, is equally incapable of supporting a minute examination upon solid grounds; for the inscriptions neither bear any relation to the figures near which they are placed, nor form any connected sense of their own; and the whole is undoubtedly the work of a Roman sculptor, imitating only the general style and the separate delineations of the Egyptian tablets; as indeed some of the most learned and acute of our critical antiquaries had already asserted, notwithstanding the contrary opinions of several foreigners, of the highest reputation for their intimate acquaintance with the works of Greek and Roman art. We may hope, however, that in future these unprofitable discussions and disputes will become less and less frequent, and that our knowledge of the antiquities of Egypt will gain as much in the solidity and sufficiency of its evidence, as it may probably lose in its hypothetical symmetry and its imaginary extent; and while we allow every latitude to legitimate reasoning and cautious conjecture in the search after historical truth, we must peremptorily exclude from our investigations an attachment to fanciful systems and presupposed analogies on the one hand, and a too implicit deference to traditional authority on the other.

OBSERVATIONS ON DR YOUNG'S ANALYSIS.

Observations of Dr Young's analysis.

In the following observations on the preceding essay it is not intended to do more than correct the errors in principle into which its writer fell. To correct, except by occasional notes, all the faults of detail inevitable to the early stages of such an investigation, would occupy much space that can be more usefully employed. The reader will have seen that he cannot rely upon the accuracy of all the interpretations in Dr Young's essay, and before accepting them, he will do well to examine the later works referred to in this article.

Dr Young's essay is, perhaps necessarily, very faulty in arrangement, since it gives us rather the record of the progress of his inquiry, than the results of that inquiry placed in a systematic form. His method of examination need not here be further commented on, except that it should be granted that in the first instance he displayed extraordinary skill, and undoubtedly deserves the credit of having discovered the means of interpreting the hieroglyphic, hieratic, and demotic characters.

Dr Young ascertained the identity of the three modes of writing, though he was in error in calling the linear hieroglyphic, hieratic, and in making what is now called the hieratic identical with the demotic. He was correct in his supposition that the demotic expressed a vulgar dialect. He supposed the characters, whether hieroglyphic, hieratic, or demotic, to be either phonetic or ideographic, and if phonetic to be syllabic or alphabetic, a single character in the former case expressing a monosyllable or a dissyllable, which was the name of the object which it represented. It is very remarkable that he was near the truth in this case in principle, but that he applied the principle to words for which it was not employed. It has been since proved by Dr Lepsius that the Egyptians had syllabic characters; but these were almost if not wholly disused for foreign names at the period to which the Rosetta Stone belongs. These syllabic characters, however, are rarely objects standing for their names, and they are not in so large a proportion to the phonetic signs as Dr Young supposed. He was in error in not sufficiently recognising the existence of homophonous characters, which were very numerous at the time when the Rosetta Stone was sculptured, though much fewer in earlier periods. He seems also not to have understood the principle of determinatives in the hieroglyphic method, although he detected them in the demotic or hieratic. His two most important results were the separation into phonetic characters of the hieroglyphic names of Ptolemy and Berenice. Here his progress was arrested, and he did little further beyond ascertaining the meaning and sound of demotic words, the comparatively scanty alphabet of which system hindered him from discovering the general application of the principle of homophones in late hieroglyphic writing.

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[1] This inscription is either an Arab forgery, or ancient, but executed by some artist who did not correctly understand the characters.
(R.S.P.)

Champollion's discoveries.

Champollion le Jeune, following Young's discoveries, formed the conjecture that the phonetic hieroglyphics were simply alphabetic, and at once commenced an examination of royal names, thus putting the hypothesis to the test. The result, based on partial error, was brilliantly successful, and it was not long before he was enabled to publish, in the year 1822, his *Lettre à M. Dacier*, containing a considerable number of alphabetic characters. Abandoning the demotic, Champollion set himself to apply this alphabet to all the hieroglyphic documents within his reach, and in his *Précis*, published two years subsequently (in 1824), he astonished the world with a relatively complete system of hieroglyphics, which subsequent discoveries have not much altered except in principle. His great mistake was not seeing that some phonetic characters were syllabic; but this error did not affect his results, since he had to deal for the most part with inscriptions in which the alphabetic characters had mostly supplanted the syllabic, which were formerly more intermixed with them, and he explained the syllabic signs to be abbreviations. By his *Grammaire Egyptienne* and his *Dictionnaire*, Champollion deservedly took the highest rank among Egyptologists, and it is not a little remarkable that since his death scarcely more has been done in addition to his results than was done before he took up the study.

Merits of Young and Champollion.

Young and Champollion contended in their lifetime for the honour of having discovered the interpretation of hieroglyphics, and their friends have not ceased to maintain the controversy. Too much acrimony was displayed by both the principals, and Champollion was unquestionably guilty of unfairness in endeavouring to establish his claim. The truth is, that neither can merit the claim of undivided discovery. Young, indeed, first read the mysterious characters, but his reading was not correct until Champollion had taken it up. Certainly Champollion was unable to discover what Young discovered; but it is equally sure that Young could not apply the discovery as did Champollion. It is most unfair to say that Young did little when he made the first step, and it is no less unfair to decry Champollion as a fortunate guesser when we see how little has been effected since his death. The abilities of these two great men are distinct; and while we admire the patience, the scientific skill, and the varied knowledge of Young, we need not undervalue the marvellous felicity of conjecture, power of comparison, and accuracy, which distinguished Champollion.

Chev. Bunsen's criticism of Young.

It might have been reasonably hoped that an Egyptologist who is neither an Englishman nor a Frenchman, would have been unswayed by any party feeling in estimating the merits of Young's discovery. Chevalier Bunsen appears, however, as a partizan of Champollion, and instead of pointing out the singular merits of the two great rivals, endeavours to raise the one at the expense of the other. The German scholar's observations are so ingenious that they cannot be considered except in some detail. After speaking of Dr Young's high acquirements in the physical and mathematical sciences, he goes on to mention his attempt to interpret the Egyptian characters. "His acute mind was not contented with studying the enchorial inscription. He contemplated also the deciphering of the hieroglyphic character, and applied to both texts a method, in which, and in his mode of following it out, we recognise rather the sagacity of the experienced mathematician than the native genius of the philologer." This passage is the first of a series of criticisms which seem too much as if intended to be accepted unhesitatingly, without examination. In an inquiry of this kind we should have expected, in the first instance, better results from the close reasoning of a mind trained to high mathematical processes than from the speculations of a philologer, which would be rather valuable in the second stage, as indeed was proved in this very case. We find no especial fault with the account of the subsequent results of Young's studies, until the criticism of his famous essay. Of this it is said, with reference to the opinions he had previously formed, "So firmly were these views impressed on his mind, that his closer and more philological limitation and definition of them, in his treatise of 1819 on the Language and Writing of the Egyptians,[1] which, however, formed an epoch in the inquiry, led him in many points still further from the truth, and in no instance to any certain or philologically accurate result. Afterwards, indeed, he was led clearly to perceive the difference between the hieratic and enchorial writing, chiefly by a more careful collation of the demotic papyri; but he calls the latter a second corrupt form of the hieroglyphics, the hieratic character being the first. He gives no proof of this; indeed his method neither aims at nor admits of any strict philological demonstration; but, besides, the assumption is incorrect. It is as impossible to deduce and explain the demotic from the hieratic character as it is false to define it to be purely alphabetical, as Akerblad has done." The fault here found with Dr Young is his unacquaintance with a method of philological inquiry which may be said to have been but in its infancy when he wrote, and his results are unjustly estimated. It would have been more satisfactory had we been told how it was that a treatise which "formed an epoch in the inquiry" did not express "any certain or philologically accurate result." The concluding sentence of the quotation given above is perhaps its most extraordinary portion, and we may ask from what the demotic characters are to be deduced if not from the hieratic; and that Chevalier Bunsen does derive the former from the latter is evident from the transcriptions of a hieroglyphic passage into hieratic and demotic (taken from Lepsius), at p. 594 of the volume from which we quote. Perhaps the meaning is, that the hieratic does not afford direct means of interpreting the demotic, since the one expresses the sacred, the other the vulgar dialect, although the characters of the second were derived from those of the first; but the criticism should have been more distinct. Chevalier Bunsen continues as follows:—"There was, however, one very happy result of his speculations embodied in this treatise, and which, by the impression it made upon Champollion, led to the greatest discovery of the century, the alphabet of the old Egyptian language and character. But it would be a very false view of the matter to suppose that he arrived at it by a scientific process, or upon any principle of inductive analysis. His continued comparison of demotic, hieratic, and hieroglyphic groups—for these, and not their individual elements, were the sole data for the exercise of his inventive faculties—led him, indeed, to the inference that the rings on the Rosetta Stone and other monuments contained the names of kings, which, as we have seen, had already occurred to Barthelemy and Zoega." This citation contains a more distinct opinion on Dr Young's result and his method. The former is diminished into an impression on Champollion's mind which "led to the greatest discovery of the century," where we must notice that the other great parallel discovery, which is fully equal to that of the reading of hieroglyphics, is ignored: it was made by an Englishman. As to the method, it is expressly denied that it was one of inductive analysis, and in the next sentence its essentially inductive character is proved. We do not think that the first stages of any inquiry of this sort can be conducted on strictly scientific principles, however easy it may be to apply such principles to their result. Champollion, whose marvellous success places him at the very head of acute decipherers, cannot be said to have used a scientific process except that he was guided by inductive reasoning. His *Grammaire* is absurdly unscientific in form. But both he and Young reasoned generally by induction, of which he indeed made the greater use, and neither is to be condemned for not having put his results into better shape, through a want of acquaintance with methods of arrangement subsequently matured. In pursuing the criticism, which we have not space to continue to examine in detail, Chevalier Bunsen finds fault with Young for a conclusion which, although in his case "a 'certain kind of syllabic system,' in itself a very obscure and uncritical expression," becomes in Lepsius's hands "a brilliant discovery" (p. 332). Young did indeed discover the original principle of nearly all, if not all, the phonetic characters, but failed by applying the original principle to their most debased use. The discovery is therefore to be attributed to Young, not to Lepsius, and his application of it seems to us to be an evidence of the abandonment of simple induction for the more refined process which Chevalier Bunsen recommends. The whole criticism is based on an admission of the inapplicability of the first principles of the Egyptian modes of writing to which philologers have at length arrived, to the late records by which Young and Champollion discovered the interpretation of the characters. Young's success was mainly retarded by his adhering too rigidly to a philosophic method: Champollion's was mainly advanced by his setting simple induction above all other means of arriving at the truth. We have dwelt at some length on Chevalier Bunsen's observations,[1] because we think that they are calculated to injure the reputation of Dr Young by their low estimate of his abilities, and the use to which he put them, and we are gratified to find our views corroborated by those of Dr Peacock and Mr Leitch, in the *Life* and *Works* of Dr Young, respectively.

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[1] *Supplement* to the *Encyc. Brit.*, vol. iv., Dec. 1819.

Later researches.

Having thus endeavoured to indicate the respective merits of Young and Champollion, rendering honour to each without robbing the other, we have yet to sketch the subsequent progress of discovery after the publication of the *Précis.* As soon as the learned had thus been enabled to profit by the results of Young's and Champollion's researches, the interpretation of the hieroglyphics ceased to be confined to those who had discovered it. For a time, however, inquirers were rather engaged with the historical results of these discoveries in identifying the names of sovereigns of Egypt mentioned by ancient writers with those occurring on the monuments, than in philological questions. Mr Salt and Colonel Felix did much to apply the system to the monuments, and Mr, now Sir, Gardner Wilkinson was one of the first to make himself master of the new discovery, and to attempt the reconstruction of Egyptian history; and his earliest work, the *Materia Hieroglyphica*, evidences the importance of the fruits of his inquiry. Dr Young himself pursued his Egyptian researches, particularly in the enchorial, of his great progress in which we may judge by the posthumous *Egyptian Dictionary.* Champollion, however, carried much further than any others the study of the Egyptian characters. Having been sent, by the liberality of the French government, on a scientific expedition to Egypt, he there collected materials for the *Grammar* and *Dictionary* which appeared after his lamented death. The Tuscan expedition, conducted at the same time by Professor Rosellini, had no small share in promoting the knowledge of hieroglyphics, but its head was unable to give to philology more than an incidental attention. The next step was taken by Dr Lepsius, who, in his Letter to Rosellini, made public an important modification of Champollion's views, by showing that the greater number of phonetic hieroglyphics were, until a late period, syllabic not alphabetic, thus proving the correctness of Young's theory. The same scholar was afterwards sent on a scientific mission to Egypt and Ethiopia by the King of Prussia, and the result of his labours is the magnificent *Denkmäler aus Ægypten und Æthiopien*, now in course of publication. Five other living scholars have done good service as successors of Champollion, the Rev. Dr Hincks, Mr Birch, and the Rev. Dunbar Heath, in our own country; M. de Rougé in France; and Dr Heinrich Brugsch in Prussia. Dr Hincks and Mr Birch have from time to time discovered the signification of hieroglyphic groups previously unknown, and have published many very valuable papers. Mr Heath has applied himself to the study of the hieratic papyri, and has proved himself to be well acquainted with their contents. M. de Rougé has proved his ability by his critical examination of part of a very remarkable inscription in a tomb at Eilethyas, of which he has given an account in a memoir read to the Institute of France, wherein much new and valuable philological information is to be found, and has published many interesting papers. But it is to Dr Brugsch that we are indebted for the first great philological work which has appeared since Champollion's *Grammaire* and *Dictionnaire.* Notwithstanding the dryness of the study, he has indefatigably applied himself to the demotic character, and has been enabled at last to make public, in his *Grammaire Démotique*, a complete account of that difficult system. He has also done much to advance the knowledge of hieroglyphics.

When we contemplate the brilliant results that have already rewarded those who have devoted themselves to the pursuit of the studies which Young and Champollion rendered practicable to the learned world, it is disheartening to see so few engaged in the cultivation of these branches of learning. So much was, however, achieved by Champollion, that if any one possessing the same qualifications should now take up the study, we might hope for the most remarkable results. At the same time, the field is so wide and so rich, that there is room for all to labour, and a certainty that none will go away unrewarded.

Results of interpretation, and reasons for its correctness.

Before proceeding to the examination of what is known respecting the ancient Egyptian language, it will be desirable to give a summary of the main results of its interpretation, and the chief reasons for the correctness of that interpretation principally deduced from external evidence.

The results of the interpretation of an unknown language may be divided into the philological and the historical, the former concerning the language itself, the latter the ideas which it expresses. The former class must be again separated into the characteristics of the language by itself, and those characteristics which refer to comparative philology, and here philology is connected with history. The second class may be conveniently separated into three divisions,—the first containing the purely historical results, the second those illustrating religion, and the third, those relating to manners and customs, as well as the results bearing on science and art. This class must be considered with reference, in the present case, both to the Egyptians and to the nations connected with them. So large a subject can only be treated, as it were, in outline, for to enter into it fully would demand more space than is devoted to the whole of this article.[2]

The Egyptian language.

First, as to the Egyptian language itself. We can now form a very just opinion of its characteristics. The method of writing, the sounds, the nature of the roots, the grammar, are all, more or less, known to us, and it is hardly too much to say, that if the study is prosecuted with perseverance and zeal, the time may not be far distant at which Egyptian will be as well understood as Latin. Already, enough has been done to enable the student to ascertain the general purport of any document. If it be an historical tablet, for example, he can say that it is dated in a certain year of a sovereign of a particular dynasty, and that it refers, for example, to the subjugation of some country, and the carrying away captive of some of its inhabitants. The exact period at which the sovereign reigned, or even his dynasty, may indeed be uncertain, to a greater or less degree, the country mentioned may be difficult or impossible to identify with any known region, and many details may be hard to explain, yet the general sense will be clearly made out, and the historical fact recorded on the tablet ascertained more or less certainly. With the religious records the case is not dissimilar, although, in their case, obviously much of the meaning must be lost by our being often unable to translate every word even approximatively. Yet we know enough to form a clear opinion of the most important doctrines of the religion, as we do of the leading events of the history; and an increased knowledge of the language is not likely *of itself* to lead to any very important results in either branch of inquiry.

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[1] *Egypt's Place*, vol. i., p. 316, *et seqq.*

[2] Some part of the following observations may seem like a repetition of the Introduction, but it may be remarked that that portion of this essay is a summary of what is here given in more detail.

We may here notice the strong evidence of the antiquity of the Egyptian language to be found in that language itself, and in the hieroglyphic method of writing it. The monosyllabic roots, and the virtual absence of inflexion and composition, prove its extreme age, while the system of hieroglyphics having probably its origin in picture-writing, is of itself an evidence of the same kind; and, if we examine the most ancient form of this system, our opinion will receive additional strength.

Another important result of Young's and Champollion's discoveries must not be overlooked—the proof thus obtained, that the Coptic is but a later form of the language of the ancient Egyptians, and thus essentially the same. It was indeed to be expected that the language expressed by the ancient characters should bear a strong resemblance to the Coptic; but that this resemblance should be as close as it has proved could scarcely have been anticipated. It is, however, readily explained, when we consider the necessarily unchangeable character of the language. In the dialect of Egyptian expressed by the demotic method of writing we have a record of the transition from the dialect of the hieroglyphics to the Coptic.

The importance of the Egyptian language to comparative philology is beginning to be understood. It forms a connecting link between the so-called Semitic group and an unknown family of languages; besides that its records are more ancient than those of any other form of human speech. We are also able to trace in it evidences of the influence of immigrations from the East, as in the presence of more than one derivative word which must have been taken direct from the Hebrew, or a sister language, since it is not formed in the Egyptian manner.

Historical results of the interpretation.

Those results of the interpretation of the Egyptian characters which illustrate the history and condition of the world in early times far outshine those which we have been noticing; and in their congruity, and their accordance with the statements of ancient writers, furnish the most conclusive evidence of the correctness of the system by which they have been obtained. We now possess a history from contemporary monuments, extending, with few considerable breaks, through a period of about twenty-six centuries, or, as some hold, through a still longer time. This history presents no internal discordance, and there is no forced agreement between its different parts. The progress of art on the monuments whence we derive the history most satisfactorily confirms it, as do the statements of ancient writers. The testimony of these last is not to be overlooked, more especially as it has not come so much from expected as from unexpected sources. Thus, admiration for the beautiful style and evident truthfulness of Herodotus had induced most scholars to prefer his statements respecting Egyptian history to the dry fragments of the native historian Manetho. But they should have remembered that Herodotus was but a visitor and a stranger, and that his veracity did not ensure that of his informers; and that, on the other hand, Manetho was an Egyptian priest, well versed, no doubt, in the ancient literature of his country, and probably commissioned by his sovereign to write its history. It is therefore no matter for surprise that Manetho has received the most ample confirmation, while many of the statements of Herodotus have been found to be incorrect, or absolutely false. Another important circumstance is that of the occurrence of the names of the sovereigns of the House of Lagus, and of many of the Roman emperors, on the monuments, in entire accordance with the history of the period.

But while the history of Egypt itself is thus restored, we are enabled from the same sources to throw light upon the annals of neighbouring nations. An Egyptian record has been discovered of one important event in Hebrew history, the subjection of Judah to Sheshonk I., or Shishak, and many other facts illustrative of the Bible have become known. The early history of the Greeks has received important light from the Egyptian records, no less than that of the nations nearer to Egypt, and this illustrative or corroborative evidence is being constantly increased by fresh discoveries.

The information as to the Egyptian religion which we have gained through the interpretation of the ancient characters has been almost wholly new. Previously, we had scarcely any reliable account even of its principal tenets and observances under the Romans. Now, we are acquainted not only with such general particulars of its state under the early Pharaohs, but we have been able partly to interpret and explain its sacred book. The results have corroborated what trustworthy information the Greek and Roman writers had handed down to us on this subject, and we are again able to elucidate wider questions than any respecting particular points of the Egyptian religion, for we can trace in it marks of different origins, and discover remains of what can only have been a patriarchal revealed religion. (See article EGYPT.)

Besides the light thus thrown upon the history and religion of the people of ancient Egypt, we, for the first time, gain a clear idea of their life and manners, of their literature, and their arts and sciences. We are astonished to find the height of their civilization, and the extent of their knowledge. But it is not only with respect to them that we gain this valuable information, for their records are not silent respecting neighbouring nations. Besides, we are able to say that this or that scientific fact was known to mankind at least as early as a particular date, that of the Egyptian monument on which we discover its most ancient mention. In this manner we can state that probably steel was used in the time of the building of the Great Pyramid, since in a tomb of that period a man is represented slaughtering an ox with a knife painted blue. From time to time we find fresh evidence of the high degree of knowledge which obtained in the remotest periods of Egyptian history, periods not far distant from the most probable date of the Dispersion of Noah's descendants; and we are thus led to form more correct notions from facts than we had previously done from theories with respect to such doctrines as those of progressive improvement.

Evidences of the truth of the interpretation.

From these particulars it is manifest that we can no more over-estimate the importance of the results which have already flowed from the new source of knowledge opened by Young and Champollion, than we can calculate the value of what may reward further inquiries. On this matter it is needless to insist, but it will not be without use to point out the resistless evidence that is afforded of the truth of the system of interpretation which has led to such results.

When we bear in mind the various records from which these facts have been drawn, by several *rival* scholars who have worked to the same results in different countries and at separate times, we find in the consistency of the results at which they have arrived, the most conclusive evidence of the correctness of the method they have employed. And we are firmly persuaded that any one who will take the trouble to verify for himself these deductions, or merely one class of them, will, except he be unfortunately the victim of a scepticism which no evidence will overthrow, rise from the examination firmly convinced of the truth of this method of interpretation. In order, however, to show that it does not depend for the proof of its truth upon the harmony of its results alone, some separate evidences are here added.

Evidence from king's names.

After a little progress had been made in the reading of hieroglyphics, travellers in Egypt began to attempt the identification of the kings' names found on the monuments with those occurring in the works of ancient writers. Among the most certain of these identifications were those of the names of the builders of the three most famous pyramids, according to the hieroglyphic orthography, Shufu or Chufu, Shafra or Chafra, and Menkura. These names corresponded to the Sûphis, or Cheops, the Chephrên, or Kephrên, and the Mencherês, Mykerinos, or Mecherinos, of the historians. This identification was based upon the similarity of sound and the circumstance that the names occurred in the inscriptions of tombs near the Pyramids of El-Geezeh, until the results of the late General Vyse's expedition threw an unexpected light upon the matter. In the course of the examination of the Great Pyramid by that expedition, some chambers were discovered which had never been previously opened since the edifice was raised. These new apartments were a series of entresols, one above the other, over the King's Chamber, intended to lighten the weight of the superincumbent masonry. In them were found marks scrawled on the stones by the masons who cut them from the quarry, or placed them in their present position.[1] These marks were therefore contemporary with the building of the pyramid. In them occur the names of two sovereigns, Shufu and Num-shufu, one of whom had been previously concluded to be the builder of the pyramid, and the other the next king of his dynasty. Nor was this all. In the examination of the Third Pyramid, a portion of a mummy-case was discovered bearing an inscription which proved that it originally inclosed the body of King Menkura, who had been before identified with the Mencherês, or Mykerinos, who founded this monument.[2] No one will be rash enough to assert that these are fortuitous coincidences.

Evidence from quadrilingual inscriptions.

Very striking evidence is afforded by certain quadrilingual cuneiform and hieroglyphic inscriptions, which are the more valuable from their showing that the three systems of arrow-headed writing have received a true interpretation no less than the ancient Egyptian characters. Two examples of quadrilingual inscriptions of this character are known to exist in modern collections. They are on vases, one of which is known as that of the Comte de Caylus, and the other is in the treasury of St Mark's at Venice, and are in hieroglyphics and the three kinds of cuneiform characters, expressing the names and titles of Persian sovereigns. The systems of Young and Champollion on the one hand, and of Grotefend and his successors on the other, will be found, without any change or modification, to afford the same reading in their respective languages to the double inscriptions.[3] Since this evidence cannot be set aside, some will admit that the royal names can be correctly read in Egyptian, but that nothing further has been satisfactorily determined. But when this concession is made, the truth of the whole system is at once of necessity admitted. As M. de Rougé has very justly remarked, two forms of the royal names afford examples of every mode by which ideas were expressed in hieroglyphics.[4] And not only is the truth of the method thus proved, but from the royal names we can form an alphabet that will afford a sufficient basis of interpretation.

Evidence from Chæremon.

The most complete and remarkable confirmation which the interpretation of the Egyptian characters has received is afforded by the recent discovery of a fragment, or a series of citations, of the lost work of Chæremon on hieroglyphics. This valuable evidence we owe to the research of Mr Birch, who has brought it forward and criticised it with his usual skill and learning, in a paper read to the Royal Society of Literature.[5] Referring to this paper for the complete details, it will not be necessary here to do more than point to the main results, and cite the passage in which the fragment is preserved.[6] Chæremon was an Egyptian by birth, a sacred scribe, and keeper of the Library of Alexandria towards the close of the first century of the Christian Era. He was known to have written an Egyptian history, and to have been the author of a work entitled Ἱερογλυφικά. It is of this work that Mr Birch discovered a fragment in the Commentary on the Iliad by Tzetzes the grammarian. The passage in question contains the explanation of nineteen hieroglyphic signs, whereof three have more meanings than one, making altogether twenty-six significations. Of these, fifteen agree with the results of Young's and Champollion's method, and have been for the most part long known, and are thus certain. Three are probably, and other three possibly, to be placed in the same class, from their similarity; while but five are positively unknown, and there is no contradiction. Considering the short time that the method of interpretation has been discovered, and the confessedly imperfect state of the study as regards what we may call the vocabulary, intending by that term words, however written, this agreement is greater than could have been expected, and furnishes the most conclusive confirmation of the truth of Young's discovery. Those who require mathematical demonstration in arguments which can only be treated by the laws which apply to the examination of evidence will no doubt be disappointed. But such we would ask to demonstrate mathematically any one historical fact, or even their own existence. We are firmly convinced that the interpretation of the Egyptian characters is capable of the most convincing proof, and that if we have not produced that proof in its strongest form, we have adduced evidence that will enable more practised logicians to do this in an irresistible manner. This has certainly not been hitherto done, partly because one who is firmly convinced of the truth of any system is often unable from that conviction to place himself in an independent position, so as to prove his case, and falls into the error of arguing in a circle; and partly because those who have studied hieroglyphics have felt that it would not be worth while to attempt to prove the truth of what is shown by its results to be true. Some have thought, too, that it would be derogatory to reply to the objections of those who seemed to condemn a new study simply because it was new, or sat in judgment on a cause without making themselves acquainted with the language of those who pleaded it. We may now pass on to the next portion of our subject—an examination of the ancient Egyptian language; and this will afford to the philologer the most satisfactory evidence, not alone of the truth of the system of interpretation, but of the accuracy of its details.

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[1] Pyramids of Gizeh (fol. plates). Great Pyramid, pls. v., vi., vii.

[2] Id. Third Pyramid, pl. vi.

[3] Rawlinson in *Journ. As. Soc.*, vol. x., pp. 339, 347, 348.

[4] *Tombeau d'Ahmès*, p. 2, note 1.

[5] *Trans. Roy. Soc. Lit.*, 2d Series, vol. iii., p. 385.

[6] Ὅμηρος δὲ, παιδευθεὶς ἀκριβῶς δὲ πᾶσαν μάθησιν ἐκ τῶν συμβολικῶν Αἰθιοπικῶν γραμμάτων, ταῦτα φησίν· οἱ γὰρ Αἰθίοπες στοιχεῖα γραμμάτων οὐκ ἔχουσιν, ἀλλ' ἀντ' αὐτῶν ζῶα παντοῖα, καὶ μέλη τούτων. καὶ μόρια· βουλόμενοι γὰρ οἱ ἀρχαιότεροι τῶν ἱερογραμματέων τὸν περὶ θεῶν φυσικὸν λόγον κρύπτειν, δι' ἀλληγορικῶν καὶ συμβόλων τοιούτων καὶ γραμμάτων τοῖς ἰδίοις τέκνοις αὐτὰ παρεδίδουν, ὡς ὁ ἱερογραμματεὺς Χαιρήμων φησί· καὶ ἀντὶ μὲν χαρᾶς, γυναῖκα τυμπανίζουσαν ἔγραφον· ἀντὶ λύπης, ἄνθρωπον τῇ χειρὶ τὸ γένειον κρατοῦντα, καὶ πρὸς γῆν νεύοντα· ἀντὶ δὲ συμφορᾶς, ὀφθαλμὸν δακρυοντα· ἀντὶ τοῦ μὴ ἔχειν, δύο χεῖρας κενὰς ἐκτεταμένας· ἀντὶ ἀνατολῆς, ὄφιν ἐξερχόμενον ἔκ τινὸς ὀπῆς· ἀντὶ δύσεως, εἰσερχόμενον· ἀντὶ αναβιώσεως, βάτραχον· ἀντὶ ψυχῆς, ἱέρακα· ἔτι καὶ ἀντὶ ἡλίου καὶ θεοῦ· ἀντὶ θηλυγόνου γυναικὸς, καὶ μητρὸς, καὶ χρόνου, καὶ οὐρανοῦ, γῦπα· ἀντὶ βασιλέως, μέλισσαν· ἀντὶ γενέσεως καὶ αὐτοφυῶν καὶ ἀρρένων, κάνθαρον· ἀντὶ γῆς, βοῦν· λέοντος δὲ προτομὴ πᾶσαν ἀρχὴν καὶ φυλακὴν δηλοῖ κατ αὐτούς· οὐρὰ λέοντος, ἀνάγκην· ἔλαφος, ἐνιαυτὸν· ὁμοίως ὁ φοῖνιξ· ὁ παῖς δηλοῖ τὰ αὐξανόμενα· ὁ γέρων, τὰ φθειρόμενα· τὸ τόξον, τὴν ὀξεῖαν δύναμιν· καὶ ἕτερα μυρία· (p. 123, ed. Hermann.) Περὶ τῶν Αἰθιοπικῶν γραμμάτων Διό . . . * * * * * * Χαιρήμων δὲ ὁ ἱερογραμματεὺς ὅλην βίβλον περὶ τῶν τοιούτων γραμμάτων συνέταξεν· (p. 146).

SECTION III.

THE EGYPTIAN LANGUAGE.

Philological place of the Egyptian language.

The Egyptian language has not yet been classed by the general agreement of the learned in the so-called Semitic group, or as belonging to another family. Several of those best acquainted with this language, particularly Bunsen, Lepsius, and Benfey, the last of whom treats only of its Coptic form, have come to the conclusion that it must be assigned to the Semitic class, while their arguments have been answered by Ewald, Renan, and others, who maintain it to be essentially distinct, and representing the earliest form of what may be called Hamitic languages, if such a group can be made out. Bunsen, in his late work on comparative philology, even goes so far as to assert the Egyptian to be the earliest form of Semitic speech. He, and those who more or less hold with him, find in the almost perfect identity of the Egyptian and Hebrew pronouns, and in other less striking points, conclusive evidence; while their opponents maintain the essential distinction of the two languages, and the impossibility of tracing one to the other by any known principle of change.[1] Those who support the former theory are most distinguished as comparative philologers, but their opponents are rather known for their acquaintance with Semitic languages. The opinion of these last, therefore, that the Egyptian cannot be of the Semitic stock, must not be set aside without good reason, although its acceptance has seemed to involve a dilemma. In a recent work, a theory has been proposed which harmonizes the results of the inquirers on each side. Therein it is suggested that the Egyptians were a mixed race sprung from a settlement of Noachians, that is, philologically, a people having a Semitic speech, for the Semitic, it is argued, must not be restricted to the descendants of Shem, among an aboriginal population possessing a language resembling in its essence the Chinese. Thus the Egyptian, in the main a non-Semitic tongue, might naturally present essential Semitic peculiarities.[2]

It is impossible, however, in the present state of comparative philology, the imperfections of which are shown by its having led its most distinguished students to such different views as those of Bunsen and Ewald with respect to the Egyptian language, for us to push the inquiry any further, and endeavour to determine how much of that language is actually Semitic and how much non-Semitic. Far less can we determine on philological grounds when the Semitic element was introduced, nor to which Semitic tongue it may be most reasonably referred.

Various influences affect the change of languages so differently that induction seems only to lead us to the most general conclusions. Thus, in America, we find numerous languages almost wholly differing in their vocabulary, but almost identical in their grammar. In the so-called Indo-European class, on the other hand, we see languages differing in their roots little more than do dialects of one tongue, yet distinguished by remarkable variations in their grammar. The physical condition of a race, its mental state, its intercourse with other races, produce results that forbid us to establish strict general laws of change, and if such is the case as to philology in itself, it is so in a much higher degree with reference to its application to history. If we carefully investigate the linguistic changes that have occurred to certain races, or the inhabitants of certain countries, within periods of which we know the history, we shall perceive again the difficulty of establishing strict general laws, and the dangers which attend an attempt to restore history by means of comparative philology. Whether we hold these views or not, our means of judging will be rendered more numerous by the most accurate outline that we can obtain of the structure and history of every language of mankind. Such an outline and history it will be our endeavour here to give of the language of the ancient Egyptians.

I. GRAMMATICAL SKETCH OF THE ANCIENT EGYPTIAN LANGUAGE.

Grammar.

§ 1.—SOUNDS.

Sounds.

Our knowledge of the sounds, or vowels and consonants, of the ancient Egyptian language, must be derived from a comparison of the Coptic alphabet with the hieroglyphic and demotic alphabets founded upon the Egyptian renderings of proper names, &c., independently of the Coptic. The first step in this inquiry will be to reduce the Coptic alphabet by rejecting those letters which were simply introduced to express Greek words, as well as those which are properly compound. In the next place we shall endeavour to ascertain whether any letters of the alphabet thus reduced are proper to one dialect alone, either of the Coptic or of the more ancient language; and having thus determined, as nearly as may be, how many letters composed the alphabet of the sacred dialect of Egyptian, we shall strive to fix within certain limits their sound. When it is remembered that the pronunciation of some letters of the Greek and Latin alphabets is still matter of controversy among the learned, any one will admit that a perfectly exact result is not to be expected in the present case. But if we take care to separate in our minds the question as to the correspondence of a letter in Egyptian to one in Coptic, or in another language, from that of its exact sound in either language, we shall not only avoid error, but find the results of our inquiry in reality much more definite than we should have supposed. It matters very little, for example, whether we pronounce the Greek χ as a *k* or as a German *ch*, so long as we do not found philological arguments on its sound. It is something to know that χ and κ have distinct though related sounds, and that they correspond to certain letters in kindred languages.

Coptic alphabet.

The letters of the Coptic alphabet are thirty-one in number, and are written as follows:—

ⲁ ⲃ ⲅ ⲇ ⲉ ⲍ ⲏ ⲑ ⲓ ⲕ ⲗ ⲙ ⲛ ⲝ ⲟ ⲡ ⲣ ⲥ ⲧ ⲩ ⲫ ⲭ ⲯ ⲱ ϣ ϥ ϧ ϩ ϫ ϭ ϯ. They are taken from the Greek alphabet, which is comprehended entire in the Coptic, with the addition of six characters, adopted from the demotic and hieratic systems, and one compound character. On referring to the lexicons, we find that five of the Greek letters, ⲅ ⲇ ⲍ ⲝ and ⲯ, are not employed for Coptic words, except for an extremely small number, none of which are common roots, and some of which are of doubtful authenticity.[1] These letters have been used for the Greek words which are so numerous in Coptic literature, and cannot properly be assigned to the language. In the next place we must exclude ϯ, as a compound letter. Twenty-five characters remain, which form the genuine Coptic alphabet. Certain of these letters, however, are peculiar to one dialect, being very generally substituted for other letters, and therefore represent a particular pronunciation. Whether this pronunciation be the right one or not, we are warranted in excluding the letters which represent it as dialectal variations. The letters in question are ⲑ ⲭ ⲫ and ϧ, which are peculiar to the Memphitic dialect,[2] and very generally take the place of ⲧ ⲕ ⲡ and ϩ, in the other dialects, being the aspirated forms of those letters. In addition to these we find ⲗ and ⲣ very often interchanged, and ⲣ almost always replaced by ⲗ in the Bashmuric dialect. The confusion of these two letters is evidenced by our finding Cornelius written ⲕⲟⲣⲛⲏⲣⲓⲟⲥ.[3] The frequent interchange of ϫ and ϭ is another case of the same kind, and we are warranted in concluding that ⲗ and ⲣ, as well as ϫ and ϭ only represent different sounds of the same letter. The vowels we must likewise reduce; for comparative philology leaves little room to doubt that the Egyptian language had but three vowels—*a*, the sound of which sometimes resembled that of *e*, *i* or *ee*, and *u* or *oo*, besides a short vowel, inexpressed. The manner in which the vowels interchange in Coptic favours this supposition. The result of our inquiry thus far gives the following alphabet :—

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[1] Though we might agree with M. Renan in considering the pronouns, which show the most important points of agreement with Semitic languages, to be linguistically accidental, yet they are logically essential since they cannot have been accidentally introduced, for how can we suppose a language without pronouns? *Histoire Générale des langues Sémitiques*, vol. i., p. 72, *et seqq.*

[2] *The Genesis of the Earth and of Man*, pp. 210, *et seqq.*

ⲁ	ⲃ	ⲓ	ⲕ	ⲙ	ⲛ	ⲡ	ⲣ	ⲥ	ⲧ	ⲱ	ϣ	ϥ	ϩ	ϫ
a	*b*	*i*	*k*	*m*	*n*	*p*	*r*	*s*	*t*	*ō*	*sh*	*f*	*h*	
ⲉ		ⲉ	ⲭ			ⲫ	ⲗ		ⲑ	ⲟ			ϧ	ϭ
ĕ		*ĕ*	*ch*			*ph*	*l*		*th*	*ŏ*			*kh*	
ⲏ		ⲏ								ⲟⲩ				
ē		*ē*								*ou*				

(The ⲩ has usually the form ⲟⲩ, the Coptic having properly no simple ⲩ.)

Egyptian alphabet used for Greek and Latin proper names.

This result may be tested by the manner in which foreign names are written in hieroglyphics. Unfortunately, Greek and Latin names are the only ones which are numerous enough to enable us to form an alphabet, and they do not afford us direct evidence as to those sounds which are unknown to their respective languages. From these Greek and Latin names we form an alphabet of twelve letters :—

A	B	C	D	H	I	L	M	N	O	P	S
E	V	G	T			R			U	Φ	
		K	Θ						V	F	
		Q									
		χ									

This alphabet is of great value, since it establishes the close similarity, if not identity, of sounds that afterwards became distinct.[4] Three of its peculiarities require especial notice—Firstly, no distinction is made between the *G* and *K* sound, which is a strong evidence to show that there was no letter corresponding to ϫ and ϭ in the ancient Egyptian. Secondly, *L* and *R* are not distinguished, although they are distinguished in the demotic. We find the signs which are employed in demotic for *L* and *R* used in hieroglyphics of the same period for these letters indiscriminately, whence it appears that the separation in writing of the two sounds was an innovation which was not admitted into the sacred dialect; nevertheless, these sounds were never perfectly distinguished in the Coptic, as the instance of their confusion given above may serve to show. Thirdly, *F* and Φ are represented, since the Latin names are rendered from Greek transcriptions, by the same characters, and yet the Copts found it necessary to add a letter, ϥ, to the Greek alphabet, to represent a sound supposed to be that of *F*. The reason might, indeed, be that the Greek Φ was not pronounced *Ph* but *Fh* but rather that the Egyptian *F*, like the Æolic digamma, approached the sound of *V*. In support of the former assertion, it may be observed that the name of Philip Arrhidæus has been found written in hieroglyphic characters PHILIUPUS, instead of PILIPUS, according to the usual orthography, the *P* being in both cases represented by the same character; and in corroboration of the latter assertion it must be remarked that in Coptic ⲡ interchanges with ⲫ, and ⲫ with ⲃ, while ϥ interchanges with ⲃ and ⲟⲩ. We may therefore infer that the Egyptian *P* corresponded to the Greek Π and Φ and perhaps the Latin *F*, and that the Egyptian *F* was rather a *V*, though not a *Bh*. In modern Greek we have *Bh* and *V* in the pronunciation of Β and Υ. The best parallel to this case is that of the Latin language, in which, contrary to the Greek usage of rendering *F* by Φ, the Greek Φ is never represented by *F*, but always by *Ph*, although the Italians and Spaniards have lost the distinction, as did the Copts, and write Filippo, and not Philippo, Felipe, not Phelipe. There is a difficulty in the supposition that the aspirated form of *P* was *Fh*, and not *Ph*, or both, as it would not in either case strictly follow the analogy of the aspirated form of other letters; but the parallel instances show that such has been the case in the other languages, and warn us against reasoning as to what a thing ought to be, instead of endeavouring to ascertain what it is.[5]

Coptic letters unknown to Greek and Latin.

We have yet to examine those letters of the Coptic alphabet which are unknown to the Greek or Latin, that is, ϣ, ϥ, ϫ, and ϭ. As these letters have forms derived from those of demotic characters, themselves traceable to hieroglyphics, it is important to ascertain, if possible, what sounds these hieroglyphic characters conveyed. ϣ is traceable through demotic and hieratic forms to a common hieroglyphic character never employed in writing Greek and Latin proper names. It occurs in the names of some well known kings, as the two

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[1] ⲝ and ⲯ are sometimes used for their component letters in Coptic words, by way of abbreviation.

[2] ⲑ is not used, but as an abbreviation of ⲧϩ, except in the Memphitic dialect.

[3] Peyron, *Gram. Copt.*, p. 4, which see for a fuller account of the changes of the Coptic letters.

[4] It is to be noted that the hieroglyphic signs were used for the sounds they originally represented, at the same time that their demotic forms were employed for a different sound or sounds which had arisen from the changes of the language.

[5] Without attempting to disparage the extraordinary critical skill which has been displayed by recent scholars in discovering the *original meanings* of particular derivatives and grammatical forms, it may be safely asserted that many have pushed the results thus obtained too far when they have supposed these original meanings to have been always, or even often preserved. They have thus been led either to repudiate senses which usage proves to have been assigned to words or forms, or to accommodate those senses to their preconceived opinions. Although this method does not produce very serious evils when applied to the highly philosophical Indo-Germanic languages, it would be disastrous in its results were any one bold enough to try it with the Semitic group.

Hieroglyphics.

called Shebek, where it has been rendered in Greek by Σ (Σαβακῶς, Σαβάκων, Σαββάκων, Σεβιχὼς, Σεύηχος), and in the case of one of these kings, in Hebrew, by ס, (סוֹא). The same character is twice employed in the name Sheshonk, which has been written, in Greek, Σέσογχις, Σέσωγχις, and Σεσόγχωσις, &c., and in Hebrew, שִׁישַׁק. There is no doubt that this letter had a sound resembling that of s, and was its aspirated form SH. ϥ is likewise proved to have been a letter unknown to the Greek alphabet of the time of the Ptolemies and Cæsars, since its hieroglyphic form, which may be traced through the demotic and hieratic, is not employed in writing Greek proper names, nor, indeed, in Roman ones, which, it should be remembered, were spelt according to their *Greek* orthography. When, however, a name containing this letter has been transcribed in Greek characters, we find it represented by Φ, as in Νεφερχέρης, ῎Ομφις,[1] Μέμφις, for Nufr-ka-ra, Un-nufr, Men-nufr. Its sound thus nearest approached that of Φ, though it had not the sound of that letter, as is clearly shown by Φ never being represented by it. The hieroglyphic character whence it was taken seems therefore to have resembled *F* in sound, and we have already shown that it must have been pronounced like the kindred letter *V*. We retain the character *F*, however, for this sound, as it seems to have been intermediate between *F* and *V*, though more nearly resembling the latter, to prevent needless change, and particularly as the German *V* affords an instance of an inconsistent use, the very converse of this. ϫ may be clearly traced to a hieroglyphic sign which is the initial letter of the common name of Egypt, and of the adjective "black," which has the same orthography. Both words are rendered in several ways in Coptic, but their initial letter is *always* ⲕ or ϫ. Now, as the sign in question is properly used for the words above mentioned alone, it should here be rendered by ϫ in Coptic, were that letter one of the ancient alphabet. We are therefore warranted in excluding it. ϭ which very frequently interchanges with ϫ, of which it is to be regarded as simply another form, is traced to a common hieroglyphic sign used for K in very many Greek names and Latin names taken from Greek transcriptions. It sometimes stands for the Greek Γ, to which the Egyptians had, as we have seen, no equivalent. The letter ϭ cannot, therefore, be assigned to the ancient alphabet, and with it must fall its variant ϫ, which we have already rejected for another reason. It is not improbable that ⲕ, ϭ, and ϫ, represent three modes of pronouncing one letter, as in Egypt in the present day, the two letters Káf and Kkáf (the Hebrew Caph and Koph, and Greek Κάππα and Κόππα), have three pronunciations, that is, Káf is a simple K, and Kkáf a guttural K, pronounced by some as a very hard G. It is probable, from their having been so anciently distinguished among the Hebrews and Greeks, that the old Egyptians had both a simple and a guttural K, but there is no evidence to show that they represented them by different signs; and we may reasonably suppose that the Greeks, Hebrews, and Arabs, did not *originally* distinguish letters the names of which are so strikingly similar. They may have been in all three languages originally dialectal peculiarities of pronunciation not distinguished in writing. The result of the inquiry thus far may be now stated hypothetically that we may take the next step in its prosecution. In this table we have given HH and KH as the stronger form of H and aspirated form of K, adding those by which we represent them, KH and CH. We should prefer the more accurate forms, but we have retained those in use not to cause confusion.

Hieroglyphics.

Vowels.			Consonants.										
A	EE	OO	B	H	K	M	N	P	R	S	T	SH	F
Ĕ	Ē	Ō	BH	HH (*kh*)	KH (*ch*)			PH FH	L		TH		V
Ē	Ī	U			KK			F					
	Y	W											

Separate examination of Egyptian letters.

Each of these letters must now receive a separate examination in order that we may ascertain, as nearly as may be, its general sound and dialectal differences, although some part of this inquiry has been anticipated in the preceding remarks. It will be most convenient to arrange them in a philosophical order, first, the aspirates *a*, *i*, *u*, the inexpressed vowel *ĕ* and *h*; then the liquids *m*, *n*, *r*; then the sibilants *s*, *sh*; and lastly, the mutes *b*, *f*, *p*, *k*, *t*.

Vowels.

With respect to the vowels, it is important at the commencement to ascertain the place they held with respect to the consonants, when they were written always, when always omitted, and when optionally written or omitted. The vowel A is rarely omitted at the commencement of a word, and EE and OO are never so left out. The reason is probably that the latter two are frequently, when so placed, consonants, having the sound of Y and W. Incipient vowels are therefore generally written. Medial vowels are frequently omitted, as also are final vowels. These particulars regard syllables and words of which the vowel or vowels are sometimes at least expressed. There are, however, syllables and words in which vowels are never written, and these inexpressed vowels appear to be short rather than long. It should be observed that in the Coptic a medial or incipient vowel, *generally* ⲉ (*ĕ*), is frequently omitted, its omission being indicated by a line over the consonant following in Sahidic, and a grave accent in Memphitic. Those roots which usually or always drop their vowel in Coptic are often the same that always do so in the hieroglyphic writing. Hence we may conclude that the consonants were more important than the vowels, and the long vowels, as we might analogically suppose from our previous conclusion, more important than the short. This opinion is confirmed by the place of the vowels. Very generally in the most ancient inscriptions, and frequently in the later ones, the medial vowel of a syllable is written after the consonant or consonants which it preceded in sound: thus, SHUNS (khuns), was always, when fully written, written SHNSU. We may therefore infer that the vowel letters, except when they had the sound of consonants, were of secondary importance, and that the short vowels were rarely expressed. It is unnecessary to do more than advert to the striking similarity of the Egyptian language to the Semitic group in this particular, as it is too obvious to be called in question.

The vowel A had two sounds, A and E. The former sound is proved by transcriptions of Egyptian names into Greek, or of Greek and Roman names into hieroglyphics; the latter, by the circumstance that the most common form of the vowel EE is one of the usual signs for A, twice written. This first vowel appears—if we may judge from euphony, and the high probability that the short vowel usually omitted was *ĕ*—to have represented long and short A, and also sometimes long E, but most frequently the first of these three sounds. It may sometimes have approached to the sound of O or U, both short, like the Arabic vowel, Fet-hah, which has frequently that of *a* in "beggar," or the Hebrew Kametz, which has been separated into two vowels, an *a* and an *o*. It would be important could we ascertain whether this vowel, when at the commencement of a word, ever became a consonant like the others. It must be remembered that א ו י in Hebrew, and ا و ى in Arabic, are acknowledged to be sometimes consonants, and though the consonant sound of א has been lost, that of ا is preserved by the addition of the sign Hemzeh, which resembles in sound the French aspirated *h*. The "smooth breathing" of the Greeks was probably a similar catch. On these grounds it is most reasonable to suppose that if the first Egyptian vowel ever became a consonant, its sound was that of the Arabic ا, with Hemzeh, rather than that of the rough guttural ע ع of the Hebrews and Arabs. Sometimes we find two signs for the first vowel at the commencement of a word, where, if we assign to them the same sound, which the Coptic forms warrant our doing, we cannot pronounce them without slightly aspirating the first 'A-A (in French '*haa*), or reading it as an aspiration 'A ('*ha*);[1] except, indeed, we attribute to it the strong sound of ע, but this is inconsistent with the use of the two signs in question for the same Greek vowel. We have already seen, that the Egyptians were careful not to employ signs representing sounds unknown to the Greeks and Latins for Greek and Latin letters resembling them. If they did not write Sheverus, nor Filippus or Vilippus, we cannot suppose they wrote the names of Adrian (not Hadrian, for they adopted the *Greek* form) and Antoninus with an ע, as those must do who accept the theory of Dr Hincks on this subject.[2] The probability of a perfect analogy with the Semitic languages as to the vowel system, both in the sounds and the manner in which those sounds were expressed, is a very important point of evidence, though we must remember the case of the Greeks, whose Iranian language was expressed in an alphabet shown by external and internal evidence—the latter including the vowel letters—to have been in its original form derived from a Semitic source, though the latter may have been of Turanian origination. The first vowel appears, therefore, to have most probably had the sounds 'A, Ā, Ă (sometimes like Ŭ) and E. It is represented in this essay by A, to which it generally corresponded.

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[1] *Plut. de Isid. et Osir.*, cap. 42.

The second vowel presents no difficulties. It has two forms, both of which are formed by the repetition of a sign. The original of one of these, two sloping lines, seems to have been lost;[3] but that of the other, two reeds, is one of the most usual signs for the first vowel. It is therefore a double letter, having a sound of the first vowel repeated, or lengthened, which, in a medial or final position, amounts to the same thing. As an incipient letter, it was, as we shall see, a consonant. Its sound is determined by our finding it consistently rendered by the Coptic ⲓ, the Greek ι, and the Hebrew י. As a vowel, therefore, its sound was that of our EE. At the commencement of words where it is immediately followed by another vowel its sound must necessarily be that of Y, as is shown by its being then equivalent to י, as in YUM, יָם, "sea;" YUTEH יְהוּדָה, "Judah."[4] Two sounds, therefore, suffice for this letter, Y and EE.

The third vowel corresponds to every form of *o* and *u* in Coptic, but its prevailing correspondent is the diphthong ⲞⲨ, which is the same as our sound OO. It is equivalent to the Hebrew ו, as in the word YUTEH, יְהוּדָה, "Judah," quoted above, and was used for the Greek ο, ω, and ου. It can be shown sometimes to have the sound of a consonant, W, at the commencement of a word, for the same reasons which have induced us to assign the sound of Y to the second vowel when similarly placed. Our main difficulty with respect to this vowel is to decide whether or not it has ever the sound of a short O or U. The settlement of this question partly depends upon the probability that the first vowel had sometimes a sound resembling O or U, both short. The sound this letter must have had when it became a consonant, its prevailing correspondence with the Coptic diphthong ⲞⲨ, and the probability that it was analogous to the second vowel, render it most reasonable to suppose that it had, when a vowel, the sound of U or OO. We cannot, however, prove it to have been a double vowel, or constantly long; and we therefore retain for its vowel sound the letter U, which has been frequently employed for it, particularly as the constant use of OO would be cumbrous: we therefore represent it by W and U.

The sound of the fourth, or inexpressed, vowel remains to be considered. It has been noticed above that the inexpressed vowel in Coptic is generally ⲉ (*ĕ*) and that the roots which usually or always drop their vowel in Coptic are often the same as those that always do so in the hieroglyphic system. Chevalier Bunsen has justly compared this vowel with the Hebrew Sheva, and represented it by a short E. Like Sheva, which sometimes had the sound of a very short A, whence originated Hateph-Pathah, at others that of a very short E (Hateph-Segol), differing, in what we know not, from its original sound, and at others that of a very short O (Hateph-Kametz), though it generally retained its original sound, so it is not improbable that the Egyptian inexpressed vowel represented other sounds besides that of E. This, however, we may regard as its prevailing sound. It must be borne in mind that it is convenient to employ this short E wherever we do not know the vowel or vowels of a word, so that it must be regarded in such cases as in some sort as a conventional sign. In order, however, to distinguish between this letter when thus used, and when representing, either certainly or very probably, the inexpressed vowel, it is written in this essay in the former case small (*e*), and in the latter large (E). As the long E is represented, according to our theory, by the vowels A and EE, it is not necessary to distinguish this short E by a mark of short quantity. The inexpressed vowel, therefore, which was probably the only real vowel of the ancient Egyptians, had thus the sound of E short, and occasionally other sounds.

Consonants.

In considering the consonants we must first examine H. In Coptic we find three letters representing different sounds of H, namely, ϩ, ϫ, and ϧ, simple H, CH, and KH. The first of these is undoubtedly found in the hieroglyphic system; the second cannot be a variant of it, since it interchanges with SH, and since, in Manetho's Lists, K is generally rendered by its Greek equivalent χ. ϧ remains, which may be properly considered as the strongly aspirated form of ϩ. It will be shown, by arguments which the analogy of the system confirms, that there was no separate letter in the hieroglyphic system corresponding to ϧ, and those arguments indicate that the two sounds did not exist in the pronunciation of the sacred dialect. We may next pass by M and N since their sounds are established, with the remark that N was probably pronounced M, as by the Copts, when immediately followed by B, M, and P. L and R are represented by one consonant. We do not find them distinguished except in the demotic, and they are frequently confounded in Coptic. In that language, however, we trace their separation in the circumstance that in the Bashumric dialect the Memphitic and Theban ⲣ is almost always rendered by ⲗ. The greater number of words in Coptic containing the letter ⲣ than ⲗ, the general use of ⲗ for ⲣ in the worst dialect, all tend to show that the prevailing sound was ⲣ. That sound we may safely assign to the consonant in question, bearing in mind that it may sometimes resemble L, or even correspond to that letter. We do not find any traces of an aspirated R, RH.

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[1] The latter reading is the more probable, since the two signs occur in monosyllabic roots.

[2] *Trans. Roy. Ir. Acad.*, vol. xxi., pt. 2.

[3] The two sloping lines may, however, be the double of the single straight line, representing A.

The letter S presents little debatable matter, for the supposition as to its sound to be mentioned below is but conjectural. This, however, is not the case with SH, the sound of which we must endeavour to ascertain. It has been already shown that its proper sound was SH, but there are strong reasons for supposing that it was pronounced CH or KH in one dialect. Thus Herodotus calls SHUFU Χέοψ (Χέοπα); the names Xerxes and Artaxerxes are written SHSHEEURSH and ARTASHSHESHES, in which cases a sign for SH is evidently employed as CH or KH. But as the sign which in every one of these cases represents CH or KH is sometimes rendered by ϣ in Coptic, and as Herodotus can only be supposed to have given the pronunciation which he heard, while foreign names could only be rendered by the letters nearest resembling their sounds, these examples afford no convincing evidence, nor has any such been adduced. Even Chevalier Bunsen, who has separated the two sounds as distinct letters in his vocabulary, does not propose to maintain that they were originally separate, for he says that it is doubtful if at the earliest period there were any distinction between them.[1] If we suppose, as is most reasonable, that the two sounds were represented by one letter, we have still to determine whether they existed in the sacred language, or were differences of dialects. The smallness of the alphabet, and the undoubted certainty that certain other letters had more than one sound, would indeed incline one to the former view, but a consideration of the relation of the two sounds will convince him that this supposition would be at variance with the analogy of the language. SH should rather include the sound of S, which indeed it may, like the Hebrew שׁ, if the letter usually called S be a hard letter (SS) like ס. On the other hand, the interchange of SH and CH or KH is a natural occurrence, of which many instances might be produced, as in the derivation of Guadalaxara (Guadalachara) from Wádi-l-Asharah, and of Sherry from Xeres (Cheres). This peculiarity exists also in the Coptic, ϣ interchanging with ϫ, but not with ϧ, a circumstance of great importance, since the last letter is derived in its *form* from one of the hieroglyphic signs most commonly corresponding to the first and second. This circumstance shows that ϧ, which is maintained to be the representative of the ancient sound, is derived from a hieroglyphic equivalent of letters which do not interchange with it in Coptic, and thus the argument based on the form of ϧ being ancient is not valid. This evidence in showing that the SH and KH were only separate letters by reason of the dialects (the SH of the sacred dialect being rendered in the vulgar dialect, or its Memphite form, by KH),[2] forbids us to imagine them to have been ever distinguished in the hieroglyphics.

Of the mutes, B appears to have been sometimes aspirated, taking a sound resembling V, that is, BH. For this we have double evidence, since in Coptic Ⲃ interchanges with ⲟⲩ, ϥ, ⲫ, and thence even ⲡ; while in the rendering of Latin names, through Greek, its hieroglyphic correspondent is employed for *ου*. Here again we must inquire whether this is the result of the difference of dialects, or whether the two sounds existed in the sacred language represented, as probably in Hebrew, by one letter.[3] The latter seems probable, since, on the one hand, it is not reasonable to exclude B from one dialect, and on the other, because, if B were never BH, then V would have been always represented by F, which it never is, and thus Seferus would have more nearly represented Severus (Σεουηρος) than Seberus. We shall see, too, that the weight of evidence is in favour of the existence of aspirated sounds of several letters, that is, of certain letters having been sometimes aspirated in the sacred dialect. The pronunciation of the next letter F has already been determined as that of a V approaching the sound of F. The letter which we have called P is used for the Greek Π and Φ, whence we may infer that it had the true sound of the latter (being probably pronounced FH, or perhaps P'H), no less than the sound which we usually ascribe to it, PH. The one hieroglyphic letter K corresponds partly or wholly to the Coptic ⲕ, ϫ, ⲭ and ϭ, that is, to K, KH (CH), and KK, for there can be little doubt that the last two (ⲭ and ϭ) represent a harsh K (ק, ق, and *κόππα*). The first sound K is unquestionably made out, and may be considered the proper sound of the letter, and its aspirated form is shown to have been known to the sacred language by examples of Manetho's transcriptions of kings' names given in a note ([2]) below. Lastly, T appears to have also had the sound of TH, though not of D. Although the T was employed in the time of the Ptolemies and Cæsars to represent the Greek Δ as the nearest sound, the first introduction of D into the language is under the form NT, for so was the name of Darius spelt, NTEREEUSH, whence, as this was probably a simple D in both old Persian and Greek, we may infer that sound to have been unrepresented in the Egyptian alphabet. T seems, however, to have had sometimes the sound of TH in the sacred dialect, for such would have been the case by analogy, and the transcriptions of Egyptian names would lead to the same inference.—It has not been attempted in these observations to determine, in the cases in which letters appear to have had in the sacred dialect more than a single sound, when a letter took one sound or another, or, in other words, when its sound was changed by its position. Some steps may be taken towards doing this; but the carelessness of the ancients in the transcription of foreign names into Greek, and the corrupt orthography of Coptic, render the probabilities of great success very slight. Still, by the application of the inductive process, which is not sufficiently employed in inquiries of this nature, it may be possible to obtain more satisfactory results than those at which we have hitherto arrived. In the meanwhile, the following table gives a statement of the fruits of our examination of the Egyptian alphabet.

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[1] *Egypt's Place*, vol. i., pp. 490, 572.

[2] Manetho, who may be fairly concluded to have given, as nearly as he could in Greek, the pronunciation of the sacred dialect, seems generally to have rendered the SH by ς, employing the χ for κ aspirated. The examples are Σώϋφις, SHUFU; Σοῦφις, SHUFU; Σεφρὴς, SHAFRA. We find, however, Ἀχερρῆς or Χευχέρης, or Ἀκεγχήρης, for ASHENATENRA, where SH is rendered by χ or κ, and Ψιναχῆς for PEANSH. These are the instances that occur in the Dynasties. In the fragments of the history we find Σὼς for the Coptic ϣⲟⲟⲥ, ϣⲱⲥ, or ϣⲱϣ. The χ on the other hand is frequently used for the letter κ as its aspirated form: thus, Καιέχως, or Χοὸς KeKU; Χαίρης, MENKARA; Νεφερχέρης, NUFRKARA; Χενερὴς, KAËNRA; Ἄχης, 'AÄKU; Μευχέρης, MENKURA; Οὐσερχέρης, USERKEF; Νεφερχέρης, NUFRARKARA; Μευχέρης, MENKAHER; Σέσογχις, SHeSHeNK; Σεβιχὼς, SHeBeK (but SHeBeK also Σαβάκων); Ψαμμήτιχος (also Ψαμμίτιχος), PSEMETEK; Νεχαὼ, NEKU; Ἀχωρις, HAKeR;—as positively against these can be adduced nothing but Ὀσοχὼρ, the corrupt transcription of AMENSAPeHER.

Egyptian alphabet compared with Greek, Hebrew, and Coptic.

The Egyptian Alphabet.

Primitive Sound.	Derivative Sound.		Used for Greek.	Transcribed by Greek.	Used for Hebrew.	Transcribed by Hebrew.	Rendered by Coptic.
	Certain.	Probable.					
('A) A	Ē	Ŏ, Ŭ	Α[1], Ε[2], Η[3], Ο[4]	Α[28], Ι[29], Ο[30], Ω[31]	א[1], ע[2]	א[19], ע[20]	Ⲁ, Ϣ, Ⲟ, Ⲉ, Ⲓ, ⲏ
Y, EE	...	...	Ι[5], ΕΙ[6], ΑΙ[7]	Ι[32]	י[3]	...	Ⲓ, ⲁ, ⲉ
W, OO, U	O	...	Ο[8], Ω[9], Υ[10], ΟΥ[11]	Ο[33], Ω[34], ΟΥ[35]	ו[4]	ו[21]	ⲞⲨ, Ϣ, ⲞⲨϢ, ⲓ, ⲩ, ⲁ
Ĕ	...	...	Ε[12], Α[13], Ο[14]	Ε[36], Α[37], Ι[38]	...	...	
H	...	...	...	Χ[39], Α[40]	ה[5], ח[6]	...	Ϩ
M	...	...	Μ[15]	Μ[41]	מ[7]	מ[22]	Ⲙ
N	...	...	Ν[16]	Ν[42]	נ[8]	נ[23]	Ⲛ
R	...	(L ?)	Ρ[17], ῾Ρ[18], Λ[19]	Ρ[43], ῾Ρ[44], (Λ ?)[45]	ר[9], ל[10]	ר[24]	Ⲣ, Ⲗ
S	...	...	Σ[20]	Σ[46]	ש[11]	ס[25]	Ⲥ, ϣ, ϭ, ϫ
SH	...	(S ?)	...	Σ[47], Κ[48]	כ[12]	...	Ϣ, Ϩ, Ϧ, ϭ, ϫ, ⲕ, Ⲭ
B	BH	...	Β[21],	Β[49], ΟΥ[50]	ב[13]	...	Ⲃ, ϥ
F	...	...	...	Φ[51]	...	פ[26]	Ϥ, Ⲃ
P	...	...	Π[22] Φ[23]	Π[52], Φ[53]	פ[14]	פ[27]	Ⲡ, Ⲫ, ⲃ
K	KH (*ch*)	...	Κ[24], Γ[25]	Κ[54], Χ[55]	כ[15], ג[16]	כ[28] ק[29]	Ⲕ, Ϭ, Ϫ
T	TH	...	Τ[26], Δ[27]	Τ[56], Θ[57]	ת[17], ד[18]	ט,[30] ת[31]	Ⲧ, Ⲑ, ϫ, ϭ

[1] *Αρσινοη, κλεοπΑτρΑ.*
[2] *κλΕοπατρα, ουΕσπασιανος.*
[3] *αρσινοΗ, βερενικΗ.*
[4] *καισαρΟς.*
[5] *βερενΙκη, τιβερΙος.*
[6] *αντωνΕΙνος.*
[7] *πτολεμΑΙος, κΑΙσαρος.*
[8] *πτΟλεμαιος, κλεΟπατρα.*
[9] *αυτοκρατΩρ.*
[10] *αΥτοκρατωρ.*
[11] *ΟΥεσπασιανος.*
[12] *πτολΕμαιος, βΕρΕνικη.*
[13] *καισΑρος.*
[14] *πτολεμαιΟς.*
[15] *πτολεΜαιος.*
[16] *αρσιΝοη.*
[17] *αΡσινοη.*
[18] *῾Ρωμη.*
[19] *κΛεοπατρα, πτοΛεμαιος.*
[20] *πτολεμαιοΣ, ΣεβαΣτοΣ.*
[21] *Βερενικη.*
[22] *Πτολεμαιος, φιλιΠΠος.*
[23] *Φιλιππος.*
[24] *Κλεοπατρα, Καισαρος.*
[25] *Γερμανικος.*
[26] *πΤολεμαιος, κλεοπαΤρα.*
[27] *αλεξανΔρος.*
[28] *Αμμενεμης, ΑμενωΦθις.*
[29] *Ιαννας.*
[30] *οσΟρχων.*
[31] *νιτΩκρις, αχΩρις.*
[32] *μΙαμμοῦ.*
[33] *Οσορχων.*
[34] *ν χαΩ.*
[35] *σΟΥφις, ΟΥνος.*
[36] *νεφΕρχερης, μΕνχερης.*
[37] *ψΑμμητιχος.*
[38] *ψαμμητΙχος.*
[39] *οσοΧορ.*
[40] *Αχωρις.*
[41] *Μενχερης.*
[42] *Νεχαω.*
[43] *σεφΡης, ταΡκος.*
[44] *῾Ραμεσσης* (initial Ρ always receives rough breathing in Gr.)
[45] *τακεΛΛωθις* (foreign name).
[46] *αΣΣις.*
[47] *Σουφις, Σεφρης, ΣεΣογχις, Σαβακων.*
[48] *ν Κτανεβης.*
[49] *νεκτανεΒης.*
[50] *ΟΥεστεβκατι.*
[51] *σουΦις, σεΦρης, νεΦερχερης, νεΦεριτης.*
[52] *ἁρΠοκρατης.*
[53] *Φιοψ.*
[54] *νιτωΚρις, ταρΚος.*
[55] *νεφερΧερης, Χενερης, μενΧερης, νεΧαω.*
[56] *ψαμμηΤιχος, Ταρκος.*
[57] *οΘοης, τακελλωΘις.*

[1] אמרים
[2] בעל כנען עשתרת
[3] יהודה
[4] מגדון ביתחרון
[5] נהרים יהודה
[6] מחנים
[7] מגדו
[8] נהרים כנען
[9] ביתחרון כרתים עשתרת
[10] פלשתים בעל
[11] עשתית
[12] כרתים
[13] בעל ביתחרון
[14] פלשתים
[15] כנען
[16] מגדו
[17] ביתחרון עשתרת
[18] מגדו
[19] אמון
[20] פרעה רעמסס
[21] נכו
[22] רעמסס
[23] נכו
[24] פרעה רעמסס
[25] סונה רעמסס
[26] נף מף
[27] פוטיפרע
[28] נכו
[29] תרהקה
[30] פוטיפרע
[31] תרהקה

The number of examples from which selection has been made has been in most cases very limited, since many words have been excluded for various reasons. In the case of the use of hieroglyphic letters for Greek names, or Latin names written in Greek, it has seemed desirable to choose examples as far as possible of the earliest times at which this transcription was usual. In like manner, the examples of the transcription of hieroglyphic words into Greek characters have been chosen from those writers alone who understood the hieroglyphic writing, or from those who drew their information from such writers. To have referred to others who merely give the pronunciation of the common people would have involved the inquiry in confusion and error. With respect to the instances of Hebrew words rendered by hieroglyphics, it has been necessary to exclude such as appear to have been adopted into the ancient Egyptian language, whether proper names or not, and to reject such parts of words as seem to be only Egyptian forms, not literal transcriptions. As to these and the Egyptian words written in Hebrew, it has been necessary to except such as appear to be of common origin rather than borrowed, such as Caphthor, Caphthorim. The Coptic corresponding letters are the result of an examination of Bunsen's vocabulary, and are placed as far as possible according to the frequency of their occurrence. Common correspondents are written in capitals.

A comparison of the table with what has been previously said respecting the alphabet, will tend to show the general accuracy of those antecedent views; while a careful inspection of it affords indications that there are materials for a more accurate definition of the sound of each letter than we have ventured to give. It should be here remarked that one character is used for the Hebrew ע, and transcribed by that letter, showing that the A had sometimes something of a guttural sound. The use of this very character for the Greek A forbids us, however, to suppose that its sound was more than a slightly guttural A.

Writing.

§ 2. WRITING, OR REPRESENTATION OF SOUNDS BY WRITTEN CHARACTERS.

Various kinds of hieroglyphics.

According to the definition previously given of the hieroglyphics, these characters were delineations of material objects employed to denote real things by figures, ideal things by symbols, or to represent sounds by characters either syllabic or alphabetic. We may divide these signs therefore, into two classes, each subdivided into two kinds.

1.—*Ideographic Signs.*

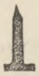


Fig. 1.

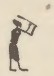


Fig. 2.

1. Iconographic, as (fig. 1), "an obelisk."
2. Symbolic, as (fig. 2), "to strike."

2.—*Phonetic Signs.*

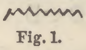


Fig. 1.

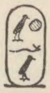


Fig. 2.

1. Syllabic, as (fig. 1), "stable, firm," where the first sign may be put for the whole word.
2. Alphabetic, as (fig. 2), Shufu, Sûphis (I.), the name of the second king of the Fourth Dynasty.

It must be observed that the ideographic signs are, though indirectly, no less representations of sounds than the phonetic; also that few signs were used in both classes, or in both kinds of the former class; and that both kinds of the latter class are connected by the syllabic signs being frequently used alphabetically with their proper complement.

Let us examine each of the kinds of hieroglyphics somewhat more minutely. We shall best understand their nature and use by ascertaining for what classes of words they were chiefly employed.

Ideographic signs.

Since everything of which we think may be referred to some one of the categories, and since the ideographic hieroglyphics represent ideas of every kind, they may be conveniently referred to the categories. The ten categories of Aristotle have been separated into two heads, substance and attribute, or accident, the former comprehending the first of these categories, and the latter the remaining nine. It will be seen at once that all the iconographic hieroglyphics stand for real things referrible to the category of substance; and that all the symbolic hieroglyphics, excepting those very few which stand for beings or things which, as ideal, could not be represented but by symbols, are referrible to the categories comprehended under the head of attribute.

Iconographic signs represent, therefore, real things alone, or, grammatically, all substantives which are names of real things, as man, dog, house, country, and the like. There are probably no other substantives in the Egyptian language excepting names of such ideal things as are referrible to the category of substance.

Symbolical signs may be classed in the following manner, the categories being arranged in a grammatical order:—

I. Substance.—Substantives which are names of ideal things referrible to this category; as, "Hades." Personal pronouns; as, "I," "thou."

II. Attribute.
  1. *Quantity.*—Adjectives of number; as, "first."
  2. *Quality.*—Adjectives of quality; as, "good."
  3. *Relation.*—Adjectives of relation; as, "great."

  And verbs and adverbs derived from them.

  4. *Action.*—Adjective verbs (derived).
  5. *Suffering.*—Adjective verbs (derived).
  6. *Collocation.*—Participles of adjective verbs relating to position.
  7. *Place.*—Prepositions and adverbs of place; as, "in," "to," "on high."
  8. *Time.*—Adverbs of time; as, "ever." Prepositions of time; as, "after."
  9. *Possession.*—Possessive pronouns; as, "thy."

Hence it is evident why so few signs are used both in an iconographic and a symbolic sense. It should be observed that particles of place, time, and situation are rarely expressed by symbolical characters, and that when such characters are employed they are symbolico-phonetic.

Phonetic signs.

In the oldest form of the Egyptian language we find very few characters which have an indiscriminate alphabetic use, the greater number of the phonetic signs being only used with a particular alphabetic sign or signs by way of complement to express a syllable. This complement being frequently omitted, the initial sign acquires a syllabic value, standing for a syllable. The two kinds of phonetic characters have therefore no distinction as to signification. They are employed to represent the sounds of the names of things represented by figures and symbols in the other class, as well as some ideas excluded by their nature from that class, like the substantive verb "to be," and almost all particles of place, time, and situation. This phonetic class should be therefore the more comprehensive, since it should contain the sounds of the whole of the signs of the other class with those of words not contained in that class. Of the form of the syllables we shall have to speak more fully hereafter in treating of the roots; but it is here needful to notice an important peculiarity in the mode of writing them, already mentioned.

Place of vowel.

In the case of syllables commencing and ending with a consonant the medial vowel was usually written after the final consonant. Professor Lepsius was the first to suggest that this might be the case in syllables apparently terminating in U in the written characters. Thus the name of the god Chons was written Shnsu (Khnsu), where the position of the vowel is proved by the Greek orthography and that of the Copts in the name of the month Παχων, ⲡⲁⲭⲱⲛⲥ, ⲡⲁϣⲱⲛⲥ. But this principle, which has been recognised as correct with respect to the U vowel, has never been carried out with reference to the others. Notwithstanding, there is abundant evidence to show its wider application. The word for horse is, for example, written HTRA, corresponding to the Coptic ϩⲧⲟ, pl. ϩⲧⲱⲣ, and since it is a root, and therefore monosyllabic, can only be read HTAR or HATR, the former of which forms appears from the Coptic to be the correct one.—As the principle under consideration may be considered to be directly or indirectly admitted with respect to the U vowel in consequence of such instances as that of the name of the god Chons, written SHNSU, but pronounced SHUNS; that of the god Munt, written MNTU; and many others,—it becomes necessary to consider only the A and I vowels. It should be remembered that the admission of a principle of this kind as to one vowel, makes its application, to say the least, highly probable to the other two, the short or inexpressed vowel being necessarily excluded. In order to test the applicability of the principle, several apparently monosyllabic words, mostly roots, were chosen at random from Champollion's *Dictionnaire Egyptien*, and compared with their Coptic equivalents, and the following was the result:—

A.—HNA, "with." Copt. ϧⲉⲛ; *s.* ϩⲛ̄.
MNA, "to come to port, disembark." Copt. ⲙⲟⲛ; *s.* ⲙⲁⲛ. "A port," ⲙⲟⲛⲏ.
MSHA, "to fight, a warrior." Copt. "a fight," ⲙⲓϣⲓ; *s.* ⲙⲓϣⲉ.
SBA, "a flute." Copt. ⲥⲏϥⲓ; *s.* ⲥⲏϥⲉ. "A reed," ⲥⲉⲃⲓ; *s.* ⲥⲏⲃⲉ.
SHRAU, "a son." Copt. ϣⲏⲣⲓ; *s.* ϣⲏⲣⲉ.
SKA, "to labour, to plough." Copt. "to plough," ⲥϫⲓ; *s.* ⲥⲕⲁⲓ.
TSHA, "a stronghold." Copt. *s.* ⲧⲟϣ.
TSHA, "a boundary, frontier." Copt. ⲑⲱϣ; *s.* ⲧⲟϣ.

O these examples seven are in accordance with the supposed principle, and but one (SKA), which may possibly be a derivative form (S-KA), against it. That respecting which some doubt might be entertained, on account of its Coptic correspondents, MNA, may be fairly supposed to have had a medial vowel.

I.—FNTEE, "a worm." Copt. ϥⲉⲛⲧ; *s.* ϥⲛ̄ⲧ, ⲃⲛ̄ⲧ.
HFEE, "a serpent." Copt. ϩⲟϥ, ϩϥⲱ; *s.* ϩⲟⲃ.
HREE, "to terrify, to fear." Copt. ϩⲟⲩⲣ. "Terror," ϩⲉⲗⲓ; *s.* ϩⲏⲗⲏ.
HNBEE, "a fountain." Copt. *s.* ϩⲟⲛⲃⲉ.
HTEE, "a heart." Copt. ϩⲏⲧ, ϩⲑⲏ; *s.* ϩⲧⲏ.
KBEE, "a honeycomb." Copt. ⲕⲉⲃⲓ.
KRMEE, "Carthamus." Copt. ⲕⲣⲁⲙ. "Carthamus silvestris."
NBEE, "to swim." Copt. *s.* ⲛⲉⲉⲃⲉ, ⲛⲏⲏⲃⲉ. "Swimming" (act of), *M.* ⲛⲉⲃⲓ.
NHEE, "a sycamore." Copt. ⲛⲟⲩϩⲓ.
SBTEE, "a wall." Copt. ⲥⲟⲃⲧ.
SHREE, "to, towards." Copt. *s.* ϩⲁⲣⲟ, ϩⲣⲁⲓ; *B.* ϣⲁⲗⲁ, ϣⲁⲣⲁ.
SNTEE, "to found." Copt. "Foundations," ⲥⲉⲛϯ; *s.* ⲥⲉⲛⲧⲉ, ⲥⲩⲛⲧⲉ; *B.* ⲥⲏⲛϯ.
S-SHEE, "writing, to write." Copt. ⲥⲁϧ, ⲥϧⲁⲓ, ⲥϧⲉ, ⲥϧⲏ; *s.* ⲥⲁϩ, ⲥϩⲁⲓ, &c.
STEE, "an arrow." Copt. ⲥⲁϯ; *s.* ⲥⲟⲧⲉ, ⲥⲟⲟⲧⲉ.
T-HAU, "To be intoxicated." Copt. ⲑⲁϧⲓ, ⲑⲓϧⲓ; *s.* ⲧⲁϩⲉ, ϯϩⲉ.
T-HNEE, "the forehead." Copt. *s.* ⲧⲉϩⲛⲉ.
T-HTEE, "lead." Copt. ⲧⲁϩⲧ, ⲧⲁⲧϩ.

Of these instances, eight are in accordance with the proposed principle, and an equal number neither for nor against it, and but one (KBEE) altogether against it.

If we take into consideration the remarkable irregularity of Coptic with respect to the vowels, the circumstance that some monosyllabic roots may have commenced with two consonants and terminated with a vowel, and that among the words given above as monosyllables, some are perhaps dissyllables, we must admit that the medial vowel in hieroglyphic and hieratic writing usually followed the consonant or consonants which it preceded in pronunciation. It would obviously be wrong always to write the vowel which follows the consonants of a monosyllable before one or more of those consonants; and our safest plan, excepting where the sound renders a medial vowel absolutely necessary, will be to endeavour to ascertain from the Coptic whether the vowel in question was final or not, and we shall thus be enabled ultimately to establish something like a general rule as to the position of the vowels. We should remember, however, that the system of writing a language is always more or less irregular with respect to its pronunciation, and that the Egyptians did not endeavour to write their language in such a manner as to facilitate the labours of future discoverers.

Determinatives.

Every word in the Egyptian language doubtless could be written phonetically, and nearly every one could also be represented by a figure or symbol, that is, ideographically. These two systems were combined either accidentally, by the mixture of phonetic and ideographic signs in an inscription or writing, some words being represented in the former manner, others in the latter, or, essentially, by a single word being written in both ways. The former of these modes of combination requires no further explanation, but the latter must be examined in some detail, from its being characteristic of the system, and on account of its value, to which we have already adverted, in facilitating and verifying interpretation.

When a single word was represented both phonetically and ideographically, the ideographic sign was employed as a determinative to determine the sense of the word to which it was attached, whereof in some instances it also represented part of the sound for the whole of which it stood when employed alone.

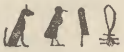
Determinatives are either initial, medial, or final; either generic or specific; either simply ideographic or both ideographic and phonetic at the same time. The final or affixed determinatives must be first considered, then the initial, and lastly the medial, as this is the order of their importance.

1. *Final Determinatives.*

Final determinatives.

1. Generic determinatives restrict the word which they follow to a generic signification. Thus the representation of the sun restricts the words which it follows to the signification of light, or time, and the representation of a fish restricts the words which it follows to the sense of fish, *i.e.*, some kind of fish, or something abominable. These adjuncts have generally both a primary generic meaning and a secondary; the primary meaning being either literal, as in the latter example, or of a simple tropical character, as in the former, and the secondary meaning being tropical in a

greater or less degree. These signs are also used as specific determinatives, as when the representation of the sun follows its name; and this is doubtless the primitive meaning of every generic determinative, although it cannot always be traced. The generic final determinatives are not numerous.



2. Specific determinatives restrict the word to which they are applied to the signification of a species; thus, the representation of a cat follows the word "male cat," SHAU; that of a particular kind of boat, the name of that boat; and sometimes they serve to distinguish different uses of the same word, as when the word "wa," a boat, is shown to mean a "boat" simply, or a "barge." This is a very numerous division of determinatives.

Final determinatives appear scarcely ever to have any phonetic value when used as such,[1] and they are very rarely so placed as to become initial, and never, as far as is known, medial.

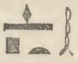
2. *Initial Determinatives.*

Initial determinatives.

These determinatives are distinguished by having a phonetic value and standing for the first letter of the word which they restrict. They are generally limited to a specific signification, since no one of them can be applied to more than a single root. Thus the so-called *crux ansata*, the emblem of life, is the initial letter of the word ANSH (ankh) "living." These determinatives are very rarely employed as final ones, and rarely as medial, and they are not a large class.

3. *Medial Determinatives.*

Medial determinatives.



These determinatives always immediately follow the first letter of a root, and are almost always initial determinatives deprived of their phonetic value, but otherwise they are final determinatives transposed. This class is very limited. Of the former kind we may instance, HEPT (commonly written hotp or hotep), signifying "devoted" or the like.

There are some determinatives which cannot be included in any of these classes. Of these one of the most common is the ring in which royal names are inclosed. It is also found as the final determinative of the word REN, a "name;" and in one of the earliest inscriptions we find its primitive form, that of a signet-ring (which appears to have been elongated in order to comprehend in it the characters composing royal names), as the determinative of a king's name.[2]

Determinatives, being properly ideographic signs, are either iconographic or symbolic, or both, as may be seen by the examples mentioned above. It will not be necessary to speak of these signs more in detail, since they must be again noticed when we come to consider the different parts of speech.

Words.

§ 3.—WORDS.

Roots.

In a language of so primitive a character as the Egyptian, it is especially needful to endeavour to ascertain the characteristics of the roots. One thing is certain respecting them, that they are always monosyllabic, except perhaps in some names imitative of sound; and this is an essential peculiarity of the language which is of the highest importance. They are either uniliteral, biliteral, triliteral, or quadriliteral, and each class has several forms, as may be seen by the following examples; unusual forms being denoted by an asterisk (*).

I. *Uniliteral*—
  * Vowel A (Affixed pronoun), "Me," &c.

II. *Biliteral*—
  1. Consonant and vowel. BA, "a goat."
  2. Vowel and consonant. AW "to be;" UN, id.

III. *Triliteral*—
  1. Consonant, vowel, and consonant. MEN (inexpr. vowel), "to establish."
  *2. Consonant, consonant, and vowel. SNA, "to bend."
  3. Vowel, consonant, and consonant. ART, "milk."

IV. *Quadriliteral*—
  * 1. Consonant, cons., vow., and cons. PTEH, "Ptah," Vulcan.
  2. Consonant, vow., cons., and cons. SHUNS, Chons.

It is not probable that there are any quinquiliteral roots. Of the preceding forms the most common, and those from which most derivatives are taken, are the biliteral and the triliteral having a medial vowel. The vowel of the former is generally long when the consonant precedes and short when it follows, and that of the latter is generally short, if we may judge from Coptic and analogically. The following may be given as the order of the forms according to the number of words belonging to each, the consonant being denoted by "C," and the vowel by "V."

1. CV.	2. CVC.	3. VC.	4. VCC.
5. CVCC.	6. CCVC.	7. CCV.	8. V.

It would lead us beyond the province of the present article were we to endeavour to ascertain the meanings of the various forms, or whether they had originally peculiar meanings, but it should be remarked that certain roots are imitative, representing things by their sounds. Thus the names of animals are taken in many instances from their cries, and the like is the case with some words descriptive of noises. This is the hieroglyphic method brought before the mind through the ear instead of the eye.

Derivatives.

Derivatives are formed in five ways, by changing the vowel, by increasing the word at its commencement, by increasing the word at its end, by reduplication, and by agglutination.

I. *Change of vowel.*—MAN, "to come to port," from MEN, "to establish."

II. *Increase at commencement*—
  1. MA, place. MA-ANSHU, "the abode of the living" (pl.)
  2. S, Causation. S-ANSH, "to cause to live" (and other verbal forms to be noticed subsequently).

III. *Increase at end*—
  1. EE;—*a.* Belonging to. AMENEE, Ἀμμώνιος, pr. n.
    b. Verbal form, usually participial. MEREE, "beloved," from MER, "to love."
    c. Substantive result of action of verb. S-SHEE, "a writing, the writing" (*i.e.*, a a thing written), from S-SHAU, "to write." HAY, "a stela" (*i.e.*, a thing set up), from HA, "to set up."
  2. U, abstract noun from verb. HAU, "duration," from HA, "to set up," "establish."
  3. NU, added to some words ending in N for the sake of euphony, as BEN-NU, "the Phœnix."

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[1] There are possible exceptions to this rule, as perhaps the word AB "to be thirsty, thirst," which would seem to have been pronounced AB-NUN, for it is rendered as the name of a Shepherd-king, the third sovereign of the Fifteenth Dynasty, Ἀπαχνὰς (Man. Jos.) Παχνὰν (Man. Afr.); but the Coptic equivalent is ⲓⲃⲓ, &c. There are also determinatives of sound, not of sense.

[2] *Modern Egypt and Thebes*, vol. i., p. 368.

4. SU, added to some words ending in S for the sake of euphony, as MES-SU, "born."

Besides these there are the inflectional terminations, which must be noticed in another place.

IV. *Reduplication*—

- *a.* Augmentative, as TEN-TEN, "to revolt," from TEN, "to raise one's self."
- *b.* Frequentative, as TEF-TEF, "to drip."
- *c.* Imitative of the cries of animals, &c., as KA-KA, "to cackle;" SEN-SEN, a kind of heron.

V. *Agglutination*—

1. Two substantives. SUTEN-SA (king's son), "prince."
2. Substantive and epithet. MEN-NUFR (good abode), "Memphis."
3. Verb and substantive. HAS-SBA, "a flute-player," from HAS, "to play," and SBA, "a flute."
4. Preposition and substantive. EM-HA, "in front."
5. Preposition and adverb. ER-TET (?), "for ever."

hanges in ronunciation.

The changes in pronunciation must here be noticed, and, first, the contractions.

The euphonic terminations NU and SU were frequently omitted, as we may conclude from their being often left out in the inscriptions, and from the correspondence of the words to which they were applied to their Coptic forms.

The letter R or L was frequently dropped at the end of a monosyllable. The cause of this elision was the weak sound which this letter had with the Egyptians, as is alone evident from its representing both R and L. The words HER, KER, HUR, and MER were not only written HA, KA, HU, and MA, but so pronounced, as is proved by each of them being written in both manners in Coptic as well as in hieroglyphics. The English and German pronunciation of the final R is an exactly parallel case. It does not seem possible, however, to determine by any rules what was the practice of the ancient Egyptians, nor do the inscriptions afford us a safe guide, since we cannot prove that the abbreviated form indicates in all cases an abbreviated pronunciation. Euphony, combined with ancient transcriptions, will be our safest guide. Thus we find MEREE-AMEN or MER-AMEN transcribed Μιαμμοῦ (Μιαμμουν?), and euphony points out MEE-AMEN as the ancient pronunciation. So, too, with MEE-RA, Μοῖρις. By this discovery we have been enabled to settle more than one difficulty. The word, for example, usually written with a beetle and mouth, was known to signify "transmigration" or "transformation," as constantly in the Ritual (Lepsius, *Todtenbuch*, ch. lxxvi., and *passim*), and its sound was generally held, and for good reasons, to be TAR or TER. For this no equivalent had been discovered in the Coptic. But if we admit the rule given above, we find the corresponding word in ⲦⲞⲨ, *transmutare*.

With respect to transpositions, it is very difficult to judge, since the letters of a word were generally written in the same order, whether that were the order of pronunciation or not. There is, however, some evidence to show that both consonants and vowels were transposed. For example, the name of the crocodile is written MSHU, MSUH, and HMSU, and in Coptic ⲙ̀ⲥⲁϩ, *s.* ⲉⲙⲥⲁϩ, and by Herodotus *χάμψαι* is given as the Egyptian name for crocodiles. Hence it seems that transpositions in writing indicate differences of pronunciation no less than does the omission of the final R, in many instances at least. It is evident that in the most ancient mode of writing transpositions were more numerous than afterwards, as we may see by comparing the inscriptions in the tombs of the time of the Fourth Dynasty near the Great Pyramid, with those of monuments of the Eighteenth Dynasty. The names of the gods, which we find to have continued unchanged until the latest period at which hieroglyphics were used, and which therefore we may conclude to have been preserved from the beginning of hieroglyphic writing, are most remarkable for the transposed mode in which their characters are arranged. That of Osiris, for example, is usually written AR-HES, though pronounced HES-AR; and that of Nephthys, either NEBT-EE or EE-NEBT. Religious reasons, perhaps, had somewhat to do with these transpositions, as with the adjectives "divine" and "royal," which preceded in writing the names to which they were applied, contrary to the use of the language, to which the exceptions are very rare. The word "Ra," "the sun," again, in royal names always occupies the first place, whether pronounced at the beginning of the name or not, thus Shaf-ra is written RA-SHAF; and Men-kura, RA-MEN-KU.

Doubled letters.

It is important to notice that doubled letters were expressed, though they seem to have been almost confined to foreign words, except when the addition of the terminations NU and SU rendered the final letters N and S double. Of foreign names we may instance that of an African nation or country, TEKRERR;[1] and that of the Ionians, HAUNENN or HAUNNEN, also written HAUNEN and thus showing that the reduplication was not always expressed.

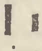
Expletive sign.

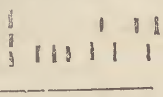
Certain signs have been concluded to be expletives used merely to fill up a gap in a group of characters, whether in the middle or at the end of a word. Champollion enumerated several of these, but some of them are determinatives, and but one certainly an expletive. This is the papyrus-roll, which follows substantives, adjectives, verbs, and prepositions; and some of these, such as NA, "great," MEH, "to fill, full," almost always; it cannot, therefore, be anything but a mere expletive, as Champollion concluded it to be. Bunsen has indeed assigned to it two uses, for he calls it a "period at end of sentences," and "the hieroglyphical *stop* or end of a group," making it thus a simple division and a stop. Its constant employment after particular words, in the midst of some words, and where no stop is admissible, affords a positive disproof of these definitions, which seem, though somewhat obscure, to contradict one another.

Parts of speech.

The section of grammar relating to the parts of speech has next to be considered, and this may be conveniently divided into what relates to inflected and what to non-inflected words. It must not be supposed, however, that any words were in themselves capable of inflexion, for the language was not in that sense susceptible of inflexion, but the ideas of number, gender, and person were added to a word by prefixes or suffixes, and the reception or non-reception of these signs of inflexion is what constitutes the great divisions into which we may separate the etymology of the Egyptian language. The most convenient order, with reference to inflected words, will be to examine the article first, then the pronoun, then the noun in its two kinds of substantive and adjective, and, lastly, the verb.

Signs of gender and number.

Before speaking of the article, it is necessary to mention the signs of the singular, masculine and feminine, and of the plural, more especially as one of these has been confounded with the article. The sign of the masculine singular is a single vertical line  which is properly the sign of the singular only. The singular feminine is distinguished by the character . Both appear to have been used as determinatives, though they sometimes represented sounds, the former the sound *a* and the latter *t*. We find the latter retained in many Coptic words at the commencement or the end, though in others it is omitted, while for the former there is no certain equivalent. The plural is denoted by three vertical lines variously disposed, and sometimes with the fem. sign prefixed. All these signs are therefore to



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[1] The modern name Tekroor, pl. Takarneh.

be regarded as determinatives, and that of the feminine as sometimes indicating a feminine form either commencing or terminating with *t*. It is important to observe that there is evidence to show that this feminine form existed in both varieties in the ancient language no less than in the Coptic. As, however, it is almost always suffixed in the hieroglyphic writing, we cannot determine its position, and must be content to place it after the word, as it seems to have been most generally pronounced as well as placed.

Article. The article PA, PEE, "the," was thus declined:—

Sing. Masc. PA, PEE; *F.* TA; *Plur. Com.* NA, "The."

It was prefixed to nouns, as TA-MEN.T, "the swallow" (in which group we find the termination T as well as the article, proving that the two were distinct, and that both cannot be articles); NA-NEBU, "the lords."

Pronouns. The pronouns we must now consider. In the tables, as in those of the verbs, the method of arrangement usually adopted in grammars of Semitic languages has been here followed, as in these parts of grammar the Egyptian most resembles the languages of that class.

Personal.

ISOLATED PERSONAL PRONOUNS.

Singular.		Plural.	
3. *M.* ENTUF,	He.	3. *C.* ENTESEN, SEN	They.
F. ENTUS,	She.		
2. *M.* ENTEK,	Thou (*m.*)	2. *C.* ENTUTEN, EMTUTEN	You.
F. ENTA,	Thou (*f.*)		
1. *C.* ANEK, NAK	I.	1. *C.* (?)	We.

AFFIXED PERSONAL PRONOUNS.

Singular.		Plural.	
3. *M.*—EF,—U	Him.	3. *C.* —SEN	Them.
F.—ES	Her.		
2. *M.*—EK	Thee (*m.*)	2. *C.* —TEN	Ye.
F.—ET	Thee (*f.*)		
1. *C.*—A	Me	1. *C.* —EN	Us.

It is to be observed that when the ideographic signs for the affixed pronouns of the first person singular are employed that person becomes necessarily masculine or feminine. As, however, it has but one sound, the person remains common though bearing this indication of a distinction of gender. The same must be remarked of the pronominal affixes of verbs for this person. These pronouns are likewise used as possessive pronouns without agreeing with the gender and number of the thing possessed, and to indicate the persons of verbs.

Possessive.

POSSESSIVE PRONOUNS.

Third Person. Object masc., person spoken of masc.	*Sing.*	PAEEF, PUEEF, PEEF, PAF	His (*m.*)	ὁ αὐτοῦ
Object fem., person spoken of masc.	*Sing.*	TAEEF, TUEEF, TEEF, TAF	His (*f.*)	ἡ αὐτοῦ
Object masc., person spoken of fem.	*Sing.*	PAEES, PUEES, PEES, PAS	Her (*m.*)	ὁ αὐτῆς
Object fem., person spoken of fem.	*Sing.*	TAEES, TUEES, TEES, TAS	Her (*f.*)	ἡ αὐτῆς
Object masc., persons spoken of com.	*Plur.*	PAEESEN, PEESEN, PASEN, PAYU	Their (*m.*)	ὁ αὐτῶν
Object fem., persons spoken of com.	*Plur.*	TAEESEN, TUEESEN, TEESEN, TASEN	Their (*f.*)	ἡ αὐτῶν
Objects com., person spoken of masc.	*Plur.*	NAEEF, NAF	His (*pl. c.*)	οἱ ϗ αἱ αὐτοῦ
Objects com., person spoken of fem.	*Plur.*	NAEES, NEES, NAS	Her (*pl. c.*)	οἱ ϗ αἱ αὐτῆς
Objects com., persons spoken of com.	*Plur.*	NAEESEN, NEESEN, NASEN	Their (*pl. c.*)	οἱ ϗ αἱ αὐτῶν
Second Person. Object masc., person spoken to masc.	*Sing.*	PAEEK, PUEEK, PEEK, PAK	Thy (*m.*)	ὁ σοῦ (*m.*)
Object fem., person spoken to masc.	*Sing.*	TAEEK, TEEK, TAK	Thy (*f.*)	ἡ σοῦ (*m.*)
Object masc., person spoken to fem.	*Sing.*	PAEET, PUEET, PEET, PAT	Thy (*m.*)	ὁ σοῦ (*f.*)
Object fem., person spoken to fem.	*Sing.*	TAEET, TUEET, TEET, TAT	Thy (*f.*)	ἡ σοῦ (*f.*)
Object masc., persons spoken to com.	*Plur.*	PEETEN, PATEN	Your (*m.*)	ὁ ὑμῶν
Object fem., persons spoken to com.	*Plur.*	TAEETEN, TEETEN, TATEN	Your (*f.*)	ἡ ὑμῶν
Objects com., person spoken to masc.	*Plur.*	NAEEK, NEEK, NAK	Thy	οἱ ϗ αἱ σοῦ
Objects com., person spoken to fem.	*Plur.*	NAEET, NEET, NAT	Thy	οἱ ϗ αἱ σοῦ (*m.*)
Objects com., persons spoken to com.	*Plur.*	NAEETEN, NATEN	Your	οἱ ϗ αἱ ὑμῶν (*f.*)
First Person. Object masc., person speaking com.	*Sing.*	PAYA, PUYA, PEEA, PAÄ	My (*m.*)	ὁ μοῦ
Object fem., person speaking com.	*Sing.*	TAYA, TUYA, TEEA, TAÄ	My (*f.*)	ἡ μοῦ
Object masc., persons speaking com.	*Plur.*	PEEEN, PAEN	Our (*m.*)	ὁ ἡμῶν
Object fem., persons speaking com.	*Plur.*	TAYEN, TEEËN, TAEN	Our (*f.*)	ἡ ἡμῶν
Objects com., person speaking com.	*Plur.*	NAYA, NAÄ	My	οἱ ϗ αἱ μοῦ
Objects com., persons speaking com.	*Plur.*	NAYEN	Our	οἱ ϗ αἱ ἡμῶν

Demonstrative.

DEMONSTRATIVE PRONOUNS.

Prefixed.

Singular.		Plural.	
M. PAY, PEE	This (*m.*)	*C.* NAY	These.
F. TAY	This (*f.*)		

Suffixed.

Singular.	Plural.
M. PEN.	*C.* APEN, APU.
F. TEN.	

Relative.

RELATIVE PRONOUNS.

1. *Simple Relative Pronouns.*

Singular.		Plural.	
M. PUY, PEFEE	He who.	*C.*	?
F. TUY	She who.		

2. *Determinate Relative Pronoun.*

Indefinite.

ENTEE, ENT (of both numbers and genders) He who; she who.

Definite.

Singular.	Plural.
M. PUYENT, PAËNTEE, PENTEE, PENT, He who.	*C.* NAËNTEE, NENTEE, Those who.
F. TUYENT, TAËNTEE, TENT, She who.	

Indefinite.

INDEFINITE PRONOUNS.

KEE, KE	Another, others.
SA	A certain one, each one.
SA-NEBT	Each one, whoever.
ASHET, SHET	Another, others.
SHET-NEB	All others, everything else.
UN-NEB, UN-NEBU	Each being, each one, each thing.

Nouns. We now come to the consideration of nouns, whether substantives or adjectives.

Substantives.

The greater number of pure substantives, as before suggested, in Egyptian seem to have been names of real things, the names of ideal things being in that language essentially adjectives or verbs, which classes of words were nearly allied; at least this seems the most probable opinion. Such words as "cat," "horse," "tree," and proper names, which are logically of the same class, are undoubted substantives; while, on the other hand, "life," "goodness," or "good," and the like, are almost certainly, in a rude language like the Egyptian, primarily adjectives; for "life" is "the state of living," spoken of a person; "goodness," "the state of being good," except among those who can comprehend the abstract notion of "life" and "goodness."

The determinatives of substantives are necessarily very numerous. Some specimens are given below, arranged under their different classes and kinds.

Generic determinatives.

I. Generic Determinatives.

FINAL.

Fig. 1.

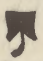


Fig. 2.

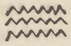


Fig. 3.

Fig. 1. (Representation of the sun.) 1. Light, as UBEN, "light, to shine." 2. Time, as HARU, "day;" KURH, "night;" HEEB, "a panegyry," periodical celebration.

Fig. 2. (Repr. of skin of some animal.) 1. Quadrupeds (including quadrumana), as SHAU, "a male cat;" HTAR, "a horse," and proper name of a man, in which latter case it is followed by a second determinative, the ordinary one of proper names of men. 2. Things made of leather, as TEB, "a sandal;" SHENR, "a helmet."

Fig. 3. (Repr. of water.) 1. Sea, river, lake, and the like, as YUMA, "the sea;" ARU, "a river." 2. Proper names of the same, as . . . URT-MU, "the Mediterranean;" Hapee-mu, "the Nile." 3. Fluids, besides water, as SNEF, "blood." 4. Actions and feelings connected with water and other fluids, as AB, "thirst, to be thirsty."

Specific determinatives.

II. Specific Determinatives.

1. FINAL.

A. *Generic, in their Primary use, as Specific.*

Fig. 1. (Representation of the sun.) Ra, "the sun."

Fig. 2. (Repr. of skin of some animal.) Bes, a "hide" or "skin."

B. *Specific.*

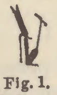


Fig. 1.

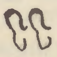
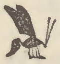


Fig. 2.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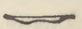
Fig. 4.

Fig. 1. (Figure of Amen.) Amen, "Jupiter-Ammon," the god of Thebes.

Fig. 2. (Repr. of ears.) Mester, "the ears."

Fig. 3. (Repr. of bee.) Sheb, "a bee."

Fig. 4. (Repr. of bow.) Peet, 1. "a bow." 2. Followed by numerals for 9, the "Nine Bows," a nomadic people, bordering on the Egyptians.

2. INITIAL.

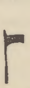
Fig. 5.

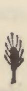
Fig. 6.

Fig. 5. (Repr. of a hatchet.) Neter, a god.

Fig. 6. (Repr. of an ear of corn.) Betee, corn.

From these examples, compared with what has been before said on the subject of determinatives generally, it will not be difficult to comprehend the use of these signs as applied to substantives. The examples, it should be added, have been chosen with a view to illustrating the use of determinatives, for instance, by showing, that all those which are generic had in many instances, and probably originally in all, a primary specific use.

Number and gender.

In Egyptian, as in Coptic, there are but two numbers, the singular and the plural, for the dual was not known to that language. Bunsen, indeed, has assigned to it a dual, contrary to the opinion of Champollion, but his view is disproved by the facts—(1.) that the usual so-called sign of the dual is not strictly analogous to those of the singular and plural; (2.) that it follows in some instances a plural termination; (3.) that it is occasionally employed as a simple termination without implying duality, whereas the sign of the plural is never so used, and that of the singular apparently never without retaining its signification of unity, and certainly never in opposition to that signification; and (4.) that the dual number does not exist in the Coptic language. It is easy to perceive how this mistake has arisen, for duality could only be represented where ideographic signs were simply employed without the addition of numerals by the doubling of a sign (as in Spec. Det. 2, *supra*), and thus occupying a place between the singular and the plural, this form was naturally mistaken for a dual.

The singular of substantives is indicated by an ideographic or phonetic sign or word being written singly, or by the addition of the signs previously mentioned of the singular masculine and feminine. The plural is analogically indicated, but, from the nature of the case, in several manners. In both numbers there are two genders, the masculine and the feminine; the former being indicated by the sign of the masculine, whether singular or plural; the latter by the feminine sign alone, or added to the masculine plural, except when the gender is denoted by the determinative, in which case that sign is not always employed.

The plural was indicated—(1.) by trebling ideographic signs; (2.) by trebling a phonetic word; (3.) by trebling the second and third signs of a triliteral phonetic word; (4.) by adding the sign of the plural, three vertical lines; (5.) by adding the termination U (or OO), to ideographic or phonetic words (by preference to the latter), whatever were their sound, excepting those ending in N, which take the termination YU (or YOO); (6.) by adding the sign of the plural to the trebled ideographic or phonetic word; (7.) by adding the sign of the plural to the terminations U and YU. The sign of the feminine is also retained in the plural.

Adjectives.

Nouns adjective are declined in the same manner as nouns substantive. They differ from them grammatically as to their determinatives principally, which will be noticed with those of the verbs. Most of the adjectives are indeed also verbs, the radical signification being the adjective one, since there is properly but one verb, the substantive; but as in use the adjective held a secondary place to the verb, being a kind of verbal noun, the verb is grammatically the more important.

Verbs.

Substantive verbs.

The substantive verb is represented by at least three words:—1. Au, or AW, "to be," both declinable and indeclinable. In the latter form it is used as the copula, and becomes a conjunction, and it also is used as a preposition. 2. Un, "to be," "to exist," both declinable and indeclinable. 3. Ar, "to be," indeclinable, placed at the head of a proposition, and representing the 3d persons singular and plural of the present, as well as the infinitive. This also becomes a preposition. To these Bunsen adds a fourth, PA, PU, PUI, TUI, which he inaccurately conjectures to be perhaps merely a pronoun. We must add to these the kindred formative TU, which is certainly a form of the substantive verb. From it have originated forms of the substantive verb in Coptic, ⲠⲈ, ⲦⲈ, and doubtless the plural ⲚⲈ, of which last we have to find the original. Perhaps one or more of the signs of tense besides AU may be considered to be forms of the substantive verb.

Adjective verbs.

Adjective verbs are distinguished by their determinatives, which are symbolical signs, very rarely used in their primary signification to restrict substantives. Their general character may be seen by the following examples:—

Generic determinatives.

I. Generic Determinatives.

FINAL.

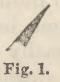
Fig. 1.

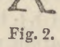
Fig. 2.

Fig. 1. (A sword). 1. Cutting, as HESK, "to cut;" SKA, "to labour." 2. Division, as TUM, "to separate, distinguish, make to distinguish, cause to know." 3. Tropically, negation, TUM, "not to be." 4. Wounding, as SMAM, "to accuse."

Fig. 2. (Two legs walking). 1. Locomotion, as YA, "to come, to go;" SHENS, "to hunt, to fish." 2. The result of locomotion, as HER, "to appear." 3. Motion, as PSESH, "to extend;" HA, "to place, to set up."

Specific determinatives.

II. Specific Determinatives.

1. FINAL.

A. *Generic, in their primary use when applied to adjective verbs, as Specific.*

It is scarcely possible to determine the primary use of the determinatives of adjective verbs as such, on account of their being tropically employed. Sometimes there seems little doubt, as in the case of the second of those cited under the previous class, the primary use of which as applied to adjective verbs, is almost certainly to restrict the verb YA, "to come" or "go." It is, however, so difficult to trace this use, that the safest plan is to class the word or words which seem to show it under the first head of examples of the employment of a sign as a generic determinative.

B. *Specific.*

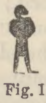
Fig. 1.

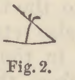
Fig. 2.

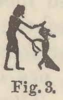
Fig. 3.

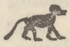
Fig. 4.

Fig. 1. (A man wrapped in his dress.) AMEN, "to envelop, cover;" the root of the name of the god Amen.

Fig. 2. (A hoe.) SKA, "to labour."

Fig. 3. (An Egyptian holding an Asiatic prisoner.) SHETB, "to subdue."

Fig. 4. (A cynocephalus.) KANT, "to be enraged."

2. INITIAL.

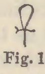
Fig. 1.

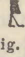
Fig. 2.

Fig. 1. (Crux ansata.) ANSH, "to live (life)."

Fig. 2. (Two legs united to the initial letter.) YEE or AY, a form of YA, "to come, go." (This group is sometimes remarkable for the repetition of the determinative.)

Forms of verbs.

There are several forms of adjective verbs, each of which may comprehend one or more kinds. They may be arranged as below, according to our present knowledge of the ancient Egyptian language. It should be remembered, however, that our incomplete acquaintance with the words of that language, both as to their number, and as to the manner in which they were written, renders the inquiry into a matter of this kind extremely difficult, and its result in many respects only approximative. Nevertheless, most of the particulars are proved by satisfactory examples to be entirely correct, and these are therefore distinguished by an asterisk (*). These examples are not all of verbs, because in some of the rarer formations one is compelled to have recourse to other parts of speech; this, however, does not weaken the cases in question, if we consider the character of the language. Care must be taken to distinguish verbs in forms from compound verbs, and these last again from verbs in juxtaposition with other words, but not composition. In the case of verbal forms they are mostly produced by separable or inseparable prefixes, respecting the former of which there can alone be doubt. When separately employed, however, these prefixes are either followed by a preposition or written under a different form, of which their prefix form is a contraction or simplification. The compound verbs are again to be distinguished from those simply in juxtaposition by the position of the pronominal terminations indicating the person, for these follow the whole group in the case of a compound verb, whereas they immediately follow the simple verb when it is not compounded with the word which it precedes. The following, then, are the principal forms:—

A. *Monosyllabic Forms.*

Sometimes the second and third of these forms appear to be derivatives.

* 1. With A, or inexpressed vowel.
* 2. With EE.
* 3. With U.

B. *Derivative Forms.*

* 1. Reduplicate, *frequentative* and *augmentative.*
* 2. S prefixed, *causative.*
3. H prefixed, *intensitive* and verb of action of substantive root.
4. T prefixed, *donative.*

Declension of verb.—Infinitive noun.

The root of the verb is the infinitive noun, a verbal noun which expresses what we should term the abstract notion of the meaning conveyed by the verb, and is the only part of an adjective verb which does not require the assistance, either expressed or understood, of the substantive verb. It may be best rendered the act of doing or condition of being, as MAR, "the condition of loving," &c. It must be carefully distinguished from the infinitive mood, which requires a prefixed preposition.

Indicative mood.—Aorist.

INDICATIVE MOOD.

Aorist.

Sing. 3. *M.*—EF, F.	2.—EK, K.	1. *C.*—A.
F.—ES, S.	—ET, T.	
Plur. 3. *C.*—SEN.	2.—TEN.	1. —EN.

This tense is formed by adding the affixed personal pronouns to the root of the verb. A more complex form is made by placing the particle KU between the root and the pronoun of the first person.

Although this tense has been usually denominated "the present," it has been judged best to call it the aorist, since it is susceptible of three meanings, corresponding to those of our present, imperfect, and preterite, as will appear from the examples given in the chapter on construction.

The past is formed by prefixing the characteristic N to the affixed personal pronouns.

Past.

Past.

Sing. 3. *M.*—NEF.	2. 1.—NEK.	1. *C.*—NA.
F.—NES.	—NET.	
Plur. 3. *C.*—NESEN.	2.—NETEN.	1. —NEN.

The signification of this tense is usually that of the past alone, though it has sometimes both a pluperfect and an emphatic present sense, in the latter case implying a past one. It may generally be best rendered by the compound form, "I have done thus," than by the simple past; so that it is better to read "I have loved" than "I loved," for the latter form would be more usually found to correspond to the aorist.

The future is formed by prefixing the substantive verb AU, generally with the addition of the preposition ER, to the infinitive of the verb to which it is desired to give a future signification.

Future.

Future.

	3.	2.	1.
Sing.	*M.* AUF-ER.—	AUK-ER.—	*C.* AWA-ER.—
	F. AUS-ER.—	AUT-ER.—	
Plur.	*C.* AUSEN-ER.—	AUTEN-ER.—	AWEN-ER.—

Chevalier Bunsen and M. de Rougé suppose that the preposition may be omitted, and the latter has even gone so far as to constitute of this supposed form a new future unknown to Champollion. This opinion has been caused by the circumstance that the R, as we have shown in the present essay, was sometimes omitted in writing no less than in speaking by the ancient Egyptians, while the vowel that preceded it was retained. When, however, the vowel preceding the R was that which was never expressed, it became impossible to indicate that it was not dropped with the consonant following it. This inexpressed vowel is that which forms part of the preposition ER, and therefore when the consonant of that preposition is omitted in writing the future the whole particle appears to be omitted. The formation of the Coptic futures remarkably corroborates this opinion, for they retain the ρ in some persons, but reject it in others.

M. de Rougé has noticed another form of future commencing with TU immediately prefixed to the root without an intervening particle, but with marks of tense following the root: thus, TU-RESH-KU-A ("I will invoke?") He is evidently correct in supposing this to be a form of the substantive verb, like AU, as we have already seen to be the case.

Optative mood.

The optative mood is known only in the aorist. This tense is formed by prefixing the syllable MAY to the aorist of the indicative; as, MAY-YA, "that I may go."

Imperative mood.

The imperative mood, which is likewise known only in the aorist, is formed by prefixing the syllable MA to the aorist of the indicative. The close similarity to the prefix of the optative is what one would reasonably expect from the affinity of the two moods.

Infinitive mood.

The infinitive mood is formed by prefixing ER and other particles to the infinitive noun or root of the verb, with which it should not be confounded.

Active participle.

The participles are formed from the root by the addition of a prefix or suffixes. The active participle is formed—(1.) by prefixing ENT, ENTEN, "he who," to the root; or (2.) by adding to it TA or T; or (3.) lastly, by adding to it the pronominal affixes of the third person singular, EF (*m.*), ES (*f.*), and U, not SEN, as their plural common.

Passive participle.

The passive participle is remarkable as being the only form in which the passive voice is found in the ancient Egyptian expressed by a peculiar inflection. It is formed by the addition to the root of UT or TU, sometimes prefixed, but almost always affixed, for both numbers and genders; and by its aid a construction arises which must be called the aorist of the passive. This is formed by the addition of the pronominal suffixes to the participle past; as ASTU *MESTUF* EM RENP XXI,[1] "Behold he was born in the year 21," where the aorist is used with an imperfect signification. It has been supposed that the derivative form terminating in EE is a passive participle; but this seems rather to be a separate form of the verb, having significations that would naturally lead to its being usually employed in a participial sense, both as an active and as a passive participle.

Negative form.

All verbs assume a negative signification by receiving the prefixes NEN or ENTEM, as in the following example from the negative confession in the *Ritual*:—NEN-ART-A AMAM HATA,[2] "I have not eaten my heart"—*i.e.*, repented; meaning, I have had no reason to repent, I have not committed anything to cause repentance; where it may be noticed that the aorist is used for the perfect.

Very frequently do we find the root of the verb employed without mark of tense, number, or person, in the signification of every one of the tenses spoken of above, and for both the participles; but this use is chiefly confined to the sculptured inscriptions of the temples, where the scribes have aimed at a contracted mode of writing; and we do not find frequent instances of it in the papyri. The general sense of the inscription in which the root is thus employed without inflexion enables us to supply the omission.

Respecting the non-inflected words, prepositions, adverbs, conjunctions, and interjections, little need be said, for they can be learned from vocabularies, and their use will appear from the syntax.

Prepositions.

Prepositions are both simple and compound, the compound ones being formed by the addition of a noun; as HER-KER or HA-KA, "above, before," literally "above the head." They are joined with the affixed pronouns when they are used in relation to a person, as NER-SEN, "above them."

Adverbs.

Adverbs are in like manner both simple and compound, the compound ones being usually formed by the union of two nouns, a preposition and adverb, of two adverbs, &c.

Conjunctions.

Conjunctions are also simple or compound, but the compound ones hitherto discovered are but two, HAR-ENTEE (above which?) "because," and KAR-ENTEE (below which?) 'therefore." Among the simple conjunctions AU is remarkable as being identical with one of the forms of the substantive verb; and it is to be observed that its manifest correspondence with the Hebrew ו seems to lend support to the supposition that the latter is etymologically connected with the substantive verb היה. Having thus sketched the main features of the orthography and etymology of the Egyptian language, it only remains for us to notice some of the principles of its syntax.

§ 4.—CONSTRUCTION.

Construction.

It has been observed in an earlier part of this article that it has been denied that there was any syntax to the Coptic language, syntax being here used in a very limited sense to denote the part of grammar relating to idiomatic uses, and the same opinion appears to have prevailed respecting its ancient form, the Egyptian; for no one has yet attempted to give any account of the syntax of the latter. The deficiencies of this portion of the present essay are therefore in some measure excusable, not only as there is no previous work, but because of the imperfect knowledge of the language. It is also difficult at this distance of time so completely to master the modes of thought of the Egyptians of the Pharaonic period, as to be able to discriminate the more delicate of the idiomatic forms of expression, and to ascertain their origin. Nevertheless the simplicity of the language, and its similarity to the Coptic, tend to lessen these difficulties, and to embolden us to hope that some general principles of syntax may be indicated.

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[1] Stela from the Apis-tombs, now in the Louvre, from Sir Gardner Wilkinson's notes.

[2] *L. T.*, c. cxxv., 27.

Characteristics of Egyptian literature.

First of all, it will be necessary to give a short sketch of the literature of the ancient Egyptians, since much that must be included in the province of syntax may be the result of the peculiar forms it took. In this place the literary records must be considered as to form and matter, and divided into graven and written.

Such remains of the ancient Egyptian literature as have come down to us are either historical or religious; for those that cannot be referred to these classes are so very few as only to afford exceptions to general rules in their subjects, and to indicate to us that the same system of composition runs through the entire body of records. The substance of the historical and religious inscriptions is, however, remarkably different; for the former, although religious in feeling, are devoid of the peculiar mysticism which characterizes most of the latter. The historical inscriptions are records of the successes of the kings, in explanations (often very short) accompanying the historical scenes on the walls of the temples: the religious inscriptions are extracts from the great *Ritual*, or explanatory inscriptions like those of the former class. The historical papyri are panegyrics of the sovereigns recording their successes in war, and notes of current events made by the scribes of the palace-temples: the religious papyri mostly comprehend the whole or parts of the great *Ritual* before mentioned. Of those inscriptions which cannot be classed as either historical or religious, we may particularly mention the explanatory ones accompanying the scenes illustrative of manners and customs which adorn the walls of the tombs of private persons. Referring to other works for some account of the subjects and characteristics of these various records in more detail, it is only needful here to consider them in their relation to our present subject. In the religious inscriptions particularly, and more or less throughout the whole literature, there runs a superstitious conservatism, which has doubtless caused words otherwise obsolete, and characters of an earlier usage, to be constantly retained. The explanatory inscriptions, whether religious, or historical, or simply civil, must be regarded as merely complemental to the scenes which they were meant to explain; and he who should take any one of these inscriptions, and judge it by the rules applied to a quotation from a classical author, would be as unjust as he who should read the short sentences or single words that occur in the illuminations of mediæval manuscripts as connected or complete records. It should be noticed also, that in the sculptured inscriptions much was sacrificed to appearance, and, as has been before remarked, ideographic signs therefore preferred to phonetic, as well as particles and marks of tense omitted. Where this is plainly he case it is folly to cite as an example of peculiar construction what is merely an accidental result of this desire to adopt the most decorative characters; but there are instances on which it is difficult to form a decided opinion.

1. *Propositions.*

Propositions.

As to propositions, nothing need be noticed except the use of the copula. The copula in Egyptian is denoted after a Semitic method, as well as in the Indo-European manner; so that one could write "man he great," or "man is great." Hence it might be argued that the language had a double origin, but it should be remembered that in this instance the pronominal affixed termination of the so-called Iranian copula is a Semitic word, the same which is employed for the other copula. It may, indeed, be replied that the probable indication of an Iranian impression yet remains, although it has taken a Semitic form; and it must be confessed that this reasoning is not without its force, nevertheless it is best to base the theory of the origin of the language on more convincing evidence.

2. *The Article.*

Syntax of the article

The article was prefixed to substantives to determine their application to a particular individual or individuals, but most commonly to express a remarkable distinction between the individual spoken of and all others of the same class:—Thus we read *PE*-NEB EN KAM,[1] "*the* lord of Egypt;" AU-NAK *PE*-HEKA,[2] "adorations to thee *the* king." So, too, we find such royal names as *TA*-USERT,[3] "*the* director" (f.),[4] and *P*-SA-MUT, "*the* son of Mut,"—Psammuthis.[5] The article is thus especially used in the names of countries, places, and peoples; as *PE*-MUEE, "*the* City of the Lion,"[6]—Leontopolis. It was also employed as a simple determinative article; thus, *PE*-TU-N SHETA *PE*-TU-N NEHEEREN,[7] "*the* land of Sheta, *the* land of Neheeren" (Aram-Naharaim,[8] Mesopotamia). From the Coptic we might conclude that this use was very common, but we must remember that the Copts mainly supplied the old marks of gender and number by the definite article, as well as by the indefinite. The emphatic use is too frequent in the inscriptions and papyri not to have been universal in the language; but with this simple determinative use the contrary is the case in the written language, and therefore probably was also in the spoken.

3. *Pronouns.*

Pronouns.

The isolated personal pronouns are very rarely employed; so rarely that Chev. Bunsen does not give that of the first person plural in his *Egypt's Place*, not believing that an instance of its use has been found in the Egyptian records.[9] These pronouns are indeed used very much as were the personal pronouns in the nominative in Latin, for example in the following passage: TET EN-SEN AN HAN-F *ENTUTEN*[10] ASH[11] TATSEN TUEN[12] ER PE-SHER-EN-SHETA[13] "Speech to them of his holiness. 'Who are ye?' They say, 'We are of the hostile Sheta.'"

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[1] *Select Papyri*, pl. lxiii., line 1.

[2] Champollion *Grammaire Egyptienne*, p. 480.

[3] Wilkinson's *Modern Egypt and Thebes*, vol. ii., p. 424.

[4] The sound and signification of this word seem to be proved by its use for "oar" (Lepsius, *Todtenbuch*, ch. xcix., line 16, compared with *Rit.* of Burton, Brit. Mus., Coptic ⲟⲥⲣ, *S.*; ⲃⲟⲥⲉⲣ, *M.*; and in the name of the *Οὐσερχέρης* of Manetho, USER-KEF, head of the Fifth Dynasty.

[5] Wilkinson's *Modern Egypt and Thebes*, vol. ii., p. 429. One Psammuthis alone is known from the Egyptian monuments. He has been usually held to have been the third sovereign of the Twenty-ninth Dynasty (*Ψάμμουθις*), but Chevalier Bunsen makes him the third of the Twenty-third Dynasty (*Ψαμμοῦς*).

[6] For the identification of this town with Leontopolis, see *Horæ Ægyptiacæ*, pp. 176, 177.

[7] Rosellini, *Mon. Stor.*, No. cii., line 18.

[8] This Neheeren may be the Nahiri of the Assyrian inscriptions placed by Sir H. Rawlinson to the west of the Euphrates. It is indeed once written Neharee in a tomb at Thebes (MS. notes of writer).

[9] *Egypt's Place*, vol. i., p. 283.

[10] Corrected from Champollion's *Dictionnaire Egyptien*, s. v.

[11] Coptic ⲁϣ, M. *quis*, &c. ⲉϣ, B. *quis, unde*, &c.

[12] This is valuable as an example of the use of the rare substantive verb TU, with marks of inflection, already noticed by Mr Birch. M. de Rougé had also discovered its employment as a prefix to form the future, had conjectured that it might be a substantive verb like AU, and had pointed out its probable relation to the Coptic.

[13] Rosellini, *Mon. Stor.*, No. cii., line 14.

The affixed personal pronouns are employed for the accusative of the isolated personal pronouns of which they may be regarded as contracted forms; and they are also used as possessive pronouns, and to indicate the persons of verbs. The sense of a sentence in which they occur can alone determine their signification. Thus ANSHEF may be rendered "his life," or "he lives." S-HA-F, "to set it up," or "he sets up," lit. "to cause to set it up," &c. The affixed personal pronoun when used as a possessive immediately follows the substantive to which it applies, whether or not that substantive be followed by an adjective in concord; as, HEST-EF URT "his chief throne."[1]

The proper possessive pronouns are always isolated and placed before, and both in their etymology and their signification may be best rendered by the Greek ὁ—αὐτοῦ, &c.

The determinative relative pronoun is properly indefinite, but it becomes definite by the simple relative pronoun being prefixed to it. In both forms it is isolated.

4. *Nouns.*

Nouns.

The gender of substantives is not to be reduced to any distinct rules; objects in themselves masculine or feminine are assigned to these genders, but the very large class which is not susceptible of this determination is necessarily classed, in the absence of a neuter gender, in an arbitrary manner.

An adjective in concord with a substantive follows it in almost all instances. There are some rare exceptions to this rule, particularly in the case of the words NETER, "divine," and SUTEN, "royal," which always, as far as we are aware, precede the substantives to which they are applied, doubtless from respect to the signification of these words. These afford the only *general* exceptions; of particular exceptions we may instance . . . NETER-HAN,[2] "the *fourth* priest." Ordinal numerals, it should be observed, are declined in the same manner as adjectives.

5. *Verbs.*

Verbs.

It will be necessary to consider in some detail the signification of the different parts of the verb.

The infinitive noun is the root of the verb, and expresses what we should term the abstract notion of its meaning. Although therefore not part of the verb, it must be considered with it. It must be distinguished from the infinitive mood, which both requires a prefixed preposition, and is accompanied in all adjective verbs by the substantive verb either expressed or understood. It may be rendered by "the act of doing," or "the condition of being," as in the following instances:—SHEFT *YU-F* HA . . . RUTEN,[3] "on his *coming* from the land of Ruten;" *YEE* EN HAN-F HA . . . "The *coming* of his holiness from foreign lands."[4] In many cases, when no preposition is used, it is difficult to say whether the word is an infinitive noun or a simple substantive. It may be doubted whether the Egyptians would have expressed "the condition of living" and "life" by different forms of the same root, and not by the same word, and the same difficulty is experienced as to all roots which are simple substantives as well as verbs. With reference to the infinitive mood there can be no doubt, for it may always be distinguished, as in English, by its prefixed prepositions, thus,—NEN-HER NEF *ER MASH* SHER MANEF HANF,[5] "He did not come forward *to fight* after that he had seen his holiness." The root is frequently used for all parts of the verb, and this is especially the case with the forms of the substantive verb. In many inscriptions where the root appears without any marks of mood, tense, number, or person, we may conclude that the license of the scribe has omitted them; but the frequency of this use and its consistency with the genius of the language forbid us from applying this explanation in every case.

The indicative having but three tenses in the Egyptian by which to express the various shades of meaning that have caused the formation of so many tenses in the Coptic, it becomes a matter of importance to determine as nearly as may be their use.

That tense which has been formerly termed the present we have ventured to call the aorist, since it is indefinite, having occasionally a past, though not a past definite signification. The following examples will show its use; firstly, as a simple *present*,—*TATSEN* EN HANF,[6] "*They say* to his holiness;" secondly, as an *imperfect*, *ARY-A* BESHU (AÄSHU?) EN NETERU SHER *UNA* HA TU,[7] "*I did perform* (or was performing) the ceremonies of the gods while *I was* on earth;" and as a *past*, SHA *S-MAK-TU* HESAR ER SHEFTU-F,[8] "as *thou hast justified* Osiris against his enemies." In some cases the aorist has a kind of future signification when it is used for a continuous action or condition commencing at the present time, thus,—SUTEN-SHEB NEB-TU *TEE AREF* HEEB-EF EN (TET[9])? "The king of Upper and Lower Egypt, the lord of the two regions, *performs* the panegyry for ever; "*AWA* SUTEN HA KET ER (TET[10])? "I am king on the throne for ever." In these last instances the use of the future would perhaps be more accurate, although the sense could not be completely expressed without the employment of both future and present. In all the instances which we have given of the use of the aorist, deviating from its primary use as a present, it might perhaps be best rendered in English by the present, for in so doing the idiom of the original would not be lost, nor would any violence be done to our language.

The tense which we have called the past does not deviate widely from a preterite signification. Usually it is a past definite, sometimes it is a pluperfect, and at other times it becomes an emphatic present, though in the last case retaining part of its proper sense. The following examples will explain these uses:—*Past definite*, *ARNEF* MEMENNU-F EN ATF AMEN-RA,[11] "*He has made* (these) his buildings to his father Amen-ra;" *KATNEF* HAN-F ANSH-TA-SNEB-EF . . . BESHEN,[12] "His holiness, of a strong life, *built* a . . . . fort," in the latter of which cases the past sense is more remote than in the former: *pluperfect*, *NEN-HER NEF* ER MASH SHER *MA NEF* HANF,[13] "*He did not come forward* to fight after that *he had seen* his holiness," where the same tense is employed as a past and as a pluperfect: *emphatic present*, *YEE NA* SHER-EK NEB-A,[14] "*I am come* unto thee my lord," which compare with *EEYU A* EMHENEK,[15] "*I am come* before thee," where the simple present is employed. This last use is very similar to our indiscriminate use in English of "I am come," and "I have come."

The future is not altogether unlike in signification to the Hebrew aorist, but the future sense is so predominant that its occasional employment as an emphatic present, indicating determination, does not warrant us in calling it an aorist. Of each use a single example will suffice,—*AW-ER-AR* HEEB,

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[1] Champ. *Gram.*, p. 465.

[2] Inscription on a mummy-case in antiquities published by Mr Sams.

[3] Rosellini, *Mon. Stor.*, No. xlviii., 1.

[4] Id., No. xlvi., 1.

[5] Champollion, *Gram.*, p. 502.

[6] Rosellini, *Mon. Stor.*, No. cii., line 9.

[7] Champ. *Gram.*, p. 502.

[8] Lepsius, *Todtenbuch*, ch. xviii., lines 13, 14.

[9] Champ. *Gram.*, p. 516.

[10] Id., *loc. cit.*

[11] Wilkinson's *Extracts from several Hieroglyphical Subjects*, pl. i., 9.

[12] *Select Papyri*, pl. lxiii., line 1.

[13] Champ. *Gram.*, p. 502.

[14] Lepsius, *Todtenbuch*, cap. cxxv., line 1.

[15] Champ. *Gram.*, p. 487. Champollion (id., p. 477) gives two instances, both from the same part of a temple (that at Dakkeh), in one of which the past is used, and in the other the present, in precisely the same formula *YEENA* SHAR-EK TET, "*I am come* to thee, [O] Thoth;" *YEEA* SHAR-EK HESAR, "*I am come* to thee, [O] Osiris."

"I will celebrate the panegyry."[1] *AWA-RESH TU-RESH-KU-A* REN-EK,[2] "*I will invoke, I will invoke*, thy name," where it should be noted that both forms of future are used in the same sense. The context in this place seems to show that the meaning is, "I do invoke."

What we term the subjunctive mood is not distinguished in the Egyptian from the indicative, as in the following instance,—AW . . . NA HAN EN SUTEN-SHEB NTERASH ANSH (TET ?) *YAÄ* ER KAM[3], "And the holiness of the king of Upper and Lower Egypt, Darius (Hystaspis) ever-living, commanded me that I should go to Egypt."

The imperative and optative moods have each but a single tense. Of the former, it must be remarked, that it is frequently expressed by the root without any mark of time, as,—*PESHT* (TENHU ?)-ET HA-HER-A,[4] "*Spread* thy wings over me;" and that at other times it has the form of the aorist indicative in consequence of the omission of its distinctive prefix MA; as,—*SMENEK* . . . . . HA KA-K,[5] "*Place thou* the royal helmet on thy head." The imperative is sometimes written with its prefix but with no sign of person when it is in the second person singular. Of the optative mood nothing need here be said.

The participles present considerable difficulties both from the various forms they possess and on account of their idiomatic use. As it is probable that some shades of difference were originally indicated by these forms, it will be best to give the examples of their significations under each form separately.

Participle Present.—1. Root preceded by ENT, ENTEE, ENTEN, unconnected; as,—ENTEE-NEHEM, "[He] who delivers, the deliverer."[6] 2. Root with affix TA or T, as,—ENTEK RA *SHATA* SHA,[7] "Thou Pharaoh, ruling like ——." 3. Root with pronominal affixes EF (*m.*) ES (*f.*) sing., and U (*com.*) plur., as,—42 NENETERU *UNNU* HNAK EM US-SHAT ENT (or ENTEE) MATU,[8] "Forty-two gods *who are* (*being*) with thee in the hall of the two Truths."

Participle Past.—This has, as a participial form, the root, with the formative UT or TU indeclinable, either prefixed or affixed, but almost always the latter; as,—NEN-PE-*UT-MA*, SHATETF,[9] "There has not *been seen* ought like unto it," in which the participle is used for the past passive; and HA EM RA-U EN HER . . . . *TATU* HERU KRAS AK, &c.,[10] "The beginning of the chapters of the manifestation . . . . . said [on] the day of the coffin's going," &c.

The formation of the passive is a remarkable characteristic of the Egyptian, more especially as in the Coptic the passive is always, or almost always, expressed by circumlocution. In the hieroglyphic inscriptions we find, however, a regular aorist indicative of the passive voice formed by adding the pronominal affixes of person to the participle past, as in the following passage,—URU NAU EN REMEN TATSEN EM . . NEB TUTEE EM S-NA . . . . F *MATU-K* SHA TEFK RA,[11] "The great chiefs of the land of Remen say in adoring the lord of the two regions of Egypt, in magnifying his . . . . thou *seemest* (*art seen*) like thy father Ra."

6. *Particles.*

Particles.

Besides the regular adverbs, certain words become adverbs by their use in an adverbial sense. These are substantives, adjectives, and prepositions. Thus,—UNNA HNA HER *HERU* AR HEBU EN HESAR UN-NUFR,[12] "I was with Horus *the day* of the celebration of the panegyries of Osiris Unufre," where HERU, "day," is used adverbially. The placing of an adverb immediately after a substantive gives the substantive an adverbial sense, as,—AA-U-NEK PE-HEKA NUFR MER-TEE *AMEN-SHA*, NEB HEBU ATF-EF *PTAH-SHA* ATF NETERU, ATEE *RA-SHA*,[13] "Glory to thee! the king good, twice-loved, *Amen-like*, lord of panegyries, *Ptah-like* [like] the father of the gods, chief *Ra-like*." In the following sentence an adjective takes an adverbial sense,—SHEFT EEY-F HA . . . RUTEN KER HAK *NA* NESHTU,[14] "On his coming from the land of Ruten with captives *a great* many," where the adjective great is employed as in the English idiom. The use of prepositions for adverbs will be seen by the following passage:—PE-TU *ER-HAT*, *ER*-(*PEH ?*), EM KABEB,[15] "The world *before* and *behind* [him is] in [the act of] performing libations."

The use of the prepositions does not present any difficulty, and their formation has been already spoken of in the proper place. The same may be said of the conjunctions, although it should be noticed that they are so rarely expressed in the inscriptions that we may reasonably conclude that they were frequently omitted in the language.

The interjections usually immediately precede the word to which they apply, as,—*A* TET S-MATU HESAR ER SHAT-UF,[16] "*O* Thoth, justify thou Osiris against his adversaries." It must be remarked that sometimes the article occurs between the interjection and the name of the person addressed.

Of the figures of syntax none are more common in the ancient Egyptian than ellipsis and pleonasm. The former is principally used for brevity of expression, and the latter for greater emphasis.

Had the Egyptians poetry?

To this grammatical sketch may be added some observations on the question whether the ancient Egyptians had poetry, and in particular as to the evidence on this matter afforded by their records.

What Herodotus relates of the song of Manerôs indicates very clearly a sacred chant, and from this we might infer the existence of measured prose or poetry in the Egyptian literature. Clemens Alexandrinus, in his account of the sacred books of Egypt, an account which undoubtedly was taken from good authority, speaks of their containing hymns. In describing the procession, he tells us that "first goes a singer, bearing one of the symbols of music: they say that his duty is to be versed in the two books of Hermes, of which one contains the hymns of the gods, the other, the regulation of the king's life;"[17] and later, in speaking of ten others of the Hermetic books, he tells us that they contained hymns.[18] Plato also speaks of hymns as well as music, traditionally supposed to have been composed by

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[1] Champ., *Gram.*, p. 413.

[2] Lepsius, *Todtenbuch*, ch. cxxv., line 1. Without insisting on the meaning here assigned to RESH, we may mention that it seems the most probable that we can obtain from a comparison of the inscriptions.

[3] Champ., *Gram.*, pp. 500, 501.

[4] Id., p. 466.

[5] Id., p. 462.

[6] Wilkinson's *Mod. Eg. and Thebes*, vol. ii., p. 436.

[7] Rosellini, *Mon. Stor.*, No. cxxxii.

[8] Lepsius, *Todtenbuch*, ch. cxxv., line 2.

[9] Rosellini, *Mon. Stor.*, No. li.

[10] Lepsius, *Todtenbuch*, ch. i., title.

[11] Rosellini, *Mon. Stor.*, No. xlvi.

[12] Champ., *Gram.*, p. 512.

[13] Id., p. 480.

[14] Rosellini, *Mon. Stor.*, No. li. In other cases the adjective used adverbially follows the adjective to which it is applied instead of preceding it; thus, . . . HEEB AR-F NESHTU-*UR*. "The first panegyry which he performs [of] a *great* many" (*Ancient Egyptians*, pl. 79).

[15] Champ., *Gram.* p. 512.

[16] Lepsius, *Todtenbuch*, ch. xviii., line 1, *et passim*.

[17] Πρῶτος μὲν γὰρ προέρχεται ὁ ᾽δὸς, ἕν τι τῶν τῆς μουσικῆς ἐπιφερόμενος συμβόλων. τοῦτον φασὶ δύο βίβλους ἀνειληφέναι δεῖν ἐκ τῶν ῾Ερμοῦ· ὧν θάτερον μὲν, ὕμνους περιέχει θεῶν, ἐκλογισμὸν δὲ βασιλικοῦ βίου τὸ δεύτερον. (*Clem. Strom.* vi.)

[18] Δέκα δὲ ἐστι τὰ εἰς τὴν τιμὴν ἀνηκοντα τῶν παρ᾽ αὐτοῖς θεῶν, καὶ τὴν Αἰγυπτίαν εὐσέβειαν περιέχοντα· οἷον περὶ θυμάτων, ἀπαρχῶν, ὕμνων, εὐχῶν, π πῶν, ορῶν, κα τῶν τουτοις ὁμοίων.—*Id., loc. cit.*

Isis.[1] The Egyptian *Ritual*, which we have so often cited, is supposed by the Chevalier Bunsen, with good reason, to have been a portion of those ten books of which Clemens speaks as containing hymns. Yet nothing has been found in it which we can conclude to be measured prose, much less poetry. A careful examination of such of the hieratic papyri as are not copies of the whole, or portions of the *Ritual*, has afforded the same result. *Primâ facie*, indeed, some of these papyri, containing praises of the kings, and some of the late demotic papyri,[2] would seem to be arranged in verses or parallelisms, since we find dots above in the former case, within each line in the latter at equal distances.[3] But a closer examination shows that this must be regarded as merely a method of subdivision, for the convenience of the scribes, perhaps like the English legal reckoning of "folios." In like manner we do not find any indications of poetry in the tablets bearing prayers to the gods, or those which record the exploits of the kings. There is indeed a chant sung while ploughing, inscribed in a tomb at Eilethyas,[4] but this does not seem to be strictly poetry. Although it must be admitted that much of the ancient Egyptian literature has perished, yet enough of it remains for us to form a correct idea of each of its classes, and thus to show that it probably did not contain any poetry, even if we include in that term measured prose. And it is most reasonable to conclude that the Greeks termed those prayers and invocations hymns, which were chanted because they were so recited, and because they corresponded in their subject, though not in their form, to their own hymns.

In order to render this essay complete, some notice is subjoined of the demotic system, expressing the vulgar dialect, in the compilation of which we have received great assistance from Dr Brugsch's *Grammaire Démotique*, to which the reader is referred for fuller details.

SECTION IV.

THE VULGAR DIALECT.

Vulgar dialect.

Although there is reason to believe that the vulgar dialect of the ancient Egyptian was already in existence before the rule of the Eighteenth Dynasty,[5] we cannot prove that it was more ancient than the seventh century B.C., to which period is assigned the earliest known papyrus in the vulgar characters.[6] These characters continued to be employed until the fourth century of the Christian Era. Our knowledge of the vulgar dialect is therefore limited to its condition between these extremes, but its near agreement with the sacred dialect, expressed by the hieroglyphics on the one hand, and with the Coptic on the other, enables us to consider the results of a study of its known records as establishing the main characteristics of this dialect from its first establishment until its abandonment. It does not differ from the sacred dialect in a greater degree than would suffice to constitute a different dialect, and it sufficiently resembles the Coptic to warrant our saying that the latter is but its later form. In comparing the vulgar dialect with the Coptic, we must especially bear in mind that the demotic characters were not adopted to express the more delicate differences of sound expressed by the Greek alphabet, and that on the adoption of the latter by the Copts, the written language became a more accurate representation of the spoken than before. This is most evident in the various forms in which we find one word written in a single dialect of Coptic, some of which, excluding others as the result of carelessness, must have existed in the vulgar dialect, and could only have been represented by a single demotic group.

Demotic system.

Sounds.

The alphabet of the vulgar dialect contained at least one more distinct sound than did that of the sacred. L and R are distinguished by separate phonetic signs in the demotic writing, although in the hieroglyphics the former sound either did not exist at all, or was represented by the same signs that were used for R. It is commonly held that SH and CH or KH were likewise distinct, but this Dr Brugsch doubts,[7] and it is probable that the corresponding Coptic sounds had common representatives in the demotic characters no less than in the hieroglyphic. We have endeavoured to show, in opposition to the prevalent opinion, that such was the case in the latter system. The demotic alphabet also has a letter which appears, from its correspondence to the Coptic ϫ and ϭ, to have been a hard S, like the Arabic ص (ssâd), or a hard GH[8], like the غ (gheyn) of the same language.[9] Some believe that this letter, whatever its precise sound or sounds may have been, had its representative in the hieroglyphic alphabet, but this cannot, we think, be satisfactorily proved. The certain difference, therefore, between the alphabets of the sacred and vulgar dialects is the distinction, in the latter, of L from R, the probable difference the separation of a hard S or GH from K, and the possible difference the distinction of SH and CH. We have evidence, here, therefore, even if we reject every one of these differences excepting the first, of the commencement of that separation of sounds in the written character, which, checked by the conservative bias of the Egyptians, did not acquire its full development until the formation of the Coptic alphabet.[10]

Characters.

It is more important in the present place to indicate the relation of the demotic signs to the hieroglyphic, than to describe them in detail, which indeed would involve a repetition of much that has been said respecting the latter in the earlier part of this treatise.

The demotic character must be considered, if we found our opinion on its records of all periods, to be a debased form of the hieratic, differing from it principally in expressing the vulgar dialect, but also in its signs being ruder in shape, probably fewer, and in a preference being given to phonetic characters over representations and symbols. It is remarkable that the earliest known demotic writing scarcely differs from the hieratic except in expressing a different dialect. Hence we may reasonably suppose that this oldest demotic known to us is not much later than the time of the institution of the character, since it does not seem likely that a character which subsequently underwent considerable and rapid changes should have remained stationary in its primitive form for any long period. The hieroglyphics were unquestionably greatly changed in the course of centuries, but this was chiefly through the increase of their alphabetical class by the admission into it of signs originally syllabic or ideographic, for the changes in form are the result of a decline of art, not of an intentional alteration.

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[1] *De Legg.*, ii., p. 657.
[2] Brugsch, *Gram. Dém.*, p. 69.
[3] *Select Papyri, passim.*
[4] Champ., *Lettres*, p. 196.
[5] *Supra*, p. 371.
[6] Brugsch, *Gram. Dém.*, pl. i.
[7] *Gram. Dém.*, p. 17.

[8] The term "hard" is here used to prevent confusion with the soft GH, of which the pronunciation of Γ in Romaic affords an example.

[9] It is important to recollect that for centuries Arabic has been the language commonly spoken by the Copts, and that their own language has long ceased to be spoken, although, as Sir Gardner Wilkinson informs us, it has begun to be again spoken. Even when it was spoken for several hundred years past, it could only have been as a dead language, very much as Latin was employed in the middle ages. Hence the pronunciation of the Copts may be reasonably supposed to have been affected by their use of Arabic, and we cannot in any case accept the pronunciation now taught by them except as hypothetical.

[10] It is not meant to be concluded from what is here said that all the Coptic letters properly represented various sounds of one alphabet, since some of them are used exclusively, or nearly so, for Greek words, while others are purely dialectal.

So distinctly is the demotic writing traceable to the hieratic, that Dr Brugsch remarks that each demotic sign should have its hieratic prototype,[1] although he has been unable in some cases to ascertain these prototypes. Being a written character, the demotic was not so variously arranged as the hieroglyphic, but, as is usually the case with the hieratic, written from right to left, in horizontal lines. One sign was very rarely placed above another in these lines, this usage being nearly confined to particular characters, almost all of which were phonetic. Ligatures of two characters were more frequent than in the hieratic, and on this account the *separate* characters in any particular inscription are usually fewer. It is also observable that some single signs in the demotic represent more than one hieratic sign, and thus more than one sound, whether the signs represented be ideographic or phonetic, two signs altogether distinct being thus expressed by one. This is the result of the similarity of hieratic signs which, through the carelessness of the scribes, became identical in the demotic. The position of these signs made their use intelligible to the Egyptians. In these matters it does not appear that the demotic system was characterized by the exercise of inflexible rules: on the contrary, it displays an irregularity natural in a popular mode of writing.

It will not be necessary to speak in any detail of the demotic signs in their different classes, for they follow the same principles as the hieroglyphic. The distinctive peculiarities of the demotic system have rather to be indicated. It should be remembered that the hieroglyphic and hieratic systems are but two different forms of writing the same characters for the same dialect; and that the only reason why the demotic is more frequently compared to the latter than to the former is because of its being derived from it as to its forms.

In demotic as in hieroglyphic the signs were either phonetic or ideographic, and the phonetic signs were further divided into alphabetic and syllabic, the ideographic into iconographic and symbolic. Signs of the ideographic class were used as determinatives to phonetic groups. Thus the system of the hieroglyphics was retained in a mode of writing to which it was manifestly not fully applicable; since the forms of the ideographs were rude, and often retained scarcely a semblance of their original hieroglyphic shapes; and this circumstance is curiously illustrative of the conservative feeling of the ancient Egyptians, who preferred applying their difficult system to the vulgar dialect than adopting or inventing something more practical. Necessarily, however, ideographs, whether in their primary use or in the secondary place of determinatives, were much less frequent in the demotic writings than in the hieroglyphic, and usually less than in the hieratic. In the demotic alphabet we do not find any evidence of simplification, for had it been a simple alphabetic system, we should perceive either one sign or an equal number of signs for each letter. It is not, therefore, to the characters that we must look for the distinctive features of demotic. They are to be discovered rather in the words which those characters express. It must not be supposed, however, that the peculiarities of which we speak are of that markedness which we are accustomed to regard, often incorrectly, as essential to the ancient and the modern forms of a language. We must not expect the difference that we see between Latin and Italian, or even Greek and Romaic; for the causes that have made Italian a different language from Latin, and Romaic a new phasis of Greek, did not exist in the history of the Egyptian language until after the formation of the demotic system. Even if we compare the sacred dialect of the ancient Egyptian with the Coptic, carefully setting aside those changes which may be pronounced accidental, we find a most remarkable agreement, and trace the rudiments of almost every peculiarity of the Coptic in the parent dialect. In the demotic such an inquiry with reference to both the earlier and the later form of the language—for the vulgar dialect, whether itself changed or not in its oldest known records from a more ancient form, must be regarded as the offspring of the sacred dialect—will lead us to the same result, and will tend to show that the peculiarities of Coptic are of native growth, owing their development rather than their origin to foreign influence, unless, indeed, foreign influence in remote ages originated those distinctions of the vulgar dialect, which it afterwards appears to have promoted.

Words.

The roots in demotic are still monosyllabic, but the vocabulary appears to contain a greater number of words of more than one syllable than does that of the sacred dialect. The marks of gender and number are the same as in the hieroglyphics. The inflected parts of speech do not possess a dual; and the sign of duality, which has been erroneously supposed to indicate the dual number, is less frequently used than in the sacred dialect. The definite article and the pronouns generally follow the use of the hieroglyphics, although showing marks of the changes which are more evident in the Coptic.

We have noticed the virtual absence of composition in the sacred dialect. This peculiarity we find to be not so marked in the vulgar dialect as expressed by the demotic characters. The formation and use of compound substantives is, for example, much more frequent, as of those formed with T'I-EN, corresponding to the Coptic ϫιⲛ (M.B.), ϭιⲛ (S.), forming verbs from nouns expressing the action of the verb; and REM-AF, corresponding to the Coptic ⲣⲉϥ (M.), &c., and forming nouns denoting the agent. Except in these particulars, the nouns in demotic do not present any remarkable differences from those of the sacred dialect. The modes of expressing the plural, and the uses of prepositions in relation to substantives, are the same as in that dialect.

Of the adjectives in particular it need only be remarked that they are susceptible of composition, a class being formed by prefixing to the verbs the enclitic pronouns of the third person singular, AF for the masculine, and AS for the feminine; thus from ANSH, to live, we have AF-ANSH, living, the Coptic ⲉϥⲱⲛϧ; and from AEB, to be pure, AS-AËB, purified, pure (*f.*), Coptic ⲉⲥⲟⲩⲁⲃ.

The verbs very clearly indicate the transition from the sacred dialect to Coptic, for we find the tenses more numerous than in the former, and observe a deviation from its principles. The substantive verb in at least four forms is employed without marks of person, and one of these forms, if not more, is also susceptible of conjugation in the aorist. With respect to the adjective verbs, their derivative and compound forms are especially characteristic. Among the former we must notice the reduplicate form, which is rarer than in the sacred dialect, and the causative, with the prefix SA, corresponding to the S of the hieroglyphics, which is still more rarely employed than the former. The forms which are composed of two verbs, the first of which has almost become a formative particle, are classed by Dr Brugsch among the derivatives, though they are properly chiefly compounds. Those verbs which this learned writer admits to be compound are formed by a verb prefixed to a substantive, adjective, or preposition. The aorist of the indicative is the same as in hieroglyphics; but it possesses an emphatic form with the substantive verb and enclitic pronoun prefixed to the root—thus A-I, perhaps pronounced AW-I.[1] The past tense is formed by prefixing NE and affixing the pronominal terminations, thus showing a change from the hieroglyphics. There are two (if not three) forms of future —that with TA-I prefixed, corresponding to the hieroglyphic TU; and AI-EN, corresponding to AU-ER. The two forms, it will be noticed, present differences of which the most striking is the change of the preposition. The subjunctive mood is distinguished by the prefix ENTA, immediately followed by the pronominal marks of person. The optative and infinitive follow the uses of the sacred dialect, and there are similar negative conjugations, although the particle indicating negation in some forms stands between the marks of tense and the root, in others at the head of the whole form. The non-inflected parts of speech present little comparative variation from their hieroglyphic originals, and need not receive any especial notice in the present place.

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[1] "Chaque signe démotique doit avoir son prototype hiératique quoique quelques-uns me soient restés inconnus jusqu'à présent." (*Grammaire Démotique*, p. 15.)

From this short view of the peculiarities of the vulgar dialect we may learn somewhat of its relation to the sacred dialect and to the Coptic, and see that in this branch of the inquiry the discoveries of the Egyptologists have led to as satisfactory and consistent results as in the rest. Had the interpretation of the Egyptian characters been of that vague and unsatisfactory nature that some would have us to believe, is it credible that it should have led after a length of time to the tracing of the differences of the two dialects? Those who have accompanied us thus far in our inquiry will not, however, we trust, be troubled by any doubts as to the truth of that great and memorable discovery which we shall ever gratefully attribute to our countryman Dr Young.

Concluding remarks.

Before concluding this article, we may enumerate the works most useful to any one commencing the study of ancient Egyptian. The student should first gain some knowledge of Coptic, particularly of words; its grammar he will find useful, but the vocabulary will be of greater service. He will do well to read carefully Peyron's *Grammar*, and he will find Parthey's *Vocabulary* more convenient than the Lexicons for constant reference. He must take care not to be too much biassed by what he learns of Coptic in his next step, the study of ancient Egyptian. He must reverse the order in which Clemens Alexandrinus tells us the Egyptian modes of writing were in his time learnt, for he must take the hieroglyphic mode first, then the hieratic, and last of all the demotic. For the hieroglyphics he will still have to begin with Champollion's *Grammar* and *Dictionary*. The diffuseness of these works is, however, so great that he will do well to follow the example of the writer and abridge both, copying all the words and significations from the latter work, and taking the chief characteristics of the language from the former without attempting at this stage to improve Champollion's arrangement. This method will fix a great number of words in the student's memory, and give him a good idea of the system of writing. He can next acquire some knowledge of the hieratic characters, which may be easily done by transcribing hieratic texts into hieroglyphics, with the aid of the table at the close of Champollion's *Grammar*. Having thus gained an elementary acquaintance with the sacred dialect, he can attempt to read some inscriptions. The easiest of these, and the most interesting, are the historical ones of the Eighteenth and Nineteenth Dynasties, which he will find in Rosellini's great work, which is better arranged than the similar one of Champollion, and more portable than that of Lepsius, which, however, contains many more records, particularly of other periods of Egyptian history. And here we may express a regret that no one has thought it worth while to publish a collection of the most important Egyptian inscriptions in a portable form, and at a moderate price. Having thus become somewhat familiar with the language, the student may read the Chevalier Bunsen's account of it in his *Egypt's Place*, and that contained in the present article, and he will thus gain more distinct general views than he had previously possessed, and be able to examine the Ritual, the historical hieratic papyri, and the various published inscriptions. He will do well to collect Dr Hincks', Mr Birch's, and M. de Rougé's papers, as far as he can, and to compare the various views of the different scholars who have followed Young's and Champollion's method. At the same time he should endeavour to make himself acquainted with the people whose language he is studying, in doing which he will receive the greatest aid from Sir Gardner Wilkinson's *Ancient Egyptians*. If he can visit Egypt and Nubia he will find his studies greatly assisted by the local knowledge he will thus acquire. The reason of much that before appeared obscure will then be seen by him, and his pursuit will acquire a stronger interest. The demotic forms a separate study, more difficult and less interesting than that of the sacred characters. It is, however, not without a high value as supplying a link between the sacred dialect and the Coptic, and therefore it should not be overlooked. Brugsch's *Grammar* will be found an excellent guide to a knowledge of the demotic.[2]

(R. S. P.)

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[1] This form corresponds in appearance to the future in the sacred dialect when the preposition is omitted, but we have shown that this omission is one of writing, and that the preposition was really pronounced. The fact that the demotic tense is not the same as the hieroglyphic thus corroborates our opinion founded on other evidence.

[2] To the works mentioned above, and many others, we have, as the foot-notes sufficiently tell, been much indebted. We have also to express our personal obligations to Mr Lane, Sir Gardner Wilkinson, the Rev. Dunbar Heath, and others, for the assistance they have rendered us. (R. S. P.)

HIEROMANCY, the art of divination from the appearance of victims offered in sacrifice.

HIERON, or HIERO I., tyrant of Syracuse, succeeded his brother Gelon, B.C. 478. Hieron had already distinguished himself at Himera. A jealousy soon arose between him and his brother Polyzelus, who had the command of the army. A war was on the point of breaking out between Hieron and Theron of Agrigentum, who had espoused the cause of Polyzelus, when a reconciliation took place between the brothers. Hiero now proceeded to extend his dominions. He seized Naxos and Catana, transferring the inhabitants to Leontini. He put Syracusans in Catana, and changed its name to Ætna. Upon the death of Theron war broke out between Hieron and Thrasydæus, son of Theron, but victory declared in favour of Hieron. His tyrannical measures led him to fear attempts against his life, and hence we are told that he kept up a large body of mercenaries, as well as numerous spies. He deserves credit, however, in two important respects. By his vigorous assistance to the Cumæans, the power of the Etruscan pirates was completely destroyed, B.C. 474. Of the spoils consecrated after this victory, a helmet of bronze was discovered about forty years ago. Besides defeating the pirates, Hiero was the patron of poets and philosophers. He has been immortalized in the *Odes* of Pindar as a successful competitor at the Grecian games. Amongst the eminent men patronized by Hiero, are found the names of Pindar, Æschylus, Xenophanes, Simonides, and Epicharmus. Hieron died at Catana, B.C. 467.

HIERON II., king of Syracuse, born at the close of the fourth century B.C., was descended from Gelon. He distinguished himself as a soldier, and in a popular tumult was chosen general by the Syracusan army. He not only got this appointment confirmed by the people themselves, but having married the daughter of Leptines, the most influential man in Syracuse, the way was open to still higher power. Not feeling secure with the fickle mercenaries who had elected him, he took occasion to expose them to be cut to pieces by the Mamertines; then levying an army of Syracusans, he proceeded to chastise the Mamertines. City after city was taken from them, and after the signal defeat which they sustained at the River Longanus, peace was granted them through the friendly interference of the Carthaginians. Returning to Syracuse, the people saluted Hieron as king. Though Hieron had assisted the Romans with provisions in their siege of Rhegium, yet as the Romans opposed his attempt to drive the Mamertines out of Sicily, hostilities were begun between them. Hiero joined the Carthaginians, but getting little or no assistance, the Roman consuls effected a landing, and after some fighting a treaty was concluded. For upwards of forty years Hiero now remained the steady friend of the Romans. He gave them valuable aid during the first Punic War at the sieges of Agrigentum and Lilybæum. As a reward, the tribute which he formerly paid was remitted, and he was included in the treaty of peace at the close of the first Punic War, B.C. 241. After this he visited Rome, where he displayed great liberality, and received signal honours. At the breaking out of the second Punic War he remained equally steady in his friendship with the Romans, whom he assisted with ships and provisions. He is supposed to have died B.C. 216, upwards of ninety years of age.

His government was mild and eminently popular. He laid aside the pomp of royalty, and appeared undistinguishable from a private citizen. The corn laws which he established were so admirable, that in subsequent times when the Romans took possession of Sicily these laws were retained. His liberality extended to other nations besides the Romans. He sent assistance to the Rhodians, whose city had been destroyed by an earthquake, and in the largest ship then ever built he sent presents to Ptolemy king of Egypt.

HIERONYMUS, king of Syracuse, grandson of Hieron II., succeeded to his grandfather at the age of fifteen, B.C. 216. Up to this time a close friendship had subsisted between the Romans and Syracusans. (See HIERON II.) But the battle of Cannæ, in which the Romans were so terribly defeated, disposed many of the Syracusans to join the Carthaginians. Hieron II. had appointed fifteen guardians, including Andranodorus and Zoippus, to guide the young prince, but through the intrigues of Andranodorus, who was favourable to the Carthaginians, the guardians were all induced to resign their office. The young prince was now entirely under the influence of Andranodorus and Zoippus, who were sons-in-law to Hieron II. Communications were at once opened up with Hannibal. The Carthaginian envoys were received with great favour, whereas the Roman envoys were treated with contumely. Hieronymus was preparing to take the field against the Romans with 15,000 men, when he was assassinated in Leontini by conspirators under Deinomenes. His short reign of one year and one month was disgraced by indulgence in luxury, debauchery, and cruelty. He is said to have desecrated the name of queen by raising a prostitute to that dignity.

HIERRO, ISLE OF, one of the Canaries belonging to Spain. See CANARIES.

HIGDEN, RALPH, or RANULPH, author of the *Polychronicon*, was a monk of the monastery of St Werburg in Chester. He spent sixty-four years of his life in the convent where he finally died at a very advanced age. The date of his death is assigned to various years between 1360 and 1373. The *Polychronicon*, bringing down the history of England to 1357, is written in Latin. Of the original only that part has been published which brings down the narrative to 1066; but an English translation of the whole work by John de Trevisa was printed by Caxton at Westminster in 1482, and has been several times reprinted. Trevisa's manuscript is now in the Harleian collection, and seems not to have been very carefully followed by its original publisher.

HIGHAM FERRARS, a borough and market-town of England, Northamptonshire, 15 miles E.N.E. of Northampton, on the Peterborough branch of the London and and North-Western Railway. The parish church is a large and handsome building, richly ornamented with carvings and monuments. The old cross in the market-place, and the ruins of the ancient college, are interesting to the antiquary. There is a neat town-hall and a grammar school in the town, which before the Reform Act used to return one member to parliament. Shoes are the chief industrial product of the inhabitants. Pop. (1851) 1140.

HIGHGATE, a village of Middlesex, 4 miles N. by W. of London, on the great north road. It stands on a hill about 450 feet high, and commands a striking view of London and its suburbs. The church, built in 1833, is a handsome Gothic edifice, with an elegant spire. On the slope of the hill, immediately below the church, is the North London Cemetery. Highgate has a free grammar and other schools, a literary and scientific institute, dispensary, and an asylum for idiots. Pop. (1851) 4502.

HIGHNESS, a title of honour given to princes. The title of "highness" was given to Henry VII.; and, along with "your grace," continued to be used by Henry VIII. till about the close of his reign, when "your majesty" was adopted in preference to both. Along with other titles, that of "highness" was given to the Prince of Orange by Louis XIV. of France in 1644.

HIGHWAYS, or ROADS, are of various kinds; public highways, parish roads, carriage roads, horse roads, footpaths, and loanings of way for cattle. Public highways are vested in the crown for behoof of the public. In like manner the streets of burghs are held for the public by the magistrates. In no case can they be encroached on without the authority of parliament. The highways in Scotland are now under the regulations of the general statutes 4th Geo. IV. c. 49, and 1st and 2d Will. IV. c. 43, together with local statutes for different counties. The highways in England are under the regulations of the statute 5th and 6th Will. IV. c. 50. The local statutes are interpreted as if they formed part of the general ones, and are only effectual in so far as they are consistent with them. There are also the statutes 3d and 4th Will. IV. c. 33, relative to Highland roads; the 1st and 2d Vict. c. 118, relative to the conveyance of the mails by railroads, and powers of the postmaster-general; and 2d and 3d Vict. c. 45, regulating the crossing of highways by railways. The parish roads are still maintained on their old footing by statute labour. The trustees of highways are not entitled to shut up parish roads, or interrupt servitude roads, in order to compel parties to travel on the highways, whereby they may be made liable in tolls. The other roads or ways mentioned above are properly servitudes or burdens on estates for the benefit of conterminous heritors, their families, friends, and tenants, and bear some resemblance to the Roman servitudes,—*iter*, a right of horse or foot passage, *actus*, a carriage way, and *via*, which was broader than the others, and comprehended the rights of both. The usages of Scotland are analogous to these; excepting that a horse road is not included in a foot road. These servitude rights are sometimes constituted by writing, and sometimes by immemorial possession and acquiescence. In whatever way constituted, they cannot be enlarged without the consent of the owner of the land over which they pass; and he is not bound to be at any expense in maintaining the way. A right merely of footpath does not prevent the owner of the land from inclosing it, provided he leave a stile for the passengers at each end of the enclosure; and he may even shift the line a little if no real inconvenience be occasioned. In England, as in Scotland, a right of way may be acquired by prescription, as when the inhabitants of a hamlet, or owners or occupiers of a farm have immemorially crossed ground for particular purposes, such as going to church, or market, or the like; for such immemorial usage supposes that there was originally a grant. The great distinction between a servitude of way and a public road is, that the former belongs only to the parties by whom it has been acquired, while the latter is open to any body who chooses to use it, and who may even *brevi manu* remove any unwarranted obstructions that have been recently erected.

HIGHWORTH, a market-town of England, Wiltshire, on a hill 26 miles N. by E. of Devizes. Its church, which belongs chiefly to the fourteenth century, contains some curious old monuments. Market-day, Wednesday. Pop. of parish (1851), 4026.

HILARIA, a great Roman festival, celebrated in honour of Cybele at the vernal equinox. It was begun on the 22d of March and brought to a close on the 25th. The last day of the feast was the most important, and the inhabitants of the city then abandoned themselves to the most extravagant merry-making. All kinds of amusements were in vogue, especially masquerading, which, from the earliest times, has been popular in Italy. The only religious ceremony was the solemn procession of the priests, who bore round the streets the statue of the great mother of the gods with many solemnities. The only object of the festival was to celebrate the departure of winter with its snows and gloom, and to hail the approach of spring.

HILARY, Bishop of Arles, was born in Gaul at the beginning of the fifth century. Belonging to a family of distinction, he received a good education and gave early proof of ability and perseverance. Through the influence of Honoratus, abbot of Lerins, he became a monk; and after some strong opposition on his part, he consented to become bishop of Arles, at the early age of 29. The part which he took in the deposition of Chelidonius involved him in a quarrel with Leo the Great. Both Hilary and Chelidonius betook themselves to Rome, but Hilary, though willing to consult Leo, was not willing to submit to his authority. This at once provoked the hostility of the Pontiff. The deposition of Chelidonius was cancelled, and Hilary was obliged to make his escape, as best he could, back to Gaul. After being deprived of his authority by Leo, the well-known edict of Valentinian III. decreed, "Ut Episcopis Gallicanis omnibusque pro lege esset quidquid apostolicæ sedis auctoritas sanxisset, &c." This encroachment upon Gallican ecclesiastical liberty is important in the controversy between Romanists and Protestants, as showing, first, that about the middle of the 5th century supreme power was claimed by the Roman Pontiff; and, secondly, that this claim was resisted by the metropolitan of Gaul. Hilary died A.D. 449, 49 years of age. He wrote numerous epistles, of which that addressed to Eucherius is extant. We have also his life of Honoratus his preceptor.

HILARY, the *Deacon*, was born in Sardinia in the middle of the 4th century. He and Lucifer of Cagliari appeared at the Council of Milan before Constantius, to defend the followers of Athanasius. His remarks offended the emperor so much that he was ordered to be scourged and sent into banishment. He held that all heretics, including Arians, should be re-baptized before admission to the Catholic Church. Some writings ascribed to him are probably not his.

HILARY, *St*, Bishop of Poictiers, was born in the same town at the beginning of the 4th century. His parents were pagans of distinction, who afforded him every means of acquiring a good education. He was particularly struck with the writings of Moses, and afterwards with the gospels. He became a Christian, and was baptized along with his wife and daughter. He was greatly respected in his native city, and, although married, he was chosen bishop. This took place at the middle of the 4th century. At this period Arianism was spreading rapidly through the Western Church, and he set himself to oppose it. With this view he obtained the excommunication of Saturninus, bishop of Arles. But by the Council of Beziers, A.D. 356, he was banished to Phrygia. In 359 he made his appearance at the convocation of bishops at Sileucia in Isauria, and energetically resisted the opponents of the consubstantiality of the Word. Thereafter, at Constantinople, he was so persevering against the prevailing Arianism of the court, that he was sent back to his bishopric at Poictiers. Though he was received in triumph, he had enough to do for some time in eradicating the Arianism which had sprung up during his absence. After expelling Saturninus a second time, he accused Auxentius, bishop of Milan, of holding erroneous views. Both were summoned before the emperor Valentinian. Auxentius gave satisfactory answers. Hilary declared him a hypocrite, and was ordered to leave Milan as a disturber of the peace of the church. He died in January 368. His great energy of character, his courage and unwearied perseverance rendered him very influential during his life. His zeal, however, was often injudicious. He was called the hammer of the Arians (*Malleus Arianorum*), from his determined opposition to the Arian heresy. Of his works, his *Commentary on Matthew* is the oldest extant on that evangelist. His most elaborate work consists of twelve books on the Trinitarian controversy. He wrote several books addressed to the Emperor Constantius in favour of the Catholics against the persecutions of the Arians; he wrote also several epistles still extant, and some poems have been ascribed to him. The best edition of his works is that of Constant, reprinted by Scipio Maffei, 1730. 2 vols. folio.

HILARY TERM, a legal term in England, beginning January 11, and ending January 31. The festival of St Hilary, from which this term takes its name, is January 13.

HILDBURGHAUSEN, a town of Central Germany, duchy of Saxe-Meiningen-Hildburghausen, on the Werra, 17 miles S.E. of Meiningen. It was formerly the capital of Saxe-Hildburghausen till the union of that duchy with Saxe-Meiningen, and is now the seat of a consistory and of an upper district court. It has a gymnasium, normal, trade, and Jewish schools, and a lunatic and an orphan asylum. The castle is a fine building. Manufactures chiefly cloth and papier-maché. Pop. 4300.

HILDESHEIM, a province of Hanover, comprising the principality of Hildesheim, which forms the most southern part of Hanover Proper, the principalities of Göttingen and Grubenhagen, the county of Hohnstein and the Lower Eichsfeld. Area 1717 square miles. The principality of Hildesheim originated in a bishopric instituted in 812 by Charlemagne, at Else, but removed in 822 to Hildesheim. In course of time, the bishops acquired a considerable territory, amounting, in the beginning of the present century, to 682 square miles. The last prince bishop of Hildesheim possessed also the bishopric of Paderborn, acquired by his predecessor. Both bishoprics were secularized and ceded to Prussia in 1803. In 1807 they were incorporated with the kingdom of Westphalia, but were restored in 1813 to Prussia, which ceded Hildesheim to Hanover, retaining only Paderborn. The principality of Hildesheim is generally level except towards the S., where it is traversed by branches of the Hartz. Its principal stream is the Innerste, an affluent of the Leine. A considerable portion of the surface is wooded, and the rest yields moderate crops of rye, barley, flax, and potatoes, with some wheat. The chief manufacture is linen. The principality of Göttingen is mostly covered with mountains, offsets of the Hartz, chiefly of basaltic formation. The principal river is the Weser. The soil in the mountain districts is generally stony, but that of the valleys is of great fertility. Sheep are reared in great numbers. Grubenhagen is, like Göttingen, for the most part mountainous, but the peaks are higher, and include some of the loftiest summits of the Hartz. The climate is bleak and variable. Some of the valleys are fertile and well cultivated, but these are exceptions to the general sterile character of the soil. Woods and forests, which cover above half its surface, constitute the chief wealth of the district. The mines are valuable, and yield silver, copper, lead, iron, zinc, vitriol, and sulphur. The remaining portions of the province are too small to require particular notice. Pop. of province (1852), 186,628, of whom 296,734 were Lutherans, 60,302 Roman Catholics, 7627 Reformed, and 3023 Jews.

HILDESHEIM, the capital of the above province, stands on the right bank of the Innerste, 18 miles S.E. of Hanover, with which it is connected by railway. It is a large old town, irregularly built, and surrounded by ramparts now used as public promenades. The cathedral (founded by Louis the Pious, in 818) is remarkable for its fine bronze gates of the 11th century, and paintings on glass; among its antiquities is a marble pillar supposed to have been a Saxon idol, but now surmounted by a cross. Several of the other churches are remarkable for their antiquity and monuments. The educational institutions comprise a Roman Catholic and a Lutheran college and numerous schools. It has also a lunatic, a deaf-mute, and several orphan asylums, and a large workhouse. The chief manufacture is coarse linen cloth. Pop. 14,700, of whom about one-third are Roman Catholics.

HILL, AARON, an English miscellaneous writer of the eighteenth century, was born at London in 1685. His education at Westminster School was broken off in consequence of his father's imprudence, who allowed the family property to go to ruin, and thus, at the early age of fourteen, he began that career of adventure which only ended with his life. Leaving England, he proceeded to Constantinople, where he was kindly received by Lord Paget, a relation of his mother's, who was then British ambassador at the Turkish court. Under the care of a tutor provided by this considerate friend, young Hill travelled through Palestine, Egypt, and a great part of the East; returning to England about the year 1703. A misunderstanding with his patron compelled him to go abroad as travelling companion to a rich Yorkshire baronet; and on reaching home in 1709 he published his *History of the Ottoman Empire*, which, even by his own admission, had far more success than it deserved. About the same time appeared his poem of *Camillus*, in honour of the famous Charles Mordaunt, Earl of Peterborough; and in the same year he was made master of Drury Lane Theatre, and afterwards of the Haymarket. Both of these offices he soon after lost through his indiscretion, and spent the remainder of his life partly in literary pursuits, and partly in commercial speculations, which were all unlucky. One of these schemes called him to the Highlands of Scotland, and while there he wrote *The Progress of Wit, being a Caveat for the use of an eminent Writer*. The "eminent writer" was Pope, who had introduced Hill into the *Dunciad*, though in a way that was in fact complimentary, and the "caveat" is said to have made him feel very uneasy. Hill died in 1749, at the very moment, it is said, of the great earthquake of that year, and was buried in Westminster Abbey. Two only of his seventeen dramas are now remembered, *Zara* and *Merope*, both adaptations from the French of Voltaire. His poetry is stilted and commonplace, and even the *Progress of Wit* never rises above a flippant smartness. Though a poor and tasteless poet, and afflicted with an overwhelming sense of his own importance, Hill was an honourable man, and his letters to Savage show his character in a very amiable light. His letters with the author of *Pamela*, extending from 1730 to 1748, are not quite so creditable to his taste. Some of them were prefixed by Richardson to an edition of his *Pamela*, and described as coming from "a gentleman of the most distinguished taste and abilities." Till it was known that the "gentleman" in question was Aaron Hill, great weight was attached to the testimony of the anonymous correspondent.

HILL, *George*, Principal and Doctor of Divinity of St Andrews, was born at St Andrews in 1750. He gave early indication of good abilities, and of a leaning towards the clerical profession. He gained the first prize in the competition proposed by the Earl of Kinnoul, chancellor of the university, and this was the beginning of a friendship which lasted for life. Through Principal Robertson, Mr Hill was appointed tutor to the eldest son of Pryse Campbell, Esq., M.P., with whom he went to London in 1767. This enabled him to send pecuniary assistance to his mother, whom he tenderly loved, and who had a family of six to rear upon very small means. In London he was not a little indebted to his attendance on a society called the Robin-Hood Society for his proficiency in oratory. In 1771 he removed with his pupil to Edinburgh, and in the following year was appointed joint-professor of Greek in St Andrews. In 1775 he was licensed by the Presbytery of Haddington to preach the gospel, and ordained by the same body in 1778. His eloquence and impressiveness procured his appointment to the second charge in St Andrews in 1779. In the following year, by which time he was well known as one of the most popular and efficient ministers in the church, he got the degree of doctor in divinity. In 1808 he was translated to the first charge in St Andrews. He soon afterwards became successor to Principal Robertson as leader of the *Moderate Party* in the controversy with regard to patronage.

Principal Hill deserves honourable mention as the reviver of the study of theology in St Andrews. He had been admitted to a divinity chair in 1788, and, with his energy and ability, theology was treated in a manner very different from what had hitherto prevailed. His *Lectures* were a good antidote to the superficial "refutations" of Calvinism upon which English divines sometimes ventured. In 1791 he was appointed Principal of St Mary's College. In 1816 his health began rapidly to decline, and in 1819 he died in the 70th year of his age.

Hill, *Sir John*, an English botanist and social notability of the eighteenth century, was born in London about 1716. He began life as an apothecary in Westminster, was afterwards keeper of the botanical gardens of various noblemen, next took to the stage, from which he was hissed, and ended by adopting the career of letters. Some little scientific treatises which he published met with great success, and this success completely turned his head. He set up a carriage, affected the airs of a fine gentleman, and tried to force his way into fashionable society. To effect the latter purpose he established a paper, *The Inspector*, in which he chronicled all the gossip and scandal current among "the quality," and which he used as a vehicle for puffing the quack medicines in which he dealt largely. His audacious impudence and insatiable vanity urged him to court notoriety in any form, and neither was he in the least abashed by the personal castigations which he not unfrequently received in public from the victims of his scandalous periodicals. Had he not preferred to be notorious he might have been famous, for he really did possess a very considerable aptitude for science; and to botanical science, in particular, he made some valuable contributions, such as his *Vegetable System*, in 26 vols., 1759-75. The price of this work was 38 guineas plain, and 160 with the plates coloured. His *British Herbal; General Natural History*; and *History of the Materia Medica*, were all far from contemptible works. One of the great objects of his ambition was to be admitted into the Royal Society, but his applications were always rejected with scorn. Enraged at his repeated failures, he published a *Review of the Works of the Royal Society*, in which he exhausted against some of his early friends and benefactors all the resources of his wit and scientific knowledge. His self-love was a little consoled by his receiving from the university of St Andrews, in Scotland, the honorary degree of M.D., and from the king of Sweden, to whom he used to send his works, the title of Chevalier of the Order of Wasa, on the strength of which he called himself Sir John. He died in 1775. (An extremely good account of Sir John's quarrel with the Royal Society, and many interesting details of his life, are given in Disraeli's *Miscellanies of Literature*.)

Hill, *Rev. Rowland*, A.M., the most popular preacher of the Whitefield school that has appeared in England since Whitefield's death, was a cadet of the patrician family of the Hills of Hawkstone, in Salop, and was born in 1745. Like other members of his family, Rowland Hill gave early evidence of piety; and at Eton and Cambridge, where he was educated, he evinced it under circumstances which put its genuineness beyond a doubt. While a student at the university, where he graduated with great distinction, he spent all his leisure time in visiting the sick and poor, and in praying from house to house—conduct so utterly at variance with the received notions of college decorum, that he was only saved from expulsion by the powerful influence of his family. After taking orders, he was appointed in 1773 to the parish of Kingston, Somersetshire, where he began to indulge his favourite taste for open-air preaching, and soon attracted great crowds of the rural population to the sermons which he preached nearly every day of the week. In 1782, having resolved to make the metropolis his headquarters, he had the Surrey Chapel built for him, and soon filled it with an audience such as no other preacher in London could boast. During the summer months he retired to his country-house in Wales, whence he made what he called "gospel tours" into all parts of the country. In 1798, and again in 1824, he visited Edinburgh, where, on the Calton Hill, he preached to audiences of ten, fifteen, and even twenty thousand persons. After these tours he always returned with renewed enthusiasm to his duties at Surrey Chapel, where he continued to officiate almost to the day of his death, 11th April 1833.

Without a tithe of the intellect or literary skill of his great contemporaries, Hall and Chalmers, Rowland Hill had yet a gift of popular oratory nowise inferior to theirs. His power over a mixed audience was scarcely surpassed by that of Whitefield, whom he seems to have had always before his eyes as his model. There was no faculty which he possessed that he did not freely avail himself of in driving home into the hearts of his hearers the great truths of the gospel. Not unfrequently he violated the laws of good taste by eccentricities of manner, but, whether he convulsed his hearers with the broadest humour or the most pungent wit, or melted them to tears with the deepest pathos, he never lost his moral influence over them by condescending to buffoonery on the one hand or melo-dramatic affectation on the other. His earnestness and intensity carried him safely through where a mere actor would infallibly have broken down. The current stories of his pulpit eccentricities require to be received with great caution. His works, which were for the most part on controverted subjects of temporary interest, are already forgotten, but the memory of the man will long be cherished by his country as one of the most truly apostolic and disinterested ministers whose names adorn the annals of the national church. (An ambitious but ill-written life of Rowland Hill, by the Rev. Edwin Sidney, A.M., a protégé of his, was published in London in 1834.)

Hill, *Rowland*, better known under his title of Lord Hill, was one of the most distinguished officers in the British army during the great wars of revolutionary France. He was a cadet of the ancient family of the Hills of Hawkstone, in Shropshire, and was the nephew of his namesake the famous preacher. Born in 1772, and entering the army very young, Hill received, or at least completed, his education at the military school of Strasbourg. He took part in the siege of Toulon, and afterwards in the Egyptian campaign, and, partly by purchase, partly by merit, rose to the rank of major-general. In 1808 he went to Spain with the Duke of Wellington, and from Vimeiro to Vittoria, in advance or retreat he proved himself the most indefatigable coadjutor of the great captain. In 1809 he was appointed to succeed Lord Paget; two years later he defeated the French under Girard at Cavarez with great slaughter; for his conduct at Talavera he was publicly thanked by parliament; and for his capture of the forts of Almarez, which cut off the communication between the French armies on the N. and S. sides of the Tagus, he was rewarded with the title of Baron of Almarez. In 1813 he held temporarily the chief command of the English and Hanoverian troops in Belgium; and two years later crowned the glories of his noble career by his conduct at Waterloo. In 1828 he was made commander-in-chief, and exercised all the influence of his fame and position to improve the condition and promote the interests of the British army, in which he effected many valuable reforms. In the distribution of the extensive patronage which he had to dispose of he was proverbially impartial, and always made a point of advancing professional merit, regardless of the claims of party or family connection. On resigning the command-in-chief in 1842 he was made a viscount, which honour, however, he did not long live to enjoy, as he died on the 10th December of that same year.

Lord Hill was the most popular soldier of his time in the British service, and was so much beloved by the troops, especially those under his immediate command, that he gained from them the honourable title of "the soldier's friend." "With Hill," they used to say, "both victory and life may be ours." On the other hand, the strategic skill and military capacity he displayed in the Peninsula secured for him the not less honourable title of "the right arm of the Duke of Wellington." From the first day he entered the army he displayed the germs of those qualities that afterwards led him on to fame, rank, and power—boldness that amounted to daring, and was yet always under the control of the judgment, skill equal to independent commands of the most difficult kind, and a regard for the moral and physical welfare of the army such as had never before been shown by any commander-in-chief.

HILLAH. See Babylon.

HILLEL, Rabbi, born at Babylon, 112 B.C. He went to Jerusalem to study law at the age of 40. When 80 years of age he became chief of the Sanhedrim. He was one of the compilers of the Talmud, and is regarded by the Jews as the most learned of their doctors. He gave instruction in the laws and traditions to more than a thousand pupils. His master was Shammai, with whom he did not agree on some points. The difference became a quarrel, warmly taken up by the disciples of each, and ending in some bloodshed.

HIMALAYA, a Sanscrit word, compounded of "hima," *cold* or *snow*, and "alaya," *place of* (Wilson's *Sanscrit Dictionary*), is the name given to the ranges of mountains which bound India on the N., from the bend of the Indus on the W. to that of the Brahmaputra on the E. On the S. they are bounded by the plains of India, and on the N. by the Tibetan courses of the above-named rivers. A transverse section of the Himalaya nowhere presents the appearance of a simple range, but of several more or less parallel chains, separated by valleys of very great depth and steepness; this is because the secondary ranges that ramify N. and S. from it are of great length, breadth, and complexity, and from bending to the E. or to the W., often run for many miles parallel to one another and to the main range, besides rising into eminences loftier than any on the latter, for which they are sometimes mistaken. The axis of the Himalaya is, moreover, not marked out by any continuous ridge or succession of peaks, but is often broad, open, and low, compared with the neighbouring isolated eminences. Hence the line of watershed becomes the only geographically determinable axis; and this, as in all mountain chains of any extent, follows an extremely sinuous course. No doubt this line, which throws the waters in two opposite directions throughout the whole extent of the range (1440 miles), is also that of greatest elevation, or that along which the land is uninterruptedly the most lofty.

Before, however, the real nature and geographical limits of the Himalaya, as above defined, can be rightly understood, it is necessary to consider this range in its relation to the little known mountain systems of Central Asia, of which it perhaps forms a less important part than is usually supposed. On reference to the map of Asia, the watershed of that continent will be found to follow a tortuous line, running diagonally from the peninsula of Gujerat to Behring's Strait. Across the plains of India this line is for the most part indicated by the Arawali chain, N. of which it crosses the Himalaya obliquely in a N.E. direction to the sources of the Indus and Brahmaputra, whence it trends westerly to the source of the Oxus, and then again north-easterly along the Altai to the S. of Lake Baikal, till it becomes the Iablonoi Mountains, and finally terminates in the prolongation of that range which traverses the country of the Tchuktchi.

All the great rivers of Asia rise in this watershed; those from its western slope flow N. into the Polar Sea, W. into the Caspian or Aral, and S.W. into the Arabian Sea; those from its eastern slope flow E. and S.E. into the Pacific, and S. into the Indian Ocean. Enormous mountain chains branch off to the E. and W. of this main axis, inclosing the valleys of the rivers; and of these chains the southernmost is the Himalaya.

Limits of the chain.

In their Tibetan courses the Indus and Brahmaputra occupy valleys of great elevation, and the opposite directions taken by them indicates the division of the Himalaya into two portions, the eastern of which stretches from their sources at the Peak of Kailas to the bend of the Brahmaputra, and the western terminates at the bend of the Indus. These limits are more natural than is usually supposed, since the prevalent idea that the Brahmaputra enters Assam through a defile caused by a break in the chain is erroneous; on the contrary, the Himalaya gradually declines in elevation in East Bhotan; and the upper valley of the Dihong (as the Brahmaputra at its bend is called), is, according to the best information hitherto procured, broad, open, and hot—rice being cultivated there on the very confines of Eastern Tibet. So also the Indus at the western extremity of the chain is usually described as flowing through a defile; but though its valley to the W. of Kashmir is contracted and rugged, and overhung by stupendous mountains, it does not in this respect differ materially, if at all, from the remainder of its Tibetan course; nor is the fall of its bed between Iskardo and the plains of the Punjab greater in proportion to the length of its course than it is above that town.

The branches or secondary ranges of the Western Himalaya are so long and lofty, that some difference of opinion exists as to which of them should be most appropriately considered as the continuation of the chain between the peak of Kailas and Kashmir; and we have considered the line of watershed between the tributaries of the Indus to the N., and the rivers that flow to the plains of India to the S., to be the axis of the chain, since it both indicates the line of mean greatest elevation, and is the only definable axis in a geographical point of view.

Of the secondary chains we shall speak at length in connection with the rivers they inclose. Their direction is often perpendicular to the main chain, but they are so often oblique, and even parallel to the main chain, especially at their upper parts, that where very lofty and heavily snowed, they are frequently taken by local observers for the axis of the Himalaya itself; an error to which may be traced that misconception regarding the relative amount and duration of the snow on the northern and southern slopes of the Himalaya, which has led to so much fruitless controversy in India and Europe.

The general direction of the Himalaya throughout its length of 1440 miles, is E. and W., but it trends northwards from the centre towards its western extremity, its extremes being respectively in N. Lat. 28., E. Long. 95., and N. Lat. 35., E. Long. 73. Its breadth varies in different parts, but has been accurately ascertained in the western portion only, where it deviates but little from 190 miles.

It has been stated[1] that the mountain ranges of the Himalaya and the Kouenlun[2] have no special existence as chains apart from the general elevated mass of Tibet, and that that rugged country forms the summit of a great protuberance above the level of the earth's surface, of which the two chains form the N. and S. faces. This view is derived, no doubt, from the appearance of extreme confusion that prevails in this, as in every mountainous country. In the Himalaya, as in Switzerland, the traveller, in crossing ranges and valleys at all angles, perceives no order, and finds it impossible to trace rivers or chains from elevated positions; whilst in following the courses of the valleys, their bounding mountains shut out all beyond; and it is only after a map has been constructed that the relations between the several parts of a mountainous country can be traced with accuracy. The mountain system of Central Asia differs in a physico-geographical point of view from that of Europe only in bulk. The relation of the Kouenlun to the Himalaya is similar to that of the Bernese to the Monte Rosa Alps. These have not, it is true, a separate existence apart from the general mass of the Alps, but that they have a special existence also is proved by the positions of the sources of the rivers that flow to the northward and southward from each. Taking as an example the western half of the Himalaya and the parallel range of the Kouenlun, the facts that the average elevation of the watersheds of both is continuously above 18,000 feet the whole way from the Kailas to the meridian of Kashmir, whilst innumerable peaks on each rise above 20,000 feet, and that the inclosed river-bed of the Indus falls from 15,000 to 7000 feet in the same distance, appear sufficient evidence that the ranges in question have a definable existence in a geographical point of view. The elevation of the Kouenlun and Himalaya above the bed of the Indus is continuously higher in proportion than that of the Bernese and Monte Rosa Alps above the bed of the intervening Rhone.

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[1] Captain R. Strachey, *Journ. Geog. Soc.*, May 1851; *Quart. Journ. Geol. Soc.* 1852 (249).

[2] By this general name we shall (following Humboldt) designate the two chains parallel to the Eastern and Western Himalaya respectively, and north of them, and which together stretch from the sources of the Oxus to Eastern Assam. Its western branch, from the Peak of Kailas to Balti (in W. Tibet), has been called the Kailas and Karakoram range: of its eastern branch nothing is known.

General features of the Himalaya.

Before detailing the physical features of the Himalaya, it appears advisable to give some general idea of its scenery and aspect; this is derived from the impressions produced on experienced travellers who have described it. Of these there have lately been many, and although few of them have had that previous familiarity with mountain regions which would enable them to judge of the Himalaya by comparison, the narratives of Moorcroft, Thomson, the Stracheys, Cunninghams, and others, all abound in accurate and often graphic details.

Viewed from a distance, on the plains of India, the Himalaya presents the appearance—common to all mountainous countries—of consecutive parallel ridges, running E. and W.; backed by a beautiful crest of snowy peaks, with occasional breaks in the foremost ranges, through which the rivers debouche. This appearance of parallel ranges is owing to a very simple and often overlooked law of perspective; in consequence of which masses of mountains, of whatever configuration, resolve themselves into ranges perpendicular to the line of sight.[1] Any view of the Himalaya, especially at a sufficient distance for the remote snowy peaks to be seen overtopping the outer ridges, is, throughout a great extent of the range, rare, from the constant deposition of vapours over the forest-clad ranges during the greater part of the year, and the haziness of the dry atmosphere of the plains in the winter months. At the end of the rains, when the S.E. monsoon has ceased to blow with constancy, views are sometimes obtained from a distance of nearly 200 miles. From the plains the highest peaks subtend so small an angle that they appear like white specks very low on the horizon, tipping the black lower and outer wooded ranges, which always rise out of a belt of haze; and from the density, probably, of the lower strata of atmosphere, they are never seen to rest on the visible horizon. The remarkable lowness on the horizon of the whole stupendous mass is always a disappointing feature to the new comer, who expects to see dazzling peaks towering in the air. Approaching nearer, the snowy mountains sink behind the wooded ones long before the latter have assumed gigantic proportions; and when they do so, they too often appear a sombre, lurid, grey-green mass of vegetation, or rock, with no brightness or variation of colour.

The mountains once entered, the appearance of parallel ridges is found to be deceptive, and due to the inosculating spurs of long tortuous secondary ranges that run N. and S. from the axis, dividing deep wooded valleys, which flank the beds of large rivers. The snowy peaks now look like a long E. and W. range of mountains, at an average distance of 30 or 40 miles. Advancing farther into the country, this appearance proves equally deceptive, and from the same cause. The snowy range is finally resolved into isolated peaks, or masses, situated on the secondary ranges; and the source of the deception is found to be that these snow-clad spurs, projecting E. and W., cross one another, and, being uniformly white, appear to connect the peaks into one grand unbroken range. The rivers, instead of having their origin in the snowy mountains, rise far beyond them: many of their sources are upwards of 100 miles in a straight line from the base of the mountains, in a very curious country, loftier by far in mean elevation than the secondary ridges which run S. from it, yet comparatively bare of snow. This rearward part of the mountain region lies in Tibet, and it is here that most of the rivers rise as small streams, which increase rapidly in size as they receive the drainage from the snowed part of the secondary ranges that bound them in their courses.

Terai.

A belt of tropical forest, 10 to 20 miles in breadth, skirts the southern foot of the Himalaya throughout the greater part of its length. Its presence is due to the humidity of the climate, and to copious springs, which often give rise to marshes which cover the ground at the base of the mountains. This tract is called the Terai, and is notorious for its malarious atmosphere, which renders it almost certain death to spend any time in it during the spring and autumn (before and after the rains). The Terai belt is broadest, most luxuriant and humid in the Assam valley at the eastern extremity of the chain, narrowing with the diminished humidity and colder winters of the western part. It decreases in breadth, and partially loses its tropical character towards the central districts; whilst to the westward of the Sutlej it disappears, or is represented by a low jungle of bushes, containing but few tropical plants.

Outer hills.

Beyond the Terai the mountains rise more or less suddenly, though seldom in precipices. Throughout the eastern parts of the chain they are luxuriantly wooded, while to the westward they are covered with a looser, drier forest, or with brushwood. The mountain region may be entered by following the course of one of the main rivers, or by ascending the outlying spurs which bound them, and which run more or less parallel to the general direction of the chain. The roads almost invariably ascend these spurs, because the malarious region extends far up the valleys, and the banks of the rivers are usually impracticable for paths. The Himalaya once entered, the traveller's route is thenceforth an uninterrupted series of ascents and descents. There are no level tracts, plains, nor flats by the streams, of any breadth or continuity; an endless succession of ridges, several thousand feet high, and as many streams, are crossed on almost every day's march towards the axis of the chain; and during the warmer part of the year the amount of forest, fog, and cloud is so great, that until the alpine regions are reached, the traveller seldom enjoys any of those magnificent panoramic views for which the Cordillera and the European Alps are so celebrated.

Throughout the temperate and wooded regions it is scarcely possible for the traveller, let his powers of observation be ever so good, to understand the relations of the innumerable rivers and ridges he traverses. The country resembles a troubled ocean; and there being no apparent order, it is only by taking the main river that flows from the watershed as the starting-point, and laying down its course on paper with some accuracy, that a correct idea can be obtained of the structure of the valley which the traveller is ascending, and its relation to the secondary Himalayan chains that bound it.

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[1] Thomson's *Tibet*, p. 2.

The roads from India to Tibet are always carried along the flanks of these broad valleys, for the ridges of the secondary chains are too lofty, rugged, and tortuous to admit of roads being constructed along their crests, while the river banks are hot, and excessively tortuous and rocky. It is the necessity for crossing the spurs from these secondary chains, with their innumerable subdivisions and contained streams, which doubles the length of the route from the plains of India to the axis of the chain; the average distance, which is only about 100 miles, usually occupying from twelve days to a fortnight to traverse; and the total ascent, which is on the average 16,000 to 18,000 feet, being performed many times over, besides involving descents which are so steep as to be hardly less fatiguing than the ascents.

Outer valleys, dhuns, &c.

Immediately within the mountains the outermost lateral valleys (containing the feeders to the main rivers) are often broad, and bounded (especially those in the western parts of the chain) on one or both flanks by low sandstone hills. The breadth and extent of these, together with the peculiarity of the rock, has given them an undue importance in some respects. Such broad open valleys are called dhuns, and the sandstone hills (sometimes called the Sewaliks) have been supposed to constitute a system distinct from the Himalaya, but skirting its base. This theory has, however, been rejected by Dr Thomson,[1] who shows that the dhuns are valleys of precisely the same nature as the other lateral valleys; and that the sandstone ranges, however different in a geological point of view, are, in a geographical one, the terminal spurs of the ranges bounding the river valleys. Where the dhuns are very open, flat-floored, and with gradually sloping beds, their true relation to the surrounding mountain-chains is not at once apparent. Sometimes they appear to be indefinitely extended E. and W., in a direction parallel to the Himalayan chain; and, running from one great river to another, they appear to belong to a different order of valleys from those which occur further within the mountains. This arises in some cases from the slope of their beds being so extremely gradual that the watershed between the valley that ascends from the one river, and the corresponding valley that descends to the other river, can only be detected by observation of the drainage; whence the two valleys appear to form one. Such is the case with the celebrated Dehra Dhun in Kumaon, which appears to form one continuous transverse valley between the Jumna and the Ganges, but which really consists of two valleys; one descending from the village of Dehra (which occupies the *col*) westerly to the Jumna, and the other descending from the same spot easterly to the Ganges. Other dhuns, again, are simply very broad, open valleys, differing in no physical features from those that occur in other parts of the mountains. In the Punjab-Himalaya, where the tertiary sandstones acquire a great development, two or three such valleys occur in succession before the higher mountains begin. These dhuns are not, as is very generally supposed, continuous along the whole extent of the Himalaya, and interposed between the tertiary and secondary mountains. They are merely the outer series of lateral valleys, and are always of limited extent.

Temperate and alpine regions.

It is in the alpine and upper temperate regions of the Himalaya that the most interesting phenomena of the range are concentrated, where the climate resembles that of Great Britain and the alpine districts of Europe; and the scenery, if not so picturesque, exceeds in grandeur that of Switzerland and the Tyrol. Throughout the Indian watershed of the chain, the main features, between 8000 and 14,000 feet, are more or less conspicuously European; whether or not they equal those of the Alps may be doubted. In absolute height and mass the Alps of course cannot be compared with the Himalaya; and such a view as the following extract describes (whose main features are characteristic of all parts of the range) is doubtless unrivalled on the globe. The author was at the time in Sikkim, not far from the centre of the chain, and his description embraces the snowed mountains, including the loftiest in the world, as seen from the N. flanks of the outer ranges. "The actual extent of the snowy range seen from Darjiling is comprised within an arc of 80° (from north 30° W. to north 50° E.), or nearly a quarter of the horizon, along which the perpetual snow forms an unbroken girdle or crest of frosted silver; and in winter, when the mountains are snowed down to 8000 feet, this white ridge stretches uninterruptedly for more than 160°. No known view is to be compared with this in extent, when the proximity and height of the mountains are considered; for within the 80° above-mentioned more than twelve peaks rise above 20,000 feet, and there are none below 15,000 feet, while Kinchin is 28,178, and seven others above 22,000. Kinchin-junga (45 miles distant) is the prominent object, rising 21,000 feet above the level of the observer (28,178 above the sea) out of a wilderness of intervening wooded ranges; whilst, on a line with its snows, the eye descends below the horizon to a narrow gulf 7000 feet deep in the mountains, where the great Rungeet, white with foam, threads a tropical forest with a silver line." From another point of view in the same country, and also at 7000 feet elevation, the eye surveys at one glance the vegetation of the tropics and the poles. "Deep in the valleys the river beds are but 3000 feet above the sea, and are choked with fig-trees, plantains, and palms; to these succeed laurels and magnolias; and higher up still, oaks, chestnuts, birches, &c. Pine forests succeed for 2000 feet higher, when they give place to a skirting of rhododendron and berberry. Among these appear black naked rocks, rising up in cliffs, between which are gulleys, down which the snow in January descends to 12,000 feet, ascending in one unbroken sweep to peaks of 18,000 to 25,000 feet. (*Himalayan Journals*, vol. i., p. 123 and 327).

The Alps nowhere present panoramas so remarkable as these; but when once amongst the snowy mountains, the traveller's position, in respect of proximity to the snowy masses, as well as in elevation, is analogous in both ranges; the absolute heights of the principal objects being nearly the same, and strictly comparable. The apparent elevation of a mountain range is merely relative; and throughout the enormous arc of horizon embraced in a Himalayan view, its apparent vertical height is much diminished by the great distance of the nearest objects. To view Kinchin-junga as Mont Blanc is viewed from Chamonix, the traveller must ascend to 12,000 feet, for it is at that elevation that the vegetation and physical features of the valleys, caused by the moraines, &c., are analogous to those of 3000 feet in the Alps; and from such positions Kinchin-junga being but 3000 or 4000 feet higher above the observer than Mont Blanc (a difference not appreciable by the eye amid such scenes), and being further from the spectator, is not a more strikingly grand mountain than Mont Blanc. In the long extent of the Himalaya there are alpine scenes of unrivalled grandeur; but owing to the rarefaction of the atmosphere, and other causes, these regions will always remain inaccessible to any but the most hardy seekers of the picturesque, for they can only be viewed under circumstances of extreme physical discomfort. In certain respects, again, the Himalayan valleys are greatly inferior to the Alpine, for they want both lakes and cascades; and though Himalayan travellers may find scenes more awful, and solitudes immeasurably more impressive than any the Alps present, there are none known which, in grandeur, beauty, and picturesqueness combined, are to be compared with Lauterbrunnen or the valley of Chamonix. Nowhere in the Himalaya do blue glaciers, descending from mountains towering 10,000 feet above, pour their icy streams on to the flat floors of green valleys covered with corn, flocks, and villages; whilst lakes reflecting both the forest-clad base and snow-clad summits of one and the same mountain are, we believe, wholly unknown in Northern India.

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[1] *Tibet*, p. 314. Introductory Essay to the *Flora Indica*, p. 169.

Tibetan regions and axis of the range.

Immediately beyond the most heavily snowed ranges of the chain the still ascending traveller enters on the loftiest, coldest, and windiest desert to be found in the temperate zone of either hemisphere, a country contrasting quite as much with the alpine country he has just left, as with the tropical regions at the base of the mountains. This is the axis of the Himalaya, where all its rivers have their rise, and which owes its freedom from snow in part to its distance from the sources of humidity and the mass of intervening ranges, but in part also to its great elevation; for it is in the lower part of the atmospheric column that most vapour is suspended; and as the humid wind only blows from the S., the bulk of its moisture is deposited in the form of rain on the southernmost parts of the mountain range, and of snow on the secondary ranges, 15,000 to 20,000 feet high, which extend many miles S. from the axis. Hence the clouds get absolutely dispersed before they can reach the latter point, and the traveller who has crossed that part of the range where enormous snow-beds and glaciers descend to 15,000 or 16,000 feet, and thence ascends to 18,000 or 19,000, finds no snow at that level; whilst the surrounding mountains also are so bare of snow that it is difficult to conceive that he has not descended an opposite slope.

The features of the main axis of the Himalaya differ greatly at different points of the chain; it is usually broad, and is always characterized by extreme vicissitudes of temperature. As with the Cordillera, the Norwegian Alps, and many other mountain ranges, the line of the watershed is not marked by any continuous ridge or succession of ridges; loftier eminences oftener rise in its proximity, from the spurs that branch off from it than from itself; and as the southernmost of these are (as has been already shown) always very heavily snowed, it has been usual to consider the belt of the most snowed peaks (which, as seen from the southward, shuts out the view of the loftier rearward axis), as the crest of the Himalaya. Dr Thomson has, however, pointed out that the deceptive effects of false perspective, the rarity of snow, the absence of a defined ridge on the axis, and the occasionally greater elevation of isolated peaks on the subsidiary ranges, have led to the transference of the true axis from the watershed to an imaginary line cutting across the valleys of all the rivers. As even the most recent maps of India represent the Himalayan rivers as cutting through the axis of the chain, it is necessary to bear in mind upon what slender authority this is done, and that throughout two-thirds of the extent of the Himalaya, there is no foundation whatever for the position either of the rivers or of the axis, as laid down on our maps. From Kumaōn the whole way to the eastern termination of the chain, with the exception of the small province of Sikkim, nothing whatever is even approximately known of the relation of the rivers to the snowy mountains, or of these to the axis. Many lofty peaks are seen from the plains of India, and the positions of a few of these have been determined by triangulation; and in the earlier maps these were fictitiously represented as forming eminences on a continuously snowy ridge. The information was afterwards supplied by the natives that the sources of the rivers were far beyond these snows; and to reconcile these phenomena the streams were invariably made to intersect the ridge.

The fact, that in that portion of the Western Himalaya which lies between Nepal and the Sutlej, the loftiest eminences are situated on the subsidiary ranges, was first stated by Col. Herbert; but his observation, that the line of the great peaks intersects the river basins, and therefore is not the true axis of the Himalaya, has never yet been fully appreciated. More recent geographers have, however, so multiplied the number of these peaks in that portion of the Himalaya to which Col. Herbert's observation extended, that no single line of great peaks can now be traced in reality; and with regard to the explored portions of the Himalaya W. of it, and to the Sikkim portion E. of it, it is certain that the great peaks do not follow any definite line; added to which, the number of peaks on the axis itself, attaining elevations of 20,000 to 25,000 feet, is very great.

Reverting to the physical features of the loftiest regions, the suddenness with which the dry Tibetan climate and its concomitant features are often encountered, by crossing a lofty pass over a lateral heavily-snowed spur of a secondary range, is very remarkable, and contrasts with the slowness of the same change when a river is followed to its source; and as the short cuts over these spurs are generally preferred to the winding courses of the rivers, a false impression has been conveyed of the definition of the boundary between the dry and humid regions. This erroneous impression is strengthened by another fact, that the political boundary between the Tibetan and Indian states is often determined by the position of the greatest quantity of snow—a physical obstacle to intercourse of far more importance than the greater elevation of the comparatively snowless watershed N. of it. Recent discoveries have, however, shown that this boundary is neither so straight nor so natural as has been supposed, or as is represented in maps. In the small state of Sikkim, for instance, it zigzags so much that it is 50 miles further S. in one meridian than in another. Again, in the western part of Nepal, it is said to follow the true axis, or watershed; whilst in the more snowy eastern half of the same kingdom, it is traced along the most snowed regions; and it has in many places been repeatedly altered in the course of the last century by the Tibetans and Chinese.

A few other points in the physical geography of the axis of the Himalaya and of its loftier valleys are worthy of note. Such are the prevalence of lakes, never of any great depth, and of tertiary deposits, often extending for many miles, and forming undulating expanses, through which the rivers cut deep gorges, and which also form flats and terraces along the banks of the streams. These have given rise to the supposition that Tibet is a vast plain or plateau—an error which the fact that the roads in that usually difficult country make long detours to take advantage of these flats, has tended to confirm. That Tibet is however the most rugged and mountainous country in the world, the united testimony of all travellers assures us; and that no such level expanses, or lakes (with the solitary exception of Kashmir), or flat-bottomed valleys, occur in the equally mountainous, though perhaps less rugged and precipitous temperate and tropical valleys of the Indian watershed, is a very remarkable fact.

Divisions of the Himalaya.

In classifying the geographical features of the Himalaya, as they occur, in belts parallel to the axis, we recognize four distinct latitudinal zones. 1. That which extends from the plains of India to those parts of the chain where the elevation is sufficient for snow to lie upon the ground during the winter months; within this the bases of the hills and all the valleys are tropical, and the upper portions temperate. The surface, though steep, and cut up into innumerable ravines, is seldom absolutely precipitous, or continuously rugged. This belt is from 40 to 60 miles broad, and presents eminences of all heights below 13,000 to 14,000 feet —the mean being perhaps from 5000 to 8000 feet. 2. In the snowy belt, which is from 30 to 40 miles broad, the climate is temperate in the valleys, and tropical where these are very deep and damp; alpine on the heights. The mean elevation is probably under 13,000 feet, though innumerable peaks rise to 20,000, a few to 25,000, and some to 28,000 feet; while the river beds are often only 3000 feet above the level of the sea. The surface of this belt is very rugged and often precipitous. 3. The axis of the chain is from 10 to 20 miles broad, probably 15,000 feet in mean elevation; and the line of watershed itself seldom sinks below 17,000 feet, except at the two extremities of the chain. The surface is very rocky and often precipitous, but varied with occasional undulating expanses; the climate is alpine throughout. 4. The northern slope consists of rugged rocky valleys, with occasionally flat floors: a temperate climate, but one of excessive vicissitudes, prevails below 13,000 feet elevation; and great drought and a total absence of forest vegetation distinguish it from the analogous elevations of the southern side.

These general remarks indicate three principal series of divisions of the Himalaya, viz., according to length, breadth, and height; these are:—

1. *Longitudinally;* an eastern and western Himalaya.
2. *Latitudinally;* an exterior or damp, an interior or snowy, and a Tibetan or dry Himalaya.
3. *Altitudinally;* a tropical, temperate, and alpine Himalaya.

Rivers.

The secondary ranges, which originate in the axis, and descend on the S. slope to the plains of India, and on the N. to the Tibetan Indus and Brahmaputra, separate great rivers, and may consequently be conveniently used to divide the whole chain into a succession of river basins.[1]

The great rivers flowing to the S. are thirteen in number; advancing from W. to E., they are,—the Jelam, Chenab, Ravee, Byas, Sutlej, Jumna, Ganges, Gogra, Gandak, Kósi, Tista, Monas, and Subansiri.[2] The directions of these rivers vary a good deal, being often extremely oblique, especially in the upper part of their courses, to the axis of the chain. As a general rule, those that rise nearest to the centre of the chain (as, for instance, the Tista) have the straightest courses; those that are situated to the eastward flow first S.E., and then turning S., follow a western course, to the Assam Brahmaputra; those in the W. of the chain, flow first S.W., and then turning S., flow easterly. Of these rivers, the two eastern, the Monas and Subansiri, flow through Bhotan; the Tista drains Sikkim; and the three next, the Kósi, Gandak and Gogra, which are Nepalese, all flow into the Ganges; the two following, the Jumna and Ganges, water the British hill states of Kumaōn, Garhwal, and Sirmore, W. of Nepal; the remaining five water the Punjab, and flow into the Indus, draining amongst others the hill states of Mandi, Chamba, Jamu, and Kashmir, respectively.

The fall of the rivers varies with the length of their course; that of the Tista is perhaps the most rapid, the river descending from 17,000 feet to 300 (at its exit on the plains), with a fall of 85 feet per mile; this, however, varies in different parts of its course; thus, between 17,000 and, 15,000 feet, it is 60 feet per mile; between 15,000 and 12,000 feet, 140 feet per mile; between 12,000 and 5000 feet, 160 feet per mile; and between 5000 and 300 feet, 50 feet per mile. Analogous differences have been observed in other Himalayan rivers, as in the Tambur, a tributary of the Nepalese Kósi, and in some of the western rivers;[3] as the Sutlej, which, for the first 60 miles of its course, falls 35 feet per mile; in the following 50 miles, 82 feet per mile; and in the succeeding 68 miles, 25 feet per mile. The Indus again, for the first 90 miles, falls about 3 feet per mile; in the next 115 miles, 28 feet per mile, and in the remaining 345 miles, falls 18 feet per mile. The prevalence of this gradual fall at the upper part of the rivers has been attributed mainly to the fact, that in the dry climate of the axis, the floors of the valleys are raised and levelled by glacial and other accumulations, which have been removed by denudation from the lower parts of the same valleys.

All the Himalayan rivers increase enormously in volume during the summer months; in the eastern portions, where the rains are very heavy, the increase is more due to this cause than to the melting of the snow. The individual feeders of the main streams also differ much; those that rise from glaciers being in summer opaline and full, in winter clear and less in volume. Again, the main body of the streams is in summer swollen and muddy, owing to the excessive rains, but in winter clear and diminished to a fraction of its summer volume. In summer the glacier-fed feeders are always much the coldest; in winter all approximate more in temperature. In summer the volume of all the snow-fed feeders of the rivers is much diminished at night, owing to the less rapid melting of the snow, and the frequent freezing of their head waters; but this is scarcely appreciable in the central and eastern parts of the chain, where most rain falls at night, and where the effect of the sun's rays in melting the snow is less than that of the rain and corroding fog.

The rivers flowing northward from the axis have much shorter courses; and, owing to the dryness of the climate, they carry comparatively little water. The principal of those that flow into the Indus are the rivers of Dras and Zanskar: of those that flow into the Tibetan Brahmaputra none are known to geographers except the Painom, which flows from the N. of the province of Bhotan, and falls into the Brahmaputra near the holy city of Teshoo Loombo.

The rarity of cascades, on a scale at all commensurate with the grandeur of the mountains and the volume of the rivers, is a peculiarity worthy of observation. Tibet, where absolute precipices are more numerous, is better adapted for waterfalls, but the dryness of its climate sufficiently accounts for their paucity.

Lakes.

The Himalayan lakes are almost confined to Tibet, where many of the rivers have their apparent sources in lakes fed by innumerable very small glacier streams. Some of these lakes are very extensive, as that of Yeumtso in Eastern Tibet, whose drainage is unknown; the Ramchoo lakes, which are said to give rise to the Painom; and the Mansarowar or Tso Mapham, and Rakas Tal or Tso Langak lakes; which are sheets of water 20 to 30 miles long, and of considerable breadth, elevated 15,200 feet above the sea; they give rise to the Sutlej. In the Western Himalaya the principal lake is the Tso Moriri, also of 15,200 feet elevation, 30 miles long, and placed on the axis of the chain; it has now no exit, but was once of greater dimensions, when its superfluous waters (which, no doubt, were then fresh) formed a tributary of the Sutlej. The waters of the Tso Moriri, and of many other Tibetan lakes, are very salt; a fact attributed to the evaporation and drainage exceeding the influx in the case of those which have outlets, and by the further concentration of the salts in the instances of lakes without drainage, which are hence always the saltest. The *rationale* of the formation of the Tibetan lakes has never been investigated; many of the smaller ones are no doubt due to dams thrown across the valleys they occupy by the moraines of glaciers; others may be due to the unequal elevations of the surface; and the majority no doubt owe their existence to the deposits thrown across river beds by lateral feeders of the rivers themselves.

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[1] The geographical importance of these divisions was first indicated by Mr Hodgson in a valuable paper printed in the *Journal of the Asiatic Society of Bengal.*

[2] The Indian source of the Brahmaputra is amongst the Mishmi Mountains of Upper Assam. These mountains form part of a system quite unconnected with the Himalaya, and which divide the waters of the Brahmaputra from those of the Irrawaddi and other rivers of Birma, China, &c.

[3] H. Strachey, *Phys. Geog.* of W. Tibet, p. 45.

The Himalayan lakes, not situated on or near the axis, are extremely few and unimportant; the Walur Lake in Kashmir (elevation 5000 feet) is the only large one; and the small tarns of Bheem-tal and Nynee-tal, a few miles long, and 4000 to 6000 feet above the sea, are both in Kumaōn. It is a singular fact, that throughout the whole extent of the Himalaya, the Walur Lake (formed by the Jelam) is the only instance of any of the great rivers or their feeders forming any considerable expanse of still water.

Plains, &c.

Peat bogs, and moors analogous to those of Northern Europe, are wholly unknown in the Himalaya; their absence in the southern valleys is partly owing to the configuration of the latter, and more perhaps to the great rainfall. Of absolute plains there are perhaps none in the Himalaya; the comparatively level upper valley of the Sutlej being the only approach to an exception, and certainly a remarkable feature. Its extreme length is 120 miles, and its breadth varies from 15 to 60; its elevation is from 14,000 to 16,000 feet. It appears to be formed by a tertiary deposit of gravel and boulders; its surface is undulating, and broken by mountains in the eastern part. Such a feature as this, suddenly expanding before the traveller, weary of the endless ascents and descents of the southern slope of the Himalaya, must be very striking; and we accordingly often find it designated as an absolute plain. There is, however, a fall of 1000 feet from its southern edge to its centre; many mountain spurs intrude upon it; the Sutlej cuts a gorge 3000 feet deep through its longer axis; and the lateral ravines of the feeders of that river are so numerous, deep, and steep, that Moorcroft, one of the most accurate of observers, who first traversed it, calls these slopes mountains, and does not allude to the existence of a plain. Like many other mountainous valleys, it appears much flatter than it really is, from being generally viewed from a great elevation.

Elevation of the Himalaya.

It is now undisputed that for its length the Himalaya exhibits the loftiest eminences in the world by very far, but it is yet to be determined whether it is the greatest mountain mass. The great range of Kailas or Karakoram (the western branch of the Kouenlun, see p. 439 in note), running parallel to the Western Himalaya, on the N. of the Indus, is undoubtedly more continuously lofty, and presents a greater breadth of elevated country than the Himalaya to the S. of it; and if, as is very probable, the eastern continuation of the Karakoram (to the N. of the Yaru or Tibetan Brahmaputra) is as lofty as the western, this will undoubtedly prove to be by very far a more lofty mountain chain than the Himalaya.

The mean slope of the Himalaya, from the plains of India to the average greatest elevation of the axis, is only 1 foot in 25; that from the loftiest peak (which is not on the axis) to the plains is 1 in 12. The elevation of the southern base of the Himalaya, that is, of the plains of India at the foot of the range, gradually rises from 350 feet in the meridian of Calcutta to 1000 feet in the Punjab; whilst to the eastward, up the Assam valley, the rise is scarcely appreciable. The elevation of the northern base in the western portion, that is, of the bed of the Indus, falls from 16,000 to 17,000 feet at the source of that river, to 11,000 at Ladak, and to 4000 or 5000 at its great bend. The elevation of the northern base of the eastern portion (that is, of the valley of the Tibetan Brahmaputra) is wholly unknown. At the source of that river it is no doubt from 16,000 to 17,000 feet, and it has been assumed to be 13,000 at Shigatzi;[1] while, according to the accounts of the climate of that part of Tibet where the Brahmaputra turns S., the elevation is probably under 6000 feet.

In estimating the mean elevation of the known parts of the Himalaya, it has been usual to take the elevation of the passes as data; but in so doing a distinction must be made between the passes over the axis and those over its subsidiary ranges. There is every reason to believe that from the W. of the meridian of Kashmir to the Peak of Kailas, no part of the watershed axis is much below 18,000 feet; the four known passes being all above that elevation. Further to the W., and N. of Kashmir, a remarkable depression occurs at Zoji-la Pass, which, being broad and only 11,000 feet elevation, recals some of the low *cols* over the main Alps. The elevation of the eastern part of the axis is entirely unknown. It has been but twice crossed; once by Captain Bogle in 1784, in his route to Tibet by Western Bhotan, but who left no record of his journey; and again by Turner in 1789. From the narrative of the latter we gather that the watershed itself is broad, open, and undefined to a common observer, though, from observations since made in the neighbourhood, it must be fully 17,000 feet elevation;[2] while the elevation of the axis N. of Sikkim may be assumed to be nowhere below 18,000 feet.

The principal peaks of the Himalaya are in many cases concentrated in groups, which have a definite relation to the chief rivers, being placed on the secondary ranges: thus, there are clusters or *nœuds* of snowy mountains between the sources of the Monas and Subansiri, with peaks of from 23,000 to 25,000 feet in height; between the Monas and the Pachu is another probably higher; westward of the Pachu is the enormous nœud, to the N. of Sikkim, with its many spurs, from which rise Chumulari (23,929 feet), Donkiah (23,176 feet), and Kinchin-junga (28,178 feet), with its supporters, Junnoo (25,312), Kubra (24,005 feet), Pundim (21,300 feet), and others; which clusters separate the head waters of the Pachu, Machu, Tista, and Arun. Between the Arun and Kósi is another great group, probably not lower than the last; between the Kósi and Gandak is the nœud from which rises Gosain-than (24,740 feet); between the Gandak and Gogra is another, with Dhawalagiri (28,000 feet). Of the peaks on the axis N. of the Sutlej, the Kailas alone has been measured, and exceeds 22,000 feet. On the subsidiary chain S. of that river are very many peaks of above 20,000 feet; of which Nanda Devi (25,700 feet), and Kamet (25,000 feet) are the two loftiest. W. of the Sutlej many peaks on and off the axis rise above 20,000 feet; and the last of the great snowed ones, Dhiarmal (18,000 feet), occurs W. of Kashmir, close to the bend of the Indus, and termination of the chain. These peaks are for the most part situated at some distance from the axis; and their accessibility, conspicuous position, and great quantity of snow, has fixed the attention of surveyors upon them: whether any eminences on the axis attain the elevation of 28,000 feet may be reasonably doubted. Of those to the eastward absolutely nothing is known; but from the views of the axis obtained from the N. of Sikkim, Nepal and Bhotan, it would appear that many there also exceed 20,000 feet.

The mineral character of the great peaks varies extremely; the loftiest known, Kinchin-junga, is apparently a stratified granite, whilst some of the first class are of gneiss, and others of limestone, of mica-schist, and of slate.

Climate.

In the Himalaya every variety of temperature may be met with, from a tropical heat to the cold of the poles; and every degree of humidity, from the perpetual moisture of the eastern valleys to the utter aridity of Western Tibet; nevertheless the greater part of the chain is so subject to the influence of the monsoons, which sweep along its flanks from the Brahmaputra to beyond the Sutlej, that the seasons in general correspond with those of the great Gangetic valley; and the two main divisions into hot and cold months, which further correspond with the wet and dry ones, may be traced in all parts of the range except in the driest Tibetan regions. After the commencement of the vernal equinox, brilliant weather prevails more or less in all parts of the chain, except in the eastern, where any continuance of cloudless weather is rare. The rains are ushered in by gales and thunderstorms; and when they have fairly set in, a cloudless week seldom occurs in the westward, and to the eastward is quite unknown.

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[1] Hooker's *Himalayan Journals*, vol. ii., p. 171.

[2] The pass by which Turner left Bhotan, and entered the valley of the Machu in Tibet, is over a subsidiary range, and does not appear to have been of very great elevation.

Rain. In the Eastern Himalaya the rainy season commences in April or May, with the accession of the south-easterly monsoon, laden with humidity from the Bay of Bengal; by the end of May it becomes general in Nepal, and by midsummer in the extreme W. In the N.W. the rain begins to decrease about September, but in the eastern provinces can hardly be said to be over before October or November. The amount of rain deposited during this period varies extremely, but as a general rule, diminishes from E. to W. Owing to a local cause, Sikkim is the wettest province in the whole range—the Rajmahal Hills (in Bengal) partially dispersing the clouds which would otherwise descend on Nepal to the W. of it, and the Khasia range similarly sheltering Bhotan to the E. The heaviest rains fall on the outer hills, elevated from 6000 to 10,000 feet, especially where these advance in considerable masses towards the plains, whilst isolated peaks and ranges of less elevation, as well as the valleys of the great rivers, are drier. As a consequence of this, all the valleys of the interior which are separated from the plains by continuous chains, attaining an elevation of from 10,000 to 12,000 feet, are to a great extent sheltered by these from the rains, which fall only as occasional showers; while those still further back, and which are bounded on the south by mountains rising everywhere to the level of perpetual snow, are absolutely without rain during the monsoon. In Sikkim and Bhotan, where the wide valleys are perpendicular to the axis of the chain, and correspond to the direction of the winds, the rains are heavy till we penetrate far into the interior; but great irregularities everywhere occur, and this even in adjacent valleys.

The maximum rain-fall probably occurs on the outer ranges of Sikkim, and exceeds 120 inches in the year at 7000 feet elevation. The amount of rain is, however, little indication of the humidity of the climate; for, though in the interior valleys very little falls at elevations corresponding with those which are deluged on the outer ranges, the fogs and drizzle which prevail, and which are not measured by the rain-guage, sometimes obscure the sun's rays for many days in succession.

Winds. Towards the autumnal equinox, as the decreasing declination of the sun gradually changes the direction of the wind, the atmosphere becomes drier, and the cessation of the rains is marked by violent tempests.

During the winter the weather is unsettled; for whilst the N.E. monsoon is blowing over the lower parts of India, an upper current of south-westerly wind carries its moisture to the higher mountains, where it is condensed in the form of snow; and there is also a short rainy season towards the end of December, in the more humid provinces. In spring, as the sun's declination increases, and the Gangetic plain and Punjab again become heated, low currents of dry south-westerly winds often rush in the afternoons with violence up the Himalayan valleys, and obscure the distant prospect with a strong haze.

The local Himalayan winds are confined to a diurnal current of heated air which rushes up the valleys during the day, and is always experienced on the axis of the chain as a violent southerly wind; and a return cold current at night, blowing with much less violence and regularity down the valleys. These winds increase in regularity and intensity as the valleys are ascended, and as the difference increases between the temperatures of day and night; the diurnal current being least marked in winter, and the nocturnal one in summer. The other phenomena of cloud, rain, and fog, which prevail in the Himalaya, are common to all mountain countries, and require no detailed account.

Temperature. The mean temperature of the base of the Himalaya diminishes from 74° in the meridian of Calcutta, to about 70° in the western extremity of the range. At that end it is not so low as the increase of latitude would indicate, owing to the increase of the mass of land in that direction, which becomes excessively heated in summer; hence the isothermals are curved, with their convexity to the N.W. during all seasons of the year, but most so in summer, as the equator of heat trends so far to the northward of the terrestrial equator in summer as to impinge upon the base of the Himalaya in July, when its mean temperature rises almost to 86°. In midwinter again the mean temperature falls to about 60°.

The diminution of temperature in ascending is about 1° for every 350 or 400 feet of elevation in the more humid parts of the chain, and 1° for every 400 feet in the drier parts; the ratio of diminution is most rapid in the loftiest elevations, and more rapid in winter than in summer, owing to the effect of the warm S. wind. In these respects the Himalaya differs from other mountain ranges, as the Alps for instance, as it does also both in the annual and diurnal range of temperature increasing with the elevation, and in the effect of radiation being greatest in winter, all of which are due to the interference of the heavy rains and clouds of summer.

The following is an attempt to approximate (within a few degrees), to the mean temperature, and range of the thermometer, in the province of Sikkim:—

Altitude.	Mean temp. in Shade.	Mean warmest month.	Mean coldest month.	Mean daily range of temperature.	Rain-fall in inches.	Ratio of diminution of temperature.
7,500 feet	50·	62·7	40·0	13·0	120·0	1°=300 feet.
11,000 ...	40·9	50·0	24·0	20·0	40 0	1°=320 ...
15,000 ...	29·8	40·0	11·0	27·0	20·0	1°=350 ...
19,000 ...	19·8	32·0	0·0	35·0	10·0	1°=400 ...

Snow-line. The elevation of the snow-line is about 16,000 feet on the southern or outer snowed ranges throughout the whole length of the chain; the depression at the eastern extremity, which is in a lower latitude, being attributable to the convexity of the isothermals and the greater fall of snow. It rises to 20,000 feet on the loftier eminences towards and behind the axis. In winter the snow descends to 10,000 feet, and lies there for about a month, probably throughout the range; and sporadic falls have been experienced as low as 5000 feet in the central provinces, and 1000 in the western.

The glacial phenomena are everywhere the same as in the Alps of Europe and elsewhere, the descent of the glaciers being modified by the breadth, form, and slope of the valleys they occupy, and the extent, &c., of their feeders: in the Western Himalaya they descend to 11,000 feet, though rarely; while in the eastern and central parts they have not been met with below 14,000.

That the climate of the whole Himalaya has been greatly altered within a comparatively recent period, is proved by the ancient moraines of great size, and other glacial evidences, which are found as low down as 8000 or 9000 feet in the valleys of all the great rivers.

The barometric tides in the Himalaya are greatly modified by the rains; but the times of maximum pressure (9·50 A.M. and P.M.) and minimum (4 A.M. and P.M.), and the horary oscillations, are much the same at all elevations. The amplitude of the oscillations decreases from 0·100 inch at the base of the range to 0·074 at 7500 feet, and 0·050 at 14,000 or 15,000 feet. The amplitude is greatest in the spring months, least in June and July, and rises again in autumn. The pressure of dry air shows but one annual maximum (in December) and one minimum (in July), and one diurnal maximum at the coldest hour of the twenty-four, and one diurnal minimum in the afternoon.

Atmospheric pressure.

The effects of diminished pressure on the human frame are the same in the Himalaya as in other mountain regions; the uninured traveller first experiences slight giddiness at 13,000 or 14,000 feet, with nausea, headache, and lassitude at 14,000 or 15,000, while the pulse often rises to 120 per minute—symptoms which increase with the elevation, and violently so upon any exertion, but wear off with practice. Upon horseback, if the pace is gentle, 19,000 feet may be attained without inconvenience; and after living for a day or two at 16,000 feet, ascents to 20,000 feet may be made slowly and cautiously on foot, without other inconvenience than lassitude. Some individuals suffer more than others, but even the Tibetan inhabitants of 15,000 feet always have headache in walking over passes of 18,000. Bleeding at the nose and ears has never been experienced by any practised traveller in health, and is unknown amongst the natives.

Geology of the Himalaya.

Of the *Geology* of the Himalaya little can be said; for though some of the provinces have been well studied, of the majority nothing whatever is known. The strike of the rocks throughout appears to be N.W., and the dip N.E.; but this is liable to many local exceptions, the dip especially being extremely variable. At the south base of the range, spurs of sandstones and conglomerates occur, rising immediately out of the gravelly deposits which are intercalated with the alluvium of the plains of India. These sandstones have been represented as occurring along a great portion of the range, though there is no evidence to show that those of the eastern and western parts of the chain are of the same age. Some of those of Kumaōn (Sewaliks) are referable to the miocene age, and contain the remains of species of bos, camel, giraffe, hippopotamus, dinotherium, mastodon, sivatherium, many antelopes and other ruminants, various carnivora, anoptotherium, several monkeys, seven species of elephants, crocodiles, and the gigantic tortoise, whose shell measures 20 feet across. The sandstones at the foot of the Sikkim hills in the meridian of Calcutta are probably referable to the same age as the coal formations of Behar and Central India, indications of similar fossils having been found in both. The dip of these rocks is almost always to the mountains, as is often that of the succeeding metamorphic rocks, and which, though probably of far older formation, appear to overlie them.

Metamorphic rocks, consisting of beds of mica-schist with garnets, clay-slate, quartz, gneiss, and occasional veins of granite, acquire an enormous development, often rising into the loftiest peaks of the central region, and forming the mass of the mountains in those parts of the range which have been best explored. These are overlaid again by slates, and in Kumaōn by Silurian beds succeeded by rocks which are referable to the oolite series, abounding in some places in ammonites and belemnites.

In the larger river valleys towards the axis of the chain, tertiary beds are again met with, overlying the oolitic and metamorphic ones, and containing, to the north of Kumaōn, at 15,000 feet elevation, fossils analogous to those of the Sewaliks, at the south base of the mountains. Specimens of these, brought to England by Captain R. Strachey, have been referred to extinct species of horse, rhinoceros, elephant, hippopotamus, &c.

Of eruptive rocks granite is abundant throughout the chain, and dykes of greenstone and basalt occur to the westward. In the extreme Western Himalaya of Tibet, fossil shells of the pleistocene or post-pleistocene age, have been found in lacustrine clays by Dr Thomson, on the flanks of mountains bordering both lakes and rivers, high above the level of the waters; some of these, chiefly species of *Lymnæa* and *Planorbis*, are closely allied to existing Himalayan species, if not identical with them, and indicate the retirement of extensive bodies of fresh water from those regions at a comparatively recent period. Glacial deposits are found in all the Himalayan valleys above 8000 or 9000 feet elevation, in the form of transported boulders and enormous moraines, attesting the former extension of glaciers fully 6000 feet below their present limits. These phenomena so entirely resemble those of the Alps, that they require no detailed account.

Attempts have been made to draw conclusions in physical geography and geology from the relations of the river-beds (regarding them as fissures) to the strike of the rocks in the chain, and to the lines of upheaval of the main and subsidiary ranges, but hitherto without success. One fact alone is obvious, that the direction of the strike, which appears to be tolerably uniform throughout about 1000 miles of the chain, cuts both the main range and its secondary ones obliquely at an acute angle, and is not modified by the varying direction of the range; whence it follows that it cuts the river basins obliquely also. Until, however, more is known of the relative ages of the rocks composing the range, and their exact relations to one another, no conclusions can be arrived at. The order of superposition has been traced in Kumaōn alone, by Captain R. Strachey; and though the geology of this province will no doubt soon be connected with that of the countries to the westward of it, there is at present no prospect of any addition being made to our knowledge of either the geography or geology of by far the more extensive portion of the Himalaya, which stretches for 1000 miles E. of that province.

Minerals.

In mineral products the Himalaya is remarkably poor, so far as is at present known. There is nothing which can compare in abundance or value with the mines of the Ural, Andes, or European Alps. Red hæmatite is worked with profit in Kumaōn, and copper exists in Nepal and the Sikkim hills. Iron (disseminated) occurs in various places, and graphite is common. Salt, borax, and soda are procured in abundance in the dry climate of Tibet, where they are articles of commerce; there also gold-washing is carried on upon a most limited scale. Gold is known to be extremely abundant in many parts of Eastern Tibet, where, however, the jealousy of the Chinese government prevents its being worked. Slates, lime, gypsum, lead, sulphur, and magnesia, are also Himalayan products.

There is a surprising and almost total absence of gems, or minerals of rarity or beauty in the Himalaya; garnets, actinolites, and tourmalines, are perhaps the only exceptions of frequent occurrence, and these are of the coarsest description.

Hot springs abound, chiefly at elevations of 10,000 to 18,000 feet; they usually emit sulphuretted hydrogen gas, and maintain temperatures of 100° to 130°. There is no active volcano anywhere in the range, nor any traces of extinct ones. Some of the districts, especially towards the N.W., have been visited by violent earthquakes, but these do not appear to be connected with any endemic phenomena; they have generally commenced far S. of the Himalaya, and have been propagated across the range. Remarkable local subsidences and elevations have occurred in the valley of the Jhelam in Kashmir, which have been described by Dr Thomson (*Tibet*, p. 291).

Vegetation.

Vegetation.—This may be altitudinally divided into tropical, temperate, and alpine; and latitudinally into exterior or rainy, interior or intermediate, and Tibetan or arid Himalaya.

The tropical belt extends from the Terai to 6000, and even 7000 feet in the humid central provinces; and to 3000 to 4000 in the extreme western. It consists of a luxuriant forest of Malayan and insular types of trees in the eastern provinces, which to a great extent disappear to the westward, where they are partially replaced by Persian, Egyptian and Afghanistan types—amongst these trees the palms, plantains, tree-ferns, sal (*Shorea robusta*), sissoo (*Dalbergia sissoo*), toon (*Cedrela Toona*), and some oaks, are the most conspicuous, and commercially the most important, especially to the eastward.

The temperate belt extends from 5000 feet to the upper limit of forest, which varies from 12,000 to 13,000 feet, according to the dryness of the climate. It abounds in European, Levantine, and Chinese genera and even species, with but few Malayan mountain ones; of these the European are most abundant in the western provinces, and the Chinese and Japanese in the eastern, where are also a few American genera, and some belonging to the Malayan and insular mountain flora. Amongst the most conspicuous plants of this region are oaks, birch, maple, apple, hornbeam, poplar, ash, cherry, alder, celtis, pine, juniper, yew, willow, and pines (*Abies Webbiana* and *Brunoniana*), which abound throughout the range; besides which, there are to the westward of Nepal, deodar, *Pinus Gerardiana*, hawthorn, cypress, horse-chestnut, olive, myrtle, evergreen oak, sloe, black poplar, and many other European genera and even species; whilst to the eastward, laurel, magnolia, rhododendron, larch, *Abies Brunoniana*, and chestnut, more especially prevail.

The alpine belt, which commences above the forest region, ascends in extreme cases to 19,000 feet; it abounds in Siberian, Polar, and European alpine plants throughout the whole extent of the chain, the European species and genera being most prevalent to the W.

Several hundred common English plants are also natives of the Himalaya, and especially of the temperate and alpine zones; and the total number of flowering plants inhabiting the whole range probably amounts to 5000 or 7000 species.

Cultivation in the Himalaya is carried on as high as 14,000, and even 15,000 feet, where summer crops of wheat and barley exist in Tibet, but quite exceptionally; also buckwheat, turnips, radishes, mustard, potatoes, and various pulses, are grown abundantly between 8000 and 12,000 feet, as summer crops. Rice, maize, millet, and other tropical cereals, are grown below 6000 feet, with buck-wheat, and various species of chenopodium, yams, capsicum, egg-apple, legumes, and sugar-cane.

The Himalayan fruits cultivated by the natives in the eastern and central provinces are plantains, oranges, pineapples, walnuts, indifferent peaches and apples; in the western, excellent apples, pears, apricots, peaches, cherries, mulberries, grapes, and walnuts.

The cultivation of tea is now successfully carried on on a large scale in the Western Himalaya, at elevations of 2000 to 5000 feet, and might probably be pursued with more or less success in all parts of the chain.

The timber trees of the Himalaya are extremely numerous, but few of them are of great value, and some of the best inhabit inaccessible regions. The sal (*Shorea robusta*) is decidedly the most valuable; and, from growing at the foot of the hills, close to water-carriage, is the only one much felled for export. The toon (*Cedrela Toona*) and sissoo (*Dalbergia Sissoo*) are also exported from the same regions; and the deodar and other conifers from the north-western provinces. The other pines, the walnut, oaks, and the chestnuts, mostly produce indifferent timber; but, though there are exceptions, the use of these is principally confined to the neighbourhood where they grow. Of ornamental woods, few are known, and none are in general use. Bamboos prevail everywhere, and rattan-canes to the eastward. Owing, probably, to the humid climate, the woods of European genera are, almost without exception, inferior to those of their western allies. Teak is unknown in the Himalaya; and the other woods of Eastern Bengal and of both the Indian peninsulas are either confined to the malarious forests of Assam, or are altogether absent. The vegetable economic products are also very few and unimportant—such as spices, gums, resins, oils, waxes, fibres, and other textile materials. Of drugs, the baneful aconite and hemp are the best known; inferior rhubarb, and a few bitters of secondary importance in the pharmacopœia, are also collected for export. Attempts have been made to cultivate drugs for the use of the Indian medical establishments, but hitherto with very limited success. Wild madder is extensively collected and exported, as are bamboos, canes, and a few other products; and latterly potatoes in Sikkim. There is no doubt that the vegetable riches of these extensive regions are but very little known, and are capable of immense extension; but hitherto the efforts have been limited. On the northern or Tibetan parts of the range the trees are extremely few and small, and confined to willows, poplars, junipers, elæagnus, and tamarisk; and of bushes, the well-known dama or furze, that supplies fuel, is the most familiar to travellers.

Zoology.

The *Zoology* of the Himalaya is very extensive, and the laws of distribution are the same as those of the vegetable kingdom; thus Malayan genera of quadrupeds, birds, and insects, inhabit the tropical belt, diminishing in variety and number towards the west. In the temperate zone European types predominate, with a large admixture of Chinese and Japanese forms to the eastward. Siberian forms prevail in the alpine zone, and throughout both eastern and western Tibet. The most remarkable animals are in the tropical zone; the tiger, leopard, elephant, rhinoceros, buffalo, and many species of deer, monkey, wild boar, and bovine animals. In the temperate zone are other species of deer and monkey, bears, wild cats, squirrels, &c. In the alpine zone, and chiefly in the Tibetan climate, the wild ass or kiang, musk-deer, ibex, antelopes, hare, several wild sheep and goats, marmot, lemming, fox, wolf, ounce, lynx, weasel, polecat, and many smaller animals, abound. The domestic animals are the yak and its hybrids with other bovines, ponies, cows, sheep, pigs, dogs of a mastiff breed, goats, and fowls, and occasionally bees; of these the yak is the most remarkable, and is the domestic form of a wild animal of greater dimensions found in various parts of Tibet; it is used as a beast of burden for all purposes, for milk, and for beef.

Shells are rare in the Himalaya, but do exist, and even at 16,000 to 17,000 feet elevation, in fresh water.

Insects are extremely abundant at all elevations, and leeches abound up to 10,000 feet in the eastern provinces.

The rivers are generally too rapid for much fishing; but many species of *Cyprinidæ* especially abound from the level of the plains to 15,000 feet elevation; with a remarkable break, however, between 5000 to 10,000 feet, between which levels fish are said to be rare, or almost unknown, in most of the rivers. *Salmonideæ* are unknown in any Himalayan river; the so-called trouts being all species of carp. The eastern Tibetan lakes swarm with fish at 10,000 to 14,000 feet elevation.

The economic animal products are coarse silk, called tusser, from a native moth bred at the foot of the hills; shawl wool from Tibet, and musk from the alpine regions.

Inhabitants.

It is impossible to make more than a brief allusion to the numerous Himalayan races, whose very numbers are as yet unknown, and the origin of most of which is involved in obscurity. The majority, however, may be safely referred to the Mongolian race, with, in some cases, more or less of admixture with the Indo-Germanic. Of these the Tibetans are perhaps numerically the greatest; and they occupy the largest area—namely, Eastern Tibet, which is exclusively peopled by them, Western Tibet to a great extent, and all the loftier Himalayan valleys above 8000 feet elevation. They are generally an honest, hardy, hospitable, cheerful people, but indolent, unwarlike, and filthy in the extreme, both in their persons and houses. All are Lama Buddhists. The Bhotanese are perhaps more closely allied to these than any other Himalayan race, and are also all Lama Buddhists. They are more industrious than the Tibetans, but are turbulent, treacherous, dishonest, and sullen in disposition. The Nepalese are chiefly Hindus, as are many of the dominant races of the lower outer Western Himalaya, and are divided into many castes or classes, military, agricultural, pastoral, &c. Throughout the Western Himalaya are many Mussulmen. Numberless uncivilized tribes inhabit the eastern and central provinces; but, with the exception of the Abus of Eastern Bhotan, none are in an absolutely savage state. The others are the Lepchas, a timid Mongolian race inhabiting Sikkim, and the Limboos, Murmis, Haioos, Cooches, Bodos, Dhimals, and a host of other tribes, presenting various combinations of the Indo-Chinese, Mongolian, and Tamul, or aboriginal race of India. These chiefly inhabit the eastern provinces, and, with the exception of the Lepchas, none form a distinct nation; the rest are mixed off with the Nepalese, Lepchas, and Bhotanese, and are subject to the sovereigns of these tribes. Some of these are the remnants of the aborigines of the Himalaya, and claim a very early origin. For detailed information on these subjects, and on the zoology in general, we must refer to Mr Hodgson, whose works on these subjects have a European reputation.

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The principal British stations in the Himalaya are situated at elevations of 6000 or 8000 feet above the sea level, where the climate approximates to that of England. These are all healthy, and well adapted to the European constitution; and though neither objects of particular solicitude nor of sufficiently systematic resort by the British residents in India, they are of the highest value, and the conviction of this is gradually forcing itself upon the public mind. Whether as a means of civilizing the neighbouring hill-states, or of extending our commercial relations with Tibet and Central Asia, or as affording healthy sites for schools, hospitals, and depôts for invalid or unseasoned troops, they are worthy of the especial care of the government. It cannot be doubted that the Himalaya will one day become peopled by colonies of the English race, sprung in part from officers of the East India Company's service, and others who, long accustomed to the habits of the East, and with all their friends and associations in India, prefer a retirement in the immediate neighbourhood of the scenes and friends of their later life, to seeking new friends, and remodelling their habits in England. Of these hill Sanataria, the most important, proceeding westerly, are—Darjiling, elev. 7000 to 8000 feet, in Sikkim; Naini-tal, 6000 to 7000 feet, and Almora, 5000 to 6000 feet, in Kumaōn; Masuri, 6000 to 7000 feet, in Garhwal; Simla, 7000 to 8000 feet, in Sirmore; Kangra, 7000 to 8000 feet, in the Byas Valley; and Murree, 7000 to 8000 feet, between the Indus and Jhelum. (J. D. H.)

HIMERA, *in Ancient Geography*, a great Greek city on the northern coast of Sicily, at the mouth of a small stream about halfway between Panormus and Cephalædium. It was founded by a colony from Zancle, and its institutions were consequently at first Chalcidic; but there seems to have been also a considerable infusion of Syracusan blood. The date of its foundation, which is not accurately known, is generally assigned to the year 648 B.C. In its early history the only recorded event is its temporary subjugation by the tyrant Phalaris. It next fell under the power of a tyrant of its own, Terillus by name, who was expelled by Theron of Agrigentum. In his distress Terillus applied for aid to the Carthaginians. That people having probably in view the conquest of the whole of Sicily, sent him an immense army, who, in the same year, and it is said on the same day which witnessed the route of Marathon, were utterly annihilated by Theron with the assistance of the Syracusan Gelon. The successful tyrant now entrusted the government of the city to his son Thrasydæus, and augmented its diminished population by a colony of Dorian settlers. From this time Himera became Doric both in its constitution, dialect, and policy. After the death of Theron in 472, Thrasydæus was expelled from Himera, which continued to grow in power and wealth till its final destruction by the Carthaginians in B.C. 408. Near the site of the old town the conquerors founded a new one, to which, from the hot wells in the neighbourhood, they gave the name of Thermæ or Thermæ Himerenses, which from its favourable situation soon attained considerable importance as a commercial mart. Even so late as the days of Cicero it was a place of some importance, as is attested by the extensive Roman remains of that period still extant. The name of the town is preserved in that of the modern Termini which occupies its site. Himera was the birthplace of the poet Stesichorus, whose statue, preserved in Thermæ, is mentioned by Cicero as being held in the highest veneration by the natives.

Himera, *in Ancient Geography*, the name of two important rivers of Sicily. The less important of the two was the Northern Himera, falling into the sea near the city of that name. It rose about the centre of the island not very far from the sources of the Southern Himera, and is by some identified with the modern *Fiume di Termini*. Others, however, are of opinion that the Northern Himera is now represented by the *Fiume Grande*, which falls into the sea about 8 miles E. of Termini. The Southern Himera rose in the Mons Nebrodes (*Monte di Madonia*), and flowing nearly due S., fell into the sea at Phintias (*Alicata*). It is now called the *Fiume Salso*, or Salt River. On its banks Agathocles was defeated by the Carthaginians, B.C. 311, and they by Marcellus, B.C. 212.

HIMILCO, the name of several persons distinguished in the history of Carthage. The first of whom mention is made was the leader of the expedition which set out to explore the northern seas at the same time that Hanno undertook his famous voyage in the opposite direction. Nothing remains to fix the period at which it was undertaken.

Himilco, the opponent of Dionysius the Elder, of Syracuse (406–368); and Himilco, the opponent of Marcellus in Sicily, are deserving of notice. See Carthage.

HINCKLEY, a market-town of England, county of Leicester, and 13 miles S.W. of the town of that name. The parish church is a spacious old building, surmounted by a lofty spire, and having a finely carved oak roof. Cotton and woollen hosiery constitutes the staple manufacture of the town. Market-day, Monday. Pop. (1851) 6111.

HINDIA, a town of Hindustan, in the territory of Gwalior. The district of which it is the capital has been placed under British management by the provisions of the treaty of Gwalior concluded in 1844; its revenues being appropriated to the maintenance of the Gwalior contingent, a native force commanded by British officers. The town is fortified, and stands on the left or S. bank of the Nerbudda.

HINDU COOSH, or Koh, a range of mountains, physically discriminated from the Himalayas by the vast depression which forms the upper part of the valley of the Indus. They form the N.W. boundary of the province of Caubul, separating it from Balk and Buduckshan. The range of mountains so denominated extends in a westerly direction from Long. 78° as far as the snowy peak of Hindu Coosh, nearly N. of Caubul. These mountains are covered with snow the greater part of the year, and void of verdure at the summit, but are well wooded at the base. They form the Indian Caucasus range of the ancients.

HINDUSTAN.

HINDUSTAN has from the earliest ages been celebrated as one of the most highly favoured countries on the globe, and as abounding in the choicest productions both of nature and art. In ancient times, this distant region was very imperfectly known to the Greeks and other nations of the West; but they imported its most valuable produce, its diamonds, its aromatics, its silks, and its costly manufactures. The country which abounded in those expensive luxuries was naturally reputed to be the seat of immense riches, and every romantic tale of its felicity and glory was readily believed. In the middle ages, an extensive commerce with India was still maintained through the ports of Egypt and the Red Sea; and its precious produce, imported into Europe by the merchants of Venice, confirmed the popular opinion of its high refinement and its vast wealth. After the discovery of a passage to India by the Cape of Good Hope, the same ideas still prevailed; and the maritime states of Europe contended with their fleets and armies for the dominion of the Asiatic seas, and for the commerce of the country. The Portuguese, and afterwards the Dutch, made important conquests, and carried on an extensive trade. In later times, Great Britain and France appeared on the field as competitors for the prize of Indian commerce and dominion, and were allowed to establish factories on the coasts for the reception and the store of goods. These were gradually converted into military posts, defended by soldiers and cannon; and in due time those two powers were ranged on opposite sides in all the wars and politics of India. This contest terminated in the triumph of the British arms. France lost her pre-eminence on the continent of India; and her great rival, enlarging her power on every side, gradually rose to greatness and dominion, and now rules with undisputed sway from the Himalaya Mountains to Cape Comorin. This vast extension of the British power in the East has opened the way into the interior of India. It has tended greatly to enlarge our knowledge of this distant region; and if more accurate inquiry has reduced the marvellous tales of its glory and greatness within the bounds of sobricty and truth, Hindustan, the seat of industry, of commerce, and of the arts, when Europe was sunk in barbarism, the scene of many eventful revolutions, from the Mohammedan invasion till its conquest by the armies of Britain, and inhabited by a people of peculiar manners, laws, institutions, and religion, still presents a wide field for interesting inquiry and speculation.

In the following account of this interesting country, we propose to describe—I. Its geography and natural features; its produce, its animals, its manufactures and commerce; the numerous races by which it is inhabited, with their manners, religion, and policy; and the wars and political revolutions which have terminated in establishing the sway of Great Britain over nearly the whole continent of India. II. The transactions and internal policy of the East India Company, with the various reforms introduced into the revenue, judicial, and police departments, will afford ample materials for a separate discussion and inquiry. III. A brief account will be given of the constitution, commercial privileges, and pecuniary transactions of the Company, originally merchants, now the sovereigns of a vast empire.

Geography.

I. The ancient geographers had no precise ideas of the extent of Hindustan or India, terms which we mean to use synonymously in the following article; and they accordingly extended its frontier westward as far as Persia, and eastward to China. In after ages its limits often fluctuated with the events of war, and served only to mark out the course of conquest, with little or no attention to geographical accuracy. Yet in no part of the earth has nature pointed out, in the great features of the country, more distinct and magnificent boundaries. On the N. it is separated from the elevated table-land of Thibet by the precipitous wall of the Himalaya Mountains, the highest land of the Asiatic continent; on the W. the Suliman range, a continuation of the Sufeid Koh Mountains, separates it from Afghanistan and Beloochistan; its E. boundary is formed by parallel offshoots from the opposite extremity of the Himalayas and by the continuous ranges of forest-covered hills, which, skirting the Bengal district of Chittagong, stretch southward to the recently acquired province of Pegu, and separate the British dominions from the territory of Burmah. The Indus and the Ganges discharge themselves into the ocean on the western and eastern coasts of Hindustan, in about N. Lat. 24° and 22°; and to the south the country is contracted into an irregular triangle, projecting into the Indian Ocean to within eight degrees of the equator, or about 1000 miles, and on all sides inclosed by the sea. The extensive region situated within these limits is nearly comprehended between the 8th and 35th degrees of north latitude, and between the longitudes of 66° and 99° east; and its length from the northern barrier of the Himalaya Mountains to Cape Comorin is about 1900 miles, whilst in breadth it may be estimated at 1800 miles, though, owing to the irregularity of its figure, it does not exceed 1,484,367 English square miles.

Natural features.

Hindustan is of an extremely diversified aspect, and comprehends within its bounds all the varieties of climate, of soil, and of natural scenery, from the bare and naked rock, and lofty mountain buried under eternal snows, to the low and fertile plain, scorched by the tropical sun, and the seat of luxuriant vegetation. This diversity in the aspect of the country has given rise to the following territorial divisions, namely:—

1. Northern Hindustan, which comprehends the Himalaya Mountains on the N., with their lower ranges of hills stretching southwards to the plains of the Indus and the Ganges, and extending from Peshawur and Cashmere on the W., to Bootan and Assam on the E.

2. Hindustan Proper, which extends southward as far as the Nerbuddah River, where the Deccan commences. and which includes the lower provinces of Bengal, the north-western provinces, together with Oude, Malwa or Central India, the Punjab, Guzerat, Sinde, and Cutch.

3. The Deccan, bounded on the N. by the Nerbuddah River, and on the S. by the rivers Krishna and Toombudra, comprehends the larger portion of the presidency of Bombay, together with Orissa, the Nizam's dominions, and the territory of Nagpore.

4. India south of the Krishna River, comprehending the territories under the administration of the government of Madras, together with the native states of Cochin, Travancore and the Mysore.

The alpine region of Hindustan, which forms its northern barrier, is a narrow strip of land not exceeding 150 miles in breadth. It is here that the land of Asia attains to its height; and the country is composed of a succession of vast mountains rising far above the level of perpetual snow. These frozen deserts consist in many places of rugged and bare rocks, shooting aloft into the sky, and divided by deep ravines, very steep, and often ending in dark chasms, which are sometimes wooded, but as often bare rocks several hundred feet in height, with little more space between them than has been worn by the violence of the torrents. Here is concentrated all that is sublime in the scenery or phenomena of nature. On every side are to be seen snowy summits of stupendous height, and of every form; the conical volcanic peak; the mountain regularly rounded, or broken into rugged and frightful precipices, rising upwards to a tremendous height, or descending with a frightful declivity into deep hollows, and all covered with snow. This mountainous and frozen region is the scene of the destructive avalanche, when the accumulated snows of successive winters are precipitated from the mountains into the plains below, burying everything in their progress; or when the action of the intense cold upon the solid rock rends it from its base, and sends it bounding down the steep, producing the most fearful ruin of everything beneath. Mr Moorcroft, who in the year 1816 penetrated across the Himalaya ridge, mentions the tremendous crash from the fall of a rock, which he heard at a great distance. The slope of a hill he also saw broken from top to bottom. "In its fall," he observes, "it has overwhelmed large trees, of which some have been hurled into the river, others lay across its bed half buried in rubbish, and others, thrown down, were seen hanging by their roots with their heads towards the base of the mountain." The southern face of the Himalaya Mountains is much more steep than the northern descent into the tableland of Thibet, and it is in proportion difficult and dangerous. There is nothing like a road in these mountainous districts. The traveller has to scale the most terrific heights, by a path so narrow as not to admit two abreast, which winds along the mountain, and often along bare and perpendicular precipices by a narrow and irregular flight of steps, or by natural irregularities in the face of the polished marble rock, and sometimes by a projecting ledge not more than a foot broad, whilst a declivity of 600 or 700 feet in depth opens on the outer side. These steps, at certain projecting points, where the rock is perpendicular, wind in lines of zigzag not more than ten or twelve feet in length, at angles so sharp that, in a length of twenty-four feet, the actual height gained is not more than ten feet, and they are often placed at most inconvenient distances, which greatly increases the danger and the difficulty of access, except to those hardy mountaineers who have been trained from their infancy to agility and steadiness in such tremendous paths. Mr Moorcroft himself had on one occasion a narrow escape. "My left foot," he says, "having slipped off one of these irregularities, I lay for a few seconds upon the poise; but a snatch at a clump of grass, which on being seized did not give way, and a sudden spring, brought me to a comparatively safe spot, with the loss of some skin from my knees and elbows, and some rents in my trowsers and sleeves."[1] His Hindu attendants encountered the same perils, and one of them had very nearly fallen down the precipice. On missing his footing, he mentions that "he shrieked violently, and sunk down almost senseless upon a point of stone, with one leg hanging over the abyss, calling out that he was lost." Another of the bearers was so alarmed that he was incapable of proceeding until he was secured by a turban tied round his waist, and held by one of his companions. In some places the rock was found to project to the edge of the river, and it was turned by rude staircases made of wood and stone, or the path lay over immense stones and rocks, piled up in dangerous disorder, where it was very difficult to secure a footing; whilst in other places the party had to aid their ascent by laying hold of shrubs, roots of trees, clumps of grass, and clods of earth, or by creeping on both hands and knees to prevent slipping down. Yet the heavily loaded native carriers, each carrying a weight o 60 pounds, are seen descending these difficult passes with apparent ease and unconcern.[2] Lieutenant Webb, who in 1808, along with Captains Raper and Hearsay, was sent to explore the sources of the Ganges, experienced the same dangers as Mr Moorcroft, and was finally compelled to desist from his hazardous journey when he had reached within six or seven days' journey of Gangoutri. The country here assumes a savage wildness, and, except in the passes or beds of the rivers, is totally impervious; and these rivers, in approaching their sources, from rapid and turbulent streams flowing over a rocky channel, become furious torrents dashing from one huge block of stone to another, along which the traveller, climbing over rocks, or picking his dangerous way along the path of precipices, as already described, is at last met by masses of mighty ruins, which entirely check his further progress. More recently these wild regions have been explored by that enterprising traveller Dr Gerard, who crossed the great Himalaya Pass, and penetrated into the Plateau of Tartary. The abstract of his tour, given in the Asiatic Journal, is replete with valuable information, and confirms all the previous accounts of travellers respecting the nature of the country, rude and inaccessible, and exhibiting, on a scale of grandeur hardly to be conceived, all the great phenomena of nature.

The Himalaya Mountains contain the sources of the great rivers which flow through the burning plains of Hindustan. The deep valleys between the mountains are the channels through which the waters flow from the higher grounds; and, by the melting of the snow, those streams, suddenly swollen into torrents, and rushing down the declivity, work out a deep and narrow channel amongst the rocks, where, imprisoned as it were between steep and perpendicular banks, they roar and foam amidst precipices, or in dark and unfathomable glens, exhibiting, in the conflict of their troubled waters, all the great phenomena which belong to rivers, namely, the cataract, the rapid, the boiling eddy, and the dangerous whirlpool, and only subside into smoothness when they break out and spread over the plains. Huge rocks were seen by Dr Gerard whirled along with frightful velocity; nothing visible but an entire sheet of foam and spray, thrown up and showered upon the surrounding rocks with loud concussion, and re-echoed from bank to bank with the noise of the loudest thunder. Across these streams are thrown rude bridges made of ropes or of wood, the usual expedient by which rivers are crossed in all mountain countries. Where the breadth of the river is small, the passage is effected by one or two fir spars laid across from rock to rock; but where the space is wider, a bridge of ropes is constructed, on the principle of the chain bridge. In attempting the passage by one of these rude bridges, a carrier who accompanied Fraser in his journey to the sources of the Ganges unfortunately lost his footing and fell into the water. He was instantly swept down the stream to its junction with the Bhagiruttee, about fifty yards, "when his head," says the traveller, "appeared for a moment, and his load floating beside him; but the foaming current of the Bhagiruttee, here tumbling over large rocks with a mighty roar, seized him and hurried him along with its tremendous torrent."

The greatest height of the Himalaya range has been fixed by accurate measurements at upwards of 28,000 feet above the level of the sea. According to the accounts of all travellers, these mountains present from the plains below one of the sublimest aspects in nature, and they are at a loss for words to express the admiration and awe with which they are at first beheld. Bishop Heber mentions that the nearest range rises into a dignity and grandeur which he was not prepared for, divided as it is into successive ridges, in all the wildest and most romantic forms of ravine, forest, crag, and precipice. In his further progress he found "one range of mountains after another quite as rugged, and, generally speaking, more bare than those which we had left, till the horizon was terminated by a vast range of ice and snow, extending its battalion of white shining spears from east to west, as far as the eye could follow it; the principal points rising like towers in the glittering rampart, but all connected by a chain of humbler glaciers." Captain Raper, who accompanied Lieutenant Webb in his survey of the Ganges, viewed the Himalaya ridge from a summit about 4000 feet above the lower plain. "From the edge of the scarp," he observes, "the eye extended over seven or eight distinct chains of hills, one rising above the other, till the view was terminated by the Himalaya or Snowy Mountains. It is necessary for a person to place himself in our situation before he can form a just conception of the scene. The depth of the valley below, the progressive elevation of the intermediate hills, and the majestic splendour of the cloud-capt Himalaya, formed so grand a picture, that the mind was impressed with a sensation of dread rather than of pleasure."[1] "The stupendous height of those mountains," says Elphinstone, "the magnificence and variety of their lofty summits; the various nations by whom they are seen, and who seem to be brought together by this common object; and the awful and undisturbed solitude which reigns amidst their eternal snows, fill the mind with admiration and astonishment that no language can express."[2]

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[1] See Moorcroft's Journal, *Asiatic Researches*, vol. xii., p. 386.

[2] Fraser, *Journal of a Tour through part of the Snowy Range of the Himalaya Mountains.*

Northern Hindustan varies in its climate and in its aspect with the height of the ground. The lower ranges of mountains, though they scarcely reach the level of perpetual snow, still retain the sublime features of alpine scenery; namely, the rugged and bare mountain, the craggy rock, white, gray, red, or brown, springing up in fantastic forms above the general mass; and the deep and suddenly descending chasm, with the foul torrent foaming over its rocky bed. The luxuriant foliage is wanting which embellishes the lower hills; the rich and smiling valley is not so often seen; whilst the forests of dark brown fir fringing the mountains and the hollows impart a sombre and unvarying appearance to the scene. At a lower level the country improves; and though it still exhibits the mountain and the precipice, the intervening valley is clothed with verdure, and the lower hills with the most magnificent forests of large and lofty trees, the open country with roses, jasmines, and other lovely or odoriferous shrubs, and with the most luxuriant alpine plants.[3] The valleys through which flow the head waters of the Indus and the Ganges, namely, the Sutlej, the Pabur, the Jumna, the Baghiruttee, the Alkananda, with their tributaries, exhibit all the varied and sublime scenery of this romantic country. The valley of the Sutlej is hemmed in by brown and barren mountains, steep and rocky, without the grandeur of lofty precipices or fringing wood. The hollows through which it receives its tributary streams are dark chasms, without cultivation; the heights crowned with forts, but without any neat villages surrounded with trees to relieve the adjacent desert. The banks of the Jumna, on the other hand, though rocky and wild, are wooded and green, and the sloping faces of the hills fertile and well cultivated; and even at its source, the country, however wild and picturesque, is still not nearly so dreary as the valley of the Bhagiruttee. The features of the landscape are here lofty, rugged, and inaccessible, with less of the beautiful than of the sublime and terrible. A pleasing contrast to this wild scenery is presented by the smiling valley through which the Pabur meanders, chequered as it is with pasture and crops, and the banks and the hills clothed with cultivation, villages, and wood. Such is the usual aspect of the lower valley of Northern Hindustan, the height of which is for the most part from 3000 to 6000 feet above the plains. The difference between the northern and southern exposures of this mountainous country is remarkable, not only in the formation and structure of the hills and rocks, but in the vegetation. The country on its southern face is of a brown and dusky colour; the grass short and parched; the hills rough and lumpy, with rocks standing through the ground; the lower parts bare of wood; and above, the Weymouth pine, with a few stunted larches sprinkled amongst the rocks; whilst the higher parts are spread over with oak, holly, and alder, their leaves of brownish green, harmonizing with the burned appearance of the hills, and giving a sombre hue to the whole scene. On the northern exposure a rich colour of dark green is diffused over the whole landscape; the rocky sides of the glens are bolder and grander; and they are clothed with noble forests of larch, silver, and spruce firs, which shroud from the view the highest and steepest cliffs. "All," says Fraser, "was rich and dark; and here and there a glade opened, or a high slope extended from the base of the rock, or projected between two streams, of a bright beautiful green, shining through the sombre forest." This difference between the northern and southern exposures is strongly marked all over the hills.[4]

That strip of flat country, about twenty miles in breadth, which lies at the base of the great Himalaya range, dividing it from the plain of the Ganges, is called Terrae or Terreeana. It is covered with thick forests and low swamps, and, though fertile, it is so unhealthy that it is little cultivated. Bishop Heber graphically describes it as a long, black, level line, extending at the foot of the lowest hills; "so black and level," he adds, "that it might seem to have been drawn with ink and a ruler." This flat does not extend farther north-west than through a portion of Rohilcund, where the healthy cultivated country reaches to the foot of the hills, which rise abruptly from the sandy flat beneath. These low hills are watered by streams from the higher mountains, that rise to the level of 1500 or 5000 feet, from which this lower range is frequently separated by fine valleys of some length, which are called *doon* by the natives, answering to the Scottish name of *strath*. The hills which rise beyond this lower range, to the height of about 5000 to 7000 feet, are lofty and majestic, and broken into numerous ridges, divided by deep shaggy dells. This appearance Fraser ascribes to the quality of the rock of which they are composed, which consists of a strongly indurated clay, with a mixture of siliceous matter, forming a rock exceedingly hard, though easily destructible by exposure to the air, and splitting into variously-sized fragments, leaving hard marbly masses staring through the scanty soil. It may be finally remarked of this singular and interesting country, that though it appears from the plains to be divided into distinct ranges of terraces, it is really a vast collection of mountains heaped in masses one above another, without any order or plan that can be discovered, until the height of land is reached at the great Himalaya ridge which extends from beyond the sources of the Indus in a continuous chain far into China.

The great plain of Hindustan presents an entirely different scene. The cold and bracing air of the upper country is there exchanged for burning heat; the mountain torrents no longer rage, except when they are in flood, but roll their streams lazily over the plains. That large tract which is contained between the Indus and the Brahmapootra, and which extends E. and W. from 1200 to 1400 miles, and about 300 to 400 miles from N. to S., is, with few exceptions, a level country, consisting chiefly of the great plain of the Ganges, rich and fertile, and clothed with the most luxuriant vegetation, in which the spreading palm, with groves of mango and other trees of the most luxuriant foliage, and gardens, are intermixed with cultivated fields. The noble river which intersects this extensive plain determines the aspect and character of the country. Its swelling stream, as it approaches the sea in the provinces of Bahar and Bengal, is very broad and deep, and waters so completely the whole country, that in the driest season there is scarcely any part more than twenty miles distant from some river; and by means of lakes, rivulets, and water courses, boats may approach the peasant's door. During the annual inundation, a large tract of cultivated country is submerged to a great depth; and the lower part of the Delta, named the Sunderbunds, is chequered by a labyrinth of creeks and rivers, expanding to a breadth of 200 miles; the actual inundation reaching a breadth of 100 miles, in which trees and villages are seen like islands appearing above the water. Higher up the stream the inundation is diminished in extent; and in the province of Bahar the river is not above a mile broad, the country being flat and fertile, though not so abundant in trees as the rich plains of Bengal. Towards the west, the plain watered by the Ganges and its tributary streams yields in abundance all the productions of the tropics; especially the Dooab, or the tract that lies between the Jumna and the Ganges, the provinces of Allahabad and Agra, and in general all the alluvial tracts near the rivers. At a distance from these, irrigation is resorted to by the cultivators, and deep wells are dug. The plain is diversified by ranges of hills, with abrupt peaks occasionally shooting up, and crowned with forts, in which during the decay of the Mogul empire, the rebellious or robber chiefs sought to secure a precarious independence. The plain of Hindustan is generally fertile when water can be obtained; and, as it approaches the mountains, in the northern provinces of Oude and Delhi, and is watered by the numerous streams flowing towards the Ganges, it is flat, fertile, and rich, except towards the western borders of Delhi, on the verge of the great desert, where sterile tracts occur, without cultivation or inhabitants. Towards the south-western portion of the plain, near the Nerbuddah, in the province of Malwah, the country is of greater elevation, but has a regular descent from the Vindhya Mountains, which extend along the north side of the river, as is pointed out by the course of the numerous streams that still flow northward into the Ganges. But the aspect of the country changes as it recedes from this great stream; the overflowing river no longer spreads over the plain, and forms a navigable water-course; it is now merely a mountain torrent, of no depth, to float down the produce of the country. Westward, in approaching the Indian Ocean, wild tracts occur, hilly and rocky, and overgrown with jungles, the haunts of wild beasts and of robbers; and still further west, the province of Cutch is a cold sterile waste, half covered with a salt morass called the Runn. In the interior of Hindustan, large and fertile tracts have been laid waste by misrule, or the devastations of war: these are overrun with a rank vegetation, which quickly springs up under the quickening influence of a tropical sun; and which, consisting of tall trees with spreading branches, interwoven into an impenetrable fence with brushwood, and with innumerable shrubs and creeping plants clinging round the trees, and lacing them firmly together, forms thick jungles, affording abundant cover to the wild animals of the country, and to gangs of banditti, who are even more ferocious than the beasts of the field.

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[1] See Raper's Narrative of a Survey of the Sources of the Ganges, *Asiatic Researches*, vol. ii., p. 469.

[2] Elphinstone's *Journey to the Kingdom of Caubul*, p. 95.

[3] Fraser's *Journal*, p. 141.

[4] *Ibid.*, p. 142.

Hindustan, as well as almost all other tropical countries, would soon be changed by the great heat into deserts of sand, like a large portion of Africa, if it were not refreshed by the periodical rains and the overflow of the rivers. In the plain of Hindustan, towards the west, occurs a tract of this description, which, having neither rains nor refreshing streams, still remains an arid sand. This great desert reaches northward to the Ghara, a river formed by the united streams of the Beas and Sutlej, and south as far as the salt lakes of Cutch, which communicate with the Gulf of Cutch in the Indian Ocean. It extends about 500 miles from N. to S., and is about 400 miles in breadth, encroaching eastward on the cultivated parts of the Delhi and Agra provinces, and westward on the country fertilized by the Indus. Mr Elphinstone, in his journey to Afghanistan, travelled across this waste, which he describes as consisting mostly of hillocks of loose and deep sand, from 20 to 100 feet in height, which in summer are blown aloft in clouds by the wind, and threaten to overwhelm the traveller. Here a miserable village is sometimes seen, which is merely a few round straw huts with low walls and conical roofs, like little stacks of corn, surrounded by hedges of dry thorny branches stuck in the sand. A few fields, watered by the dews and the rains, surround these abodes of misery, and yield crops of the poorest kinds of pulse, and coarse grain. Water is scarce, and is only obtained from wells often 300 feet deep, with a diameter of only three feet, and all lined with masonry. One was seen by Mr Elphinstone of the enormous depth of 345 feet, with such a scanty supply of unwholesome brackish water, that the whole was drawn out, by two bullocks turning the water-wheel, in a single night. In this sandy desert springs up in profusion the most juicy of all fruits, the water-melon. From about the western frontier of Ajmeer, at Shekawutty, to Bahawulpoor, the distance is 280 miles, of which the western portion, for 100 miles, is wholly destitute of inhabitants, water, and vegetation. In the Punjab, the abundance of water corrects the sterility of the soil; and in the country watered by the five well-known rivers which flow into the Indus, cultivation, with waving grass and trees, marks the termination of the desert. In the north-western extremity of Hindustan, high up the Indus, and embosomed amongst lofty mountains, is situated the valley of Cashmere, celebrated in oriental tales for its romantic beauty. Here the eastern princes, in the days of their prosperity, were wont to retire, and to seek in those sequestered scenes of natural beauty, a brief oblivion of their daily cares.

The country to the S. of Nerbuddah, namely, the Deccan, extending N.W. and S.E. 800 miles, comprehends the whole breadth of Hindustan, between the Nerbuddah on the N. and the Krishna or Kistnah River on the S. The western range of the Ghaut Mountains, rising up with the steepness of a wall from the shore of the Indian Ocean, runs along the coast southward from the River Taptee, as far as Cape Comorin, and forms the highest land, only about seventy, or in some places forty miles, from the western shore; whilst on the opposite side of the range, the table-land, elevated about 3000 feet above the sea, has a gradual slope to the eastward for a distance varying from 300 to 700 miles, and owing to this conformation of the ground, all the rivers of any size or length of course, such as the Godavery and the Krishna, which water the Deccan, and the Palar and the Cavery, which belong to Southern India, roll down the eastern declivity of the Ghauts. These mountains also diverge in ridges across the country of the Deccan, which on the eastern coast is low, flat, and sandy, with the exception, however, of the tract between the Godavery and Kistna or Krishna rivers, 150 miles in length, along the sea-shore, and forty miles broad, composed of rich vegetable mould, such as is usually found at the mouths of rivers, and remarkably fertile. In the interior, the country, especially towards the N., is wild, woody, mountainous, and overrun with thick jungle; in some parts, as on the S.W. frontier of Bengal, it is a primeval wilderness, inhabited by people but slightly reclaimed from natural wildness. Throughout Hyderabad and Nagpore the country has a gradual slope eastward as indicated by the course of the two principal rivers, the Godavery and the Kistna, both of which, though issuing from the base of the Western Ghauts, find their way into the Bay of Bengal. Towards the S. of Nagpore, large tracts have been desolated by war and robbery; and ruined towns, and wasted fields overgrown with jungle, still remain the sad memorials of those calamities. The western districts of the presidency of Bombay extend towards the Indian Ocean, and include the Western Ghauts, which rise to the height of about 3000 feet above the level of the sea. They abound in all the interesting aspects of mountain scenery, and are studded with fortresses and natural strongholds. The eastern declivity stretches out into a table-land, with plains well watered and productive; whilst the intervening strip of land, from the mountains to the sea, is in general a rugged district, but improves as it approaches the mountains, which are fringed with noble forests of teak and other valuable trees. Numerous mountain streams, but no rivers of magnitude, make their way westward to the sea from the Ghauts; and there are few coasts so much broken into small bays and harbours with so straight a general outline.

To the S. of the Kistna River, the country forms a triangle, of which this river is the base, and the coasts of Coromandel and Malabar the sides. Its extent from the Kistna to Cape Comorin, which is the point of the triangle, is 600 miles; and its breadth in the widest point is about 550. It may be shortly described as a table-land 3000 feet in height, containing the principal districts under the Madras Presidency, and enclosed on each side by the Western and Eastern Ghauts, from which the country descends on both sides to the sea—on the E. to the Bay of Bengal, and on the W. to the Indian Ocean, forming the two provinces of the Carnatic and of Malabar; the latter a narrow strip of low country, extending 200 miles along the coast, much broken and interspersed with back-water runs and extensive ravines, shaded with forest and jungle, and filled with population; the former also a long narrow tract, stretching 570 miles along the shore, and nowhere more than 120 miles in breadth, and commonly not more than 75. The Eastern Ghauts extend along the coast of Coromandel. They are not so high as the western range; and naked, sun-burnt, and rocky peaks are more commonly seen amongst them. The table-land in the centre descends both towards the N. and S.; its elevation in the southern province of Coimbetore not exceeding 900 feet. It is extremely diversified with woods, waste, and jungles; and cultivation is here, as in other parts of India, carried on by means of large tanks containing a supply of water for the irrigation of the land. In descending from the hills into the southern plains of Travancore, which extend to the Indian Ocean, the country presents a varied prospect of hill and dale, and winding streams which clothe the valleys in perennial green; and the grandeur of the scene is heightened by the lofty forests which cover the mountains, producing pepper, cassia, frankincense, and other aromatic gums.

The following are the chief rivers of Hindustan, with the length of their respective courses to the sea:—Indus, 1700 miles; Brahmapootra, 1900; Ganges, 1500; Jumna (to its junction with the Ganges, 780), 1500; Sutlege (to the Indus 900), 1490; Ghylum (to the Indus, 750), 1250; Gunduck (to the Ganges 450), 980. In the Deccan and S. of India, the Godavery, 850; Kistna, 700; Nerbuddah, 700; Mahanuddy, 550; Tuptee, 460; Cavery, 400. There are few coasts of such extent, so destitute of islands and harbours as that of Hindustan. With the exception of emerged sea banks and mere rocks, Ceylon is the only island near its shores; and on the eastern coast, Masulipatam, which admits vessels of 300 tons burden, is the only harbour for large vessels between Trincomalee in the island of Ceylon, and the Ganges, which is free from a raging surf. To this inconvenience, Madras, though an important British settlement, is peculiarly liable. On the western coast, the only harbours capable of admitting large vessels are Bombay and Kurachee in Scinde; Mangalore admits no vessels drawing more than ten feet.

Climate.

Hindustan comprehends within its bounds the opposite extremes of heat and cold. The plains are burnt up with intense heat; whilst winter, with every intermediate variety of temperature, prevails in the mountains. Philosophers have in vain endeavoured to fix the point of perpetual congelation under different degrees of latitude. They have indeed framed a graduated scale of the respective heights at which, according to calculation, this point should begin at corresponding distances from the equator. But theory is here at variance with actual observation. The climate of mountainous tracts depends so much on localities and the particular course of the winds, as to baffle all general speculation. Hence in the Himalaya Mountains harvests of grain are found, where, according to hypothesis, the ground should be buried under deep snow, and trees are seen to flourish in the regions of perpetual winter. Captain Webb, in ascending the Himalaya range, saw around him, at the height of 11,630 feet above the level of Calcutta, rich forests of oak, pine, and rhododendra, the ground covered with vegetation as high as the knee, strawberry beds in full flower, and currant bushes in blossom; and in 1818, at the Niti Pass, 16,814 feet in height, philosophy was again at fault, as the ground was clear of snow, though above the line of perpetual congelation, and many quadrupeds were feeding on the grassy banks of the Sutlege. It was remarked by Dr Gerard that vegetation attained a higher level on the northern than on the southern face of the Himalaya ridge, where the extreme height of cultivation is 10,000 feet; the limit of the forest 11,800 feet, and 12,000 feet that of bushes. On the northern side cultivation rises to the height of 11,400 feet; in other places to 13,600 feet; birch trees to 14,000 feet; and tama bushes, which form excellent fuel, to the height of about 17,000 feet. In Northern Hindustan, great and sudden changes of temperature occur, which is the cause of pulmonary affections. During summer, the thermometer, which is often in the morning at 32° or under it, rises to 70°, 75°, and 80°, or upwards during the day: the winters are, however, uniformly severe. In this also, as in other hilly countries, the traveller may be fainting to-day under a tropical sun, and shivering to-morrow amidst the rigour of perpetual snows. From the banks of the Sutlege, where the thermometer frequently stands at 100° and 108°, three days climbing will carry him into the regions of winter.

Seasons.

In the plains of Hindustan, the heat during the greater part of the year is unintermitting and intense, except where it is modified by the ranges of mountains, or the table-lands towards the W. The seasons here are commonly divided into the hot, cold, and rainy. The spring and the dry season throughout the valley of the Ganges last about four months, the heat gradually increasing with the season, until, in May and June, the thermometer rises to 100°, and frequently in the interior to 108° and 110°, when it is almost intolerable even to the natives, and still more so to Europeans, who resort to various modes of alleviation, such as the *cuscus tatty*, which is a frame of wood, interwoven with twigs, between which is distributed a layer of a particular kind of sweet-scented grass. This being hung before an open window, in the quarter of the prevailing wind, and constantly moistened on the outside by a water-carrier, diffuses a refreshing coolness. Bishop Heber, however, thought it more effectual to shut out the external air, by which, and by agitating the air within by punkahs, a slight frame of wood, covered with silk or with canvas, and suspended from the ceiling, and swung backwards and forwards by servants, he reduced the temperature to 85° within doors, although it was at 100° without. Thus imprisoned, he complains that in going to an open window or door, "it is literally like approaching the mouth of a blast-furnace." This raging heat is modified by occasional thunderstorms from the N.W., termed north-westers, which, however terrific, refresh the air and the ground, and give new freshness and luxuriance to the grass, and to the shrubs and trees. Milder showers also occur, which refresh the atmosphere. In the western provinces of Allahabad, Agra, Delhi, &c., a parching wind very frequently blows from the W. during the hot season, and, during the night, is succeeded by a cool breeze from the opposite quarter, sometimes for days and weeks by easterly gales; and as these parching winds prevail, refreshing breezes and cooling showers of rain and hail are more rare. Those remarkable winds, the monsoons, which blow half the year from the S.W., and and the other half from the N.E., exercise a powerful influence on the climate and seasons of Hindustan. The periodical rains are ushered in by the S.W. monsoon, which commences about the beginning of June in the S. of India, and somewhat later towards the N. Mr Elphinstone, in his account of his journey to Afghanistan, gives a just and forcible description of the phenomena which accompany the change of the seasons in those eastern countries. "The approach of the monsoon," he observes, "is announced by vast masses of clouds that rise from the Indian Ocean, and advance towards the N.E., gathering and thickening as they approach the land. After some days, the sky assumes a threatening appearance in the evening, and the monsoon in general sets in during the night. It is attended by such a thunderstorm as can scarcely be imagined by those who have only seen that phenomenon in a temperate climate. It generally begins with violent blasts of wind, which are succeeded by floods of rain. For some hours lightning is seen almost without intermission; sometimes it only illuminates the sky, and shows the clouds near the horizon; at others it discovers the distant hills, and again leaves all in darkness, when in an instant it re-appears in vivid and successive flashes, and exhibits the nearest objects in all the brightness of day. During all this time the distant thunder never ceases to roll, and is only silenced by some nearer peal, which bursts on the ear with such a sudden and tremendous crash as can hardly fail to strike the most insensible with awe. At length the thunder ceases, and nothing is heard but the continued pouring of the rain and the rushing of the rising streams. The next day presents a gloomy spectacle; the rain still descends in torrents, and scarcely allows a view of the blackened fields; the rivers are swollen and discoloured, and sweep down along with them the hedges, the huts, and the remains of the cultivation, which was carried on, during the dry season, in their beds." After some days the sky clears, and discloses the face of nature changed as if by enchantment. The fields, formerly parched, are now covered with luxuriant verdure; the clear and burning sky is varied and embellished with clouds; the rivers are full and tranquil; the dust which loaded the atmosphere, and which made the sun appear dull and discoloured, has now disappeared; and the parching wind, like the blast from a furnace, and the still more sultry calms, have been succeeded by a pure and delicious air. Intermitting rains now fall for about a month, when they come on again with great violence, and in July are at their height. During the third month they rather diminish, but are still heavy; and in September, and at the end of the month, they depart amidst thunders and tempests as they came.[1] From 50 to 80 inches of rain fall in Bengal during the rainy season.[2]

The dense masses of clouds which arise on the Indian Ocean are carried forward by the S.W. monsoon over the plains of Hindustan, as far as the Himalaya Mountains. On the coasts they descend in deluges of rain, which diminish as they recede from the sea, unless where the vapours are intercepted by high mountains, when they pour down in torrents of rain on the plains beneath. But in Southern India, the S.W. monsoon is intercepted by the double chain of the Western and Eastern Ghauts, by which the mass of clouds being as it were cut in twain, is carried forward on the N. and S. sides of this mountain wall, going clear of a considerable tract to leeward of the Eastern Ghauts, namely, the coast of Coromandel, which is thus free from the periodical rains which fall in all other places of Hindustan. The western range of the Ghauts, though it checks, does not altogether impede the passage of the clouds; and we find accordingly, that in the table-land of Mysore and the neighbouring countries, the S.W. monsoon brings on the rains, though they are not so violent nor of such long continuance as in Bengal, and on the western shores of India. But those light and elevated clouds which pass the Western Ghauts, being stopped in their progress by the eastern chain, or descending in rain on the intermediate table-land, never reach the Coromandel coast; and here, accordingly, on the eastern side of the mountains, the dry season prevails, when it rains on the table-land of Mysore to the W., and still more heavily on the Malabar shore. On the other hand, it is the N.E. monsoon which, in the Bay of Bengal, sets in about the middle of October, with thunder and lightning and violent hurricanes, that ushers in the rains on the Coromandel coast, which continue to the middle of December, and sometimes to the 1st of January, whilst at this period southerly gales and fair weather prevail on the opposite coast of the Indian peninsula. It was formerly supposed that the Ghauts, interrupting the progress of the S.W. monsoon, occasioned a diversity of seasons throughout a great part of India. But it is only that limited tract of country to the leeward of the Eastern Ghauts that is free from the influence of the S.W. monsoon, which accordingly brings on the rainy season at the mouth of the Godavery, immediately to the N. Major Rennell suggests that those clouds may be blown by the S.W. monsoon from Cape Comorin; though he afterwards adds that this is not his opinion, because the cape bears S.S.W. from the mouth of the Godavery, and the reigning winds are much more westerly.[3] But the true reason seems to be, that the eastern chain of the Ghauts does not extend so far N.; hence they afford no shelter to the country at the mouth of the Godavery, which thus lies in the direct course of the S.W. monsoon. To the N. of the Ghaut Mountains, in the parallel of Surat, the S.W. monsoon, meeting with no interruption, carries its supplies of moisture over the whole face of the country. The periodical rains accordingly extend over the great plain of the Ganges. They commence on the coast of Malabar in May, farther N. in June, where they are not so violent; at Delhi they do not come on till the end of June; and a much smaller quantity of rain falls than at Bombay or Calcutta[4]. Near the sea the clouds are still in a deep mass, and descend in deluges of rain; but they are exhausted as they go; the rains become weaker and weaker; and are at last diminished to a few transient showers in the S. of the Punjab. On the sea-shore the S.W. monsoon extends into Beloochistan, and thence into Mekran, the easternmost province of Persia, where the clouds being arrested by mountains, descend in heavy rains. They pass with little obstruction over the countries of Lower Sind; but being intercepted by the mountains of Upper Sind, they occasion the principal rains of the year.

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[1] Elphinstone's *Account of the Kingdom of Caubul*, p. 128.

[2] Martin's *History of the British Colonies*, vol. i., p. 91.

[3] *Memoir of a Map of Hindustan*, p. 214.

[4] Elphinstone's *Account of the Kingdom of Caubul*, p. 130.

The eastern provinces of Hindustan, including Bengal and the mountainous countries of Bootan, Nepaul, and the other contiguous provinces, are not dependent on the rains that come across the country from the Indian Ocean, which would be very scanty at so great a distance from the sea. Of the mass of clouds driven before the S.W. monsoon, that portion which passes Cape Comorin on the S. is carried north-eastward across the Bay of Bengal, until, meeting with the mountains that join the Himalaya from the S., of which they are indeed a continuation, they follow their direction, and are thus diverted from a north-easterly into a north-westerly course; and it is from this quarter accordingly, that the north-eastern districts of Bengal and the adjoining provinces receive the rains fresh and abundant from the ocean. Part of these clouds make their way over the first hills, and bring on the rains in Nepaul and Thibet; and part passing to the N.W., water the plains of Bengal, the southern face of the Himalaya Mountains, the countries which lie to the N. of the Ganges, the northern parts of the Punjab, and, in their progress to the N.W., the southern declivity of the Cashmere Hills, and the plains beneath, though they scarcely make their way over these hills into the Valley of Cashmere. They continue their progress westward to Afghanistan, where they gradually become weaker, and only produce occasional showers. The cold season, which succeeds the rains, lasts from November to the middle of February; and during all this period the air is clear, and the thermometer is from 65° to 84°. In Southern India the heat is greater than in Bengal. In the Carnatic the thermometer ranges from 100° to 106°, and the cold season is of very short duration. On the table-land above the Ghaut Mountains, as at Coimbetore, among the hills, the temperature in the cold season is from 31° to 59°; in summer 64°, 65°, and 75°, or even higher. On the table-land in which Bangalore is situated, the thermometer seldom rises above 82°, or falls below 56°.

Vegetable produce.

Hindustan comprehends all the known varieties of the vegetable tribes. The mountainous tracts of Northern Hindustan produce all the alpine plants, and the various species of European grain, fruits, and flowers. Deep woods cover those lower ranges of mountains, in which are found the pine tree of various species, " the tallest, straightest, and most magnificent," says Fraser,[1] he ever beheld; the larch, the silver, and the spruce fir, from the bark and twigs of which resin exudes in abundance; the yew tree; several species of oak, holly, alder, sycamore, birch, with mulberry and chestnut trees. Here is also found the mimosa tree, from which is made the catechu or Indian rubber;—the resinous part of this fir, cut into slips, answers the common uses of the lamp. These noble forests extend over immense tracts, and would afford inexhaustible supplies of timber, if they could be transported to the proper market. Fruits in great variety are also produced in this elevated region, such as apricots, peaches, and grapes, apples, pears, currants, raspberries, blackberries, and strawberries; roots, such as turnips, carrots, garlic, onions; flowers and plants, as roses, both red and white, lilies of the valley, jasmines, buttercups, yellow, blue, and white cowslips, sweet briar, with numerous other beautiful and fragrant plants. The valleys exhibit, according to their altitude and temperature, the productions of Europe or of the tropical countries. At the height of 6000 feet appear the oak and the pine; at that of 3000 feet rattans and bamboos of enormous dimensions; in some parts the pine-apple, the orange, the sugar-cane, grow to maturity; in others, barley, millet, and similar grains are produced. The lower part of these hills is the seat of the saul forests. The lower valleys yield rice sown broad-cast, maize, wheat, barley, pulse of various kinds, sugar-cane, cotton, Indian madder, a large species of cardamum, besides other productions. The pastoral tribes of Northern Hindustan feed considerable flocks on the lower hills and valleys; in summer they climb the alpine country, and browse on the herbage adjacent to the region of perpetual frost.

The vegetable produce of the plains in Hindustan, and of the southern provinces, is the same as in all tropical countries. The soil, where it is copiously watered, is fertile; and if the country were one unvaried level, the copious rains would afford a sufficient supply for every spot. But, from the inequalities of the surface, the lower parts are frequently overflowed, whilst, in the higher grounds, vegetation is burnt up. To secure a more equal distribution of water, various contrivances are resorted to. It is retained in extensive plains by means of dams, or in reservoirs constructed of stone, or in ponds and water-courses, whence it is distributed over the land. Some of these works, though erected at great cost, are in a dilapidated state. Their construction conferring a reputation for piety, they have been uselessly multiplied; and not being duly repaired, they are soon filled with aquatic plants, putrid water, bad smells, and pernicious exhalations. One of these tanks, seen by Dr Buchanan, is stated to be 8 miles long and 3 broad. " I never viewed a public work," he observes, " with more satisfaction, a work which supplies a great body of people with every comfort which their moral situation will permit them to enjoy."[2] The Hindu, though he is a most industrious, is not a skilful cultivator; his implements are of a very rude kind; and even if he had the skill, he has not the capital necessary for an improved system of husbandry. The ploughing in Hindustan is quite different from any thing seen in this country. The plough has no contrivance for turning up the earth, nor has the share sufficient depth to stir a new soil. Several ploughs in succession deepen the furrows, or rather scratch the surface. The branch of a tree, or some other equally rude substitute for a harrow, is then employed to pulverise the soil, and prepare it for the seed. The plough is drawn by oxen, and in Southern India by buffaloes. The field, after it is sown, must be protected for several days by a person exalted on a bamboo stage, against the depredations of numerous flocks of birds, and still longer in woody districts, from the havoc of wild elephants, buffaloes, and other animals. The harvest is reaped by the sickle, the scythe being unknown. There is no occasion for stacking rice, which is completely preserved by the husk. The grain, after it is winnowed, is stored in jars of unbaked earth, or in baskets made of large twigs. In Benares and the western provinces, and also in the S. of India, it is stored in subterraneous granaries; but in the damp climate of Bengal it is hoarded above ground. The rotation of crops, so essential to the husbandry of Europe, is not known in Bengal; nor are the articles for cultivation ever selected with any view to restore the exhausted powers of the soil. The land is never properly manured. The Hindus, from their limited use of animal food, are no extensive breeders of stock. The labouring cattle are either pastured on small commons, or fed at home on cut grass;

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[1] Fraser's *Journal of a Tour through the Himalaya Mountains*, p. 139.

[2] See *Journey from Madras, through Mysore, Canara, and Malabar*, vol. i., p. 16.

and those for the dairy graze in numerous herds in the forests or on the downs. The dung is accounted holy by the superstitious Hindus, and is either converted to religious uses, or into fuel, and sold. In Bengal no manure is used; and, in the southern provinces, only a small quantity of ashes and dried vegetables. Oil-cake is sometimes employed as a manure for the sugar-cane. The public revenue is derived chiefly from the land, but the government are no longer the sole landlords; their interest in the soil has been defined by the limitation of the public demand, and new classes of landed proprieters are springing up in all parts of the empire.

Rice is the great staple of agriculture throughout Hindustan, in the plain of the Ganges as well as in Southern India. It is sown at the approach of the rains, and it is gathered during the rainy season, about the end of August; the last crop is sown during the same season, and is gathered in the beginning of December. It is esteemed the best, not being equally liable with the other to decay. The diversity of soil and climate, and the several seasons of cultivation, have given rise to infinite varieties in this species of grain. When the rains fail throughout Hindustan, which occasionally happens, the rice crops are apt to be deficient to a degree altogether unknown in the well-regulated agriculture of Europe, where the severest scarcity hardly ever raises the price of corn more than three times its usual rate. But the famines of Hindustan leave thousands without subsistence, and fill the land with scenes of misery and death. In the great famine of 1769, it was estimated that three millions of the people perished; the air was so infected by the noxious effluvia of dead bodies, that it was scarcely possible to stir abroad without perceiving it, and without hearing also the frantic cries of the victims of famine, who were seen in every stage of suffering and death; whole families expired, and villages were desolated; and when the new crop came forward in August, it had no owners. Bengal has been less liable to famines since this period, but they have frequently occurred in other parts of India. Rice thrives well in the inundated track of the Ganges, and in Southern Hindustan, especially on the low lands of the sea-coast; higher up the Ganges, wheat and barley are more generally cultivated, also in the high grounds and elevated table-lands of Southern India. Other kinds of grain are cultivated, such as Indian corn; and great varieties of pulse and coarse grains, such as peas, beans, chiches, gram, vetches, and raggy, which is the most important crop raised in the dry field, and in some parts of Southern India is the subsistence of all classes, in others of the poorer classes. These are important articles of cultivation, as they have each their particular season, and thrive even on poor soils. Maize is the general produce of poor soils in hilly countries, and is commonly cultivated in the more western provinces. Millet and other grains are also cultivated, and, vegetating rapidly, and in every season, they fill up profitably for the farmer the short intervals between the other modes of cultivation in Lower Hindustan. Sugar is everywhere cultivated, and at little expense, by the Hindu cultivator; and as the sugar of India is no longer subjected in the United Kingdom to an unequal import duty, there is reason to hope that the produce of India may compete not only with the sugars of British colonies, but with those also of Cuba, Brazil, Siam, and Manilla. Though formerly unknown in Europe, sugar has been produced in India from the remotest times, and was thence transplanted into Arabia, whence it has been introduced into Europe, Africa, the West Indies, and America. It grows luxuriantly throughout all the valley of the Ganges and in the plains of Southern India, and could be produced, with the help of European skill and capital, to meet any demand. It thrives more especially in Bahar and Benares, and in particular districts of Bengal. Opium is the peculiar and staple produce of the province of Bahar, and is also extensively cultivated in Malwah, and in other parts of Hindustan. It is a precarious crop, producing alternately high profits and heavy losses. The liquor extracted from the poppy is collected as it exudes, and is then placed in pots, where it is dried and formed into lumps, in which process it loses from one-tenth to one-eighth of its weight. The opium produced in Bahar and Bengal being monopolized by the East India Company, and bought at a fixed price, is a contraband article of trade, and its cultivation is confined to certain districts. Within Bengal no one is allowed to cultivate the poppy except for the government. In Malwah a treaty was entered into with the different rulers and chiefs, by which the monopoly was extended to that country, and all that was produced delivered to the Company, at the rate of three rupees a seer, which is two pounds. But so great was the discontent excited by this extension of the monopoly, that, at the desire of the chiefs, the treaties were rescinded in 1819–1820; and the trade in opium, and its cultivation, is now free in that province, and everywhere throughout India, except in the Company's dominions; but as Malwah is completely surrounded by British territory, a large revenue is derived from the high duty levied on Malwah opium in transit to Bombay for exportation to China. Malwah opium equals that of Bengal, and is brought into competition with the Company's opium in all the foreign markets, and especially in China.[1] The cotton plant has from time immemorial been one of the staple products of Hindustan, and is indigenous from Ceylon in the S., to the Himalaya Mountains. It is cultivated extensively throughout Bengal, and in the interior provinces on the banks of the Jumna; also in the Deccan, and in Southern India, whence it is imported into Bengal, and into Mirzapoor, and the district of Benares, where it is manufactured. Flax and hemp are also cultivated in several districts both in the N. and in the S. of India. Silk was long the exclusive product of India and China. Silk-worms are now reared principally in the district of Burdwan, and in the vicinity of the Bhagirati and the Ganges, and for about 100 miles down their streams. Four crops of mulberry leaves are obtained in the year, the last in December. A considerable quantity of silk, of a coarse kind, is obtained from wild silk-worms, which do not feed on the mulberry, and are found in the forests of Silhet, Assam, and the Deccan. Indigo was originally a product of India; and the plant was afterwards carried to South America, whence Europe was for a long time supplied with this dye. The manufacture on which the quality of the indigo depends was very unskilfully conducted until the year 1783. Since this period it has been so much improved by the skill and capital of Europeans that it is now a staple article of commerce; and in Bengal the value of the produce in 1854 amounted to L.1,701,206. Indigo is produced generally throughout the plain of the Ganges, and in Southern India, but chiefly in Bengal. Tobacco, formerly unknown in India, and introduced from America probably about the beginning of the seventeenth century, is now extensively cultivated in every part, chiefly however in the northern provinces, and more rarely in the S. The tobacco grown in the Mahratta territories is most esteemed; particularly that which is produced near Bilsea, a town in Malwah. Bengal does not yield good tobacco; but the Company's territories in Guzerat, being principally of a rich black soil, are considered as peculiarly suitable to its cultivation.[1] The Hindus having been already in the habit of inhaling the smoke of hemp leaves, and other intoxicating drugs, readily adopted tobacco as a more agreeable substitute, and it soon came into general use. Their recent knowledge of it appears from their having no name for it which is not a corruption of some European term. Pepper, though of inferior consequence, is a valuable product of Southern India, especially of Malabar. It is produced from a species of vine which is made to twine round the jack tree. It bears fruit about the third or fourth year, amounting to from three to seven pounds weight, and yields two crops in the year. The areca-nut and betel-leaf, universally chewed by the natives, thrive in the low grounds, where water is abundant; and cardamoms, a spice in great repute. The universal and vast consumption of vegetable oils in Hindustan, for food or unguents, or for the lamp, is supplied by the extensive cultivation of mustard seed, linseed, sesamum, palma christi, besides what is procured from the cocoa nut. The first ripen in the cold season, the sesamum during the rains, or soon afterwards.

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[1] See *Appendix to the Report on the East India Company's affairs*, p. 15, par. 59, House of Commons Papers, 1831. Minutes of Evidence before Lords' Committee, 26th February 1830.

The forests in the low plains of Hindustan, of Southern India, and those which cover the western range of the Ghauts, and more sparingly the Eastern Ghauts, abound in the most valuable trees, applicable to many important uses. The extensive woods in Southern India supply the teak tree, valuable for ship-building; and in Malabar, extensive tracts of waste land have within the last few years been converted into teak plantations by the government. Saul, sissoo, toon, and bamboo trees abound; the last of which yields a medicine much used by the native doctors, and which sells for its weight in silver. There are many species of the palm tree, with its luxuriant and spreading leaves, of which the produce is extremely useful. The cocoa-nut tree is in some provinces an important article of culture. The kernel is used for food by the richer natives, either in its raw state, or dressed after various fashions; and it yields by far the finest oil in India, if the nut be fresh and the oil quickly used. Extensive tracts, many miles in length, are planted with the cocoa-nut and betel-nut palms. Many other species of timber are found in the deep recesses of the woods, of which Dr Buchanan, in his account of Mysore, gives a particular description, with the botanical names of the different trees, and to his work we refer; observing generally, that the woods consist of every description of timber, black, heavy, and strong, and adapted for the beams and posts of houses; other kinds are white, hard, and durable, and adapted to all the purposes for which strong materials are required; some are beautifully grained, and take a fine polish, and are well suited for furniture, or exude resins and gums of a sweet scent, that are used in temples for incense; the wood of some kindles readily into a clear light, and is used for torches.[2] Other kinds of wood are employed for dyeing. The sandal-wood is valuable for its perfume, and for the essential oil which it yields. It requires a strong soil, and it is twelve years before it attains the proper size for being cut. The billets of wood are prepared by being buried in the dry ground for two months, when the ants eat up all the outer wood, leaving the heart, which is the sandal. The deeper the colour the higher the perfume. The best sandal wood of Hindustan is now in possession of the rajah of Mysore, who succeeded to a small portion of Tippoo's dominions.

The climate of Hindustan, owing to the long and heavy rains of summer, is not so favourable for many kinds of fruit which are not ripened by the previous heat of the spring. Orchards of mango trees diversify the plains of Bengal, and are common all over Hindustan; the palmyra and the date tree abound everywhere, and especially in Bahar. The former thrives remarkably well in dry barren spots, and is prized for the tari or wine which it yields. The bassia, which yields an intoxicating spirit, also suits the poorest soils, and abounds in the hilly districts, where the oil expressed from its seeds is a common substitute for butter. The other fruits are the plantain, the lime, the sweet and bitter orange, the guava, the pomegranate, the jack, the tamarind, &c. Under the shade of lofty flower and fruit-bearing trees, and the luxuriant bamboo, and the rank weeds which shoot up along with them, the natives, from shyness, bury their cottages, and especially their females, from the view of strangers; and the damp vapour from the confined air, the loathsome and pernicious animals which harbour among the trees and weeds, and the filthy habits of the natives, are generally sufficient to repel Europeans from their habitations. The Hindus cultivate in their kitchen gardens a variety of esculent vegetables and roots. But, of the European vegetables, the potato alone is suited to the climate, and is of as good quality as that which is produced in England. Asparagus, cauliflower, radish, onions, and other esculent plants, are raised; but they are comparatively tasteless.[3]

Animals.

Hindustan, from the great extent and inequality of its surface, its stupendous and snow-clad mountains, and its vast and wooded plains lying under a burning sun, comprehends all the most interesting forms of animal life; more especially those animals of the tropical regions remarkable for ferocity or size, which have been the subjects of scientific research as well as of popular curiosity in all ages, and which find ample cover in the deep woods and jungle-covered wastes of those tracts of the country which have been desolated by tyranny or war. A minute or systematic inquiry into so important a branch of natural history cannot within our limits be attempted. All that we can propose is a brief and popular sketch of the principal animals which give to the zoology of India its distinct and brilliant character. The elephant, which holds a conspicuous place in the animal creation, is seen in all parts of Hindustan, and ranges wild in its deep forests and jungles. This animal, from its size and strength, was employed in the ancient wars, and the prodigious momentum of its charge often turned the tide of battle. The richly caparisoned elephant is still used to swell the gorgeous parade of the Asiatic courts, and is at the same time, from its patience and docility, the humblest of domestic drudges. An elephant is about thirty-five inches high when newly born, and does not attain his full growth of ten or ten and a half feet, or twelve feet when the head is set up, until the age of twenty or thirty years. In length he is about fifteen or sixteen feet. The rhinoceros is between five and six feet high, in length eight feet, the whole body covered with a thick and nearly bare skin, in irregular folds, and the head, at least of the Indian species, armed with a single horn. The rhinoceros is strong and active, of peaceable habits; but when he is hunted he turns on his pursuers and resists fiercely. The Bactrian camel with two humps, so useful in traversing the sandy wastes of the torrid zone, and the dromedary with a single hump, formed more lightly for speed, are natives of Hindustan. The deer is found in all its varieties, from the large and powerful mountain stag, with its well-compacted form, to those lighter forms of the antelope species which sport so gracefully in the woods and in the burning plains. The musk-deer, so named from the perfume contained in a small bag situated in the lower region of the abdomen of the male, is a solitary dweller in the mountain tracts of Hindustan and of Central Asia, amidst ice and snows; it is shy and timid, and seldom approaches the lower region of the pine forests. This animal has no horns; the horned tribe are, however, numerous. The Nepaul stag has a short tail, short horns, and two small antlers at the base. Deer of a large size abound in Bengal, and also in Southern India, in the forests of the Ghaut Mountains. One species, with branching horns, attains to the size of a horse. The black deer of Bengal is about fifteen or sixteen hands high; it is a bold, fierce, and powerful animal; dark brown in the upper parts of the body, and in winter of a shining black; whitish in the belly, with a ring of white round the nostrils and mouth. The spotted deer, with large antlers, ranges all over India, and abounds in the forests of Bengal, and along the banks of the Ganges. The hog-deer is known in Bengal and in the northern parts of India; and the roe-buck in the hilly districts, and still more among the Ghaut Mountains in the S. There are, besides, numerous other varieties of the deer species. Hindustan contains several species of the antelope; one about twenty inches in height, and nearly three feet in length, with four horns, haunts the western forests and hilly tracts in the valley of the Ganges. The white antelope, between three and four feet in height, and of surpassing swiftness, ranges along the banks of the Ganges and the Indus, and over the intervening deserts; and another species, with one horn, and an abundant covering of wool, is a native of the mountain and icy regions of the Himalaya. Of the feline tribe, the lion claims the first place. He is considered as the lord of the brute creation; and his whole appearance, the flowing and shaggy mane, the ample forehead, the kindling eye, and the muscular strength and compactness of the whole frame, so powerfully armed by nature for the purposes of destruction, concur to give an idea of majesty and power, which is further strengthened by the boldness and courage with which, instead of seeking a dastardly retreat in the forest or the jungle, he rushes forth to confront his enemies in the open plain, where he is generally shot by the hunters. But, in the event of his being only wounded, he is extremely formidable, from his vast strength and fierceness, and the immense weight of his body, especially towards the head, and the power of his tremendous claws.[1] The lion is not nearly so common in Asia as in Africa, and is only found in the northern provinces of Hindustan.[2] The tiger is the more common animal of India, abounding in all the forests and jungles, from the mouth of the Ganges to the Himalaya Mountains. He is not quite equal in strength to the lion, though superior in activity; and his undulating movements have more of ease, grace, and bounding elasticity; whilst his bright-yellow, tawny-coloured skin, variegated with dark stripes, shaded with white in the under parts, completes this beautiful specimen of the animal creation. Since the British have acquired possession of India, they have so eagerly pursued the sport of tiger-hunting, that the animal has been driven from the inhabited parts of the country into the vast jungles which line the great rivers, and which may be considered as the game preserves of Hindustan. The leopard and the panther are found in the woods; the former animal in such numbers, that during the marches of the British troops in 1803, amongst the deep forests at Cuttack, in the province of Orissa, many of the sentinels were carried off by them in the night. The bear abounds in all the wooded mountains; also wolves, which at Cawnpore, where there is a cantonment, were formerly so numerous that they frequently dashed into some corner of the camp, and carried off children under five years of age, who happened to be straggling amongst the huts. The other wild animals are hyenas, jackals, foxes, hares, porcupines, hedgehogs, monkeys in great variety, and prodigiously multiplied by the superstitious Hindus, who consider them as sacred animals, to the great annoyance of Europeans. The wild boar, which inhabits the woods and jungles of India, is a fierce animal, and very destructive to the corn fields and sugar plantations. It affords excellent though sometimes dangerous sport to the hunter, when it turns on its pursuers. The wild dog of the Himalaya Mountains is a remarkable animal, in form and fur resembling a fox, though stronger and larger. Bishop Heber saw one of these animals which had been taken, and was exceedingly wild and fierce. They hunt in packs, give tongue like dogs, and have a very fine scent; and they are said to attack and, by dint of numbers, to destroy the tiger. They are highly valued in these countries.[3] Dr Gerard observed a pack of these wild dogs stealing along a gulley quite red. The buffalo, both wild and tame, is a native of India. There are different species, one of which (the *Bos Arnee*) is noted for its gigantic dimensions, its great strength, and its horns, which are nearly six feet in length, by the aid of which it is a match for, and frequently repels the fiercest tiger. Dr Buchanan, however, insists that this is merely the common buffalo in its wild state.[4] The yak, or ox of Tartary, particularly described by Turner in his account of his embassy to Thibet, is numerous among the Himalaya Mountains, where they browse in herds, amidst ice and snow; and constitute, next to corn, the wealth of the inhabitants.[5] It has a downcast, heavy look, and is fierce and of a suspicious temper. The Cashmere goat has been long celebrated for the soft silky nature of the wool found at the root of its long hair, which is manufactured into shawls. The other animals in the alpine regions of Hindustan are also provided with a similar covering of soft wool. "The cow," says Moorcroft in his Journal, "has a material of the same kind, not much inferior in warmth and softness; the hare has her fur of peculiar length and thickness; and even the dog has a coat of fur added to his usual covering of hair."[6] The goat bred in Southern India, called the maycay or long-legged goat, mentioned by Dr Buchanan, is also of quite a different breed from the common goat. There are other breeds remarkable for long and curiously-twisted horns. The native horse of India is a small, ill-shaped, vicious pony, the finest horses being imported from the countries to the W. of Hindustan. But wild horses are seen in herds in the northern mountains. The sandy desert in the W. of Hindustan is the haunt of the wild ass; as he is described in Scripture, "his house the wilderness, and the barren land his dwelling." This animal is found in herds of 60 or 70 on the banks of the Runn, the great salt morass or lake of Cutch, where it browses on the brackish and stunted vegetation of the desert. When caught, as it sometimes is by the natives in pits, it is fierce, untameable, and bites and kicks in the most ferocious manner. Its form is that of the mule rather than of the ass; its body is of an ash colour, changing to a dirty white under the belly. It is larger than the tame ass, stronger and more active, remarkable for shyness, and still more for speed; throwing out, at a shuffling trot peculiar to itself, the fleetest horses in the pursuit.[1] In Southern India, the ass, of which there are several varieties as to colour, is very commonly tamed for domestic purposes; some are of a black hue; and there is a species of milk-white ass, though it is rare.[2] The rat tribe abound in Hindustan; and one species is of enormous size, the tail above a foot long, and very mischievous, burrowing to a great depth in the ground, making its way under the foundations of stores and granaries, and perforating the mud or unburnt brick walls of the native cottages.

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[1] See Letter of the Secretary to the Court of Directors, to the Secretary of the India Board, 5th September 1828.

[2] See *Journey from Madras, through Mysore, Canara, and Malabar*, vol. i., p. 25.

[3] See Hamilton's *Geographical, Statistical, and Historical Description of Hindustan*, vol. i , p. 26.

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[1] Heber's *Journey*, ii., 170.

[2] "The lion," says Bishop Heber, "which was long supposed to be unknown in India, is now ascertained to exist in considerable numbers in the districts of Saharunpoor and Loodianah. Lions have also been killed on this side of the Ganges, in the northern parts of Rohilcund, in the neighbourhood of Moradabad and Rampoor, as large, it is said, as the average of those in the neighbourhood of the Cape of Good Hope. Both lions, where they are found, and tigers, are very troublesome to the people of the villages near the forest, who, having no elephants, have no very effectual means of attacking them with safety. The peasantry here (in the province of Delhi) are not a people to allow themselves to be devoured without resistance, like the Bengalese; and it often happens, that when a tiger has established himself near a village, the whole population turn out, with their matchlocks, swords, and shields, to attack him. Fighting on foot, and compelled to drive him from his covert by entering and beating the jungle, one or two generally lose their lives; but the tiger seldom escapes." Heber mentions, that he derived his information from Mr Boulderson, who was a keen sportsman, and had long been in India, and who said that he had seen some skins of tigers which bore the strongest marks of having been fought with, if the expression may be used, hand to hand, and were in fact slashed all over with cuts of the tulwar or short scimitar." (Heber's *Journey*, vol. ii., p. 149.)

[3] Fraser's *Journal of a Tour through the Himalaya Mountains*, p. 176.

[4] *Journey through Mysore*, vol. i., p. 118.

[5] Fraser's *Journal of a Tour through the Himalaya Mountains*, p. 263.

[6] *Asiatic Researches*, vol. xii., p. 460, J. Moorcroft's Journey to Lake Manasarovara.

Birds.

The ornithology of India, though it is not considered as so rich in specimens of gorgeous and variegated plumage as that of other tropical regions, still contains many splendid and curious varieties of the feathered race, as well of those that are clothed in nature's gayest attire, far surpassing the richest dyes of art, as of that other class, the birds of prey, distinguished by strength, size, and fierceness. The parrot tribe are the most remarkable for beauty. So various are the species, that we cannot even enumerate them, and must refer for details to the scientific works on the subject. Of the birds of prey, the eagle or the condor, which haunts the inaccessible crags of the great Himalaya range, is the most remarkable. Bishop Heber mentions that one of these animals was shot at Dega by Lieutenant Fisher, with whom he conversed; and, from the bareness of its neck, resembling that of the vulture, the form of its beak, which is longer and less hooked than the eagle's, and from its extraordinary size, he judged it to be the condor. It measured between the extended wings thirteen feet; its talons were eight inches in length; its colour was a deep black. According to Heber, children are sometimes carried away by this animal from the streets of Almorah.[3] Eagles, of which there are three different sizes, are numerous, and do great injury to the flocks of the shepherds in the mountainous districts. There are various kinds of vultures, and also of the falcon tribe. There is the gentle falcon; the goshawk, a large grey short-winged bird; the shaukeen, which is taught to soar over the falconer's head, and strike the quarry as it rises; the chirk, which strikes the antelope, fastening on its head, and retarding its course till the hounds come up; with various other species.[4] Numerous other birds are common in India, such as herons, cranes; the gigantic stork, well known for clearing the country of snakes and other reptiles, and the populous cities of offal; the peacock, which is found wild in the forests in all its various and brilliant hues; the black-backed goose, measuring nearly three feet in length; besides other kinds, which migrate with the seasons, and are very destructive to the corn; swans, partridges, quails, gulls, plovers, wild ducks, and the other common domestic fowls.

Reptiles.

The serpent brood in India is numerous; they swarm in all the gardens, and intrude into the dwellings of the inhabitants. Some are comparatively harmless, but the bite of others is speedily fatal. The cobra di capello, the name given to it by the Portuguese, from the appearance of a hood which it produces from the expanded skin about the neck, is the most dreaded. It is not above three or four feet long, and about an inch and a quarter thick, with a small head, covered on the forepart with large smooth scales; it is of a pale-brown colour above, and the belly is of a bluish white tinged with pale brown or yellow. It is more frequently the assailant than any other, though the bite of these also is equally dangerous, and often fatal. The Russelian snake, about four feet in length, is of a pale-yellowish brown, beautifully variegated with large oval spots of deep brown, with a white edging. Its bite is extremely fatal. The whip snake is a remarkably malignant species; it darts from the thick foliage of the trees at the cattle below, most commonly at their eyes, and inflicts wounds of which they quickly expire, often in great pain. Itinerant showmen carry about these serpents, and cause them to assume a dancing motion for the amusement of the spectators. They also give out that they render them harmless by the use of charms, though it is known that it is by extracting the venomous fangs. But, judging from the frequent accidents which occur, they often dispense with this precaution. The snake-catching fakirs pretend to bear a charmed life; and it is related that one of these impostors being invited by a shopkeeper to catch a snake which had been seen in an inner apartment, was stung in the hip bone, and for shame would not discover the injury he had received, and went home endeavouring to counteract the poison, but in vain. He died; and such is the blind confidence of the natives in these impostors, that they believed he would revive into life, until the body became putrid.[5] Physicians differ respecting the mode in which the poison of serpents acts upon the human frame. The symptoms also vary; the patient being sometimes seized with torpor and insensibility, or falling into feverish heat and convulsions; the breathing laborious; the skin cold and clammy, with a livid countenance and a feeble pulse. The mode of treatment by the British physicians in India is to bind up the limb above the wound; along with this to apply strong stimulants, as ammonia, hartshorn, eau de luce, and the like; and, above all, to give the strongest narcotics, such as laudanum and brandy. By this judicious treatment many patients have been brought back from the jaws of death.[6] There are several water-snakes in India, the bite of which is venomous; and scorpions are common.

Fishes.

The rivers of Hindustan and the surrounding seas abound in a great variety of fishes and amphibious animals, such as alligators, porpoises, and small turtle of inferior quality. The voracious shark infests the mouths of the rivers, as well as the sea-coast, and grows to an enormous size. One that was caught in the Ganges measured in length 11 feet 9 inches, and its girth round the shoulders was immense.[7] The dolphin of the Ganges is about seven feet long, and abounds chiefly in the delta of the river. It pursues its prey with great velocity, though at other times its motions are slow and heavy. The Ganges and its numerous branches, and all the tanks, swarm with fish. During the wet months they may be scooped up with a hand-net in every field; and, next to rice and plantains, they form the main food of the poorest classes. The bickty or cockup is an excellent fish; as is also the sable fish, which is uncommonly rich. But the best and highest-flavoured fish is the mango, a favourite delicacy at all the European tables, especially during the two months when it is in roe. Mullet abound in all the rivers, and are often killed with small shot as they swim against the stream. The Indian eel—of a pale brown colour, with spots of a somewhat deeper hue—is said to possess a certain degree of electrical power. The remora, about seven feet in length, is remarkable for its singular habits. It is used by the fishermen for catching turtle. A long cord being inserted through a ring fastened to the tail of the fish, it is carried to sea in a vessel filled with salt water, and is let out into the water near the turtle, when it immediately fastens itself on its breast so firmly that both are drawn out together. There are many other kinds of fish, some of a delicate flavour, others noted for the various colours of their shining scales. The voracious dolphin, and the flying fish, its food, abound in the Indian seas. The pomfret is much esteemed as a delicacy; also the robal, and several others of the same nature. The bumbalo, when dried, is an article of commerce, and is much prized for its nutritious qualities; as is also another fish, the urahl, found in the interior lakes. There are many other kinds of fish which we cannot attempt even to enumerate. The natives are dexterous fishers. They inclose the fish with nets into a narrow space, when they catch them with their hands or teeth. Bishop Heber, in his excellent Journal, gives a lively account of the fishing of a pool or lake which was nearly dried up owing to the want of rain. The fish were driven into a shallow part of the lake, when four Bheels from the mountains, with bows and arrows, made in a few hours such havoc among them, that they were procured in the greatest abundance. "They singled out the largest," says Bishop Heber, "and struck them with as much certainty as if they had been sheep in a fold. The arrows intended for striking the fish were so contrived that the iron head slipped off the shaft when the fish was struck, but remained connected with it by a long line like a harpoon, and afloat on the water, which not only contributed to weary out the animal, but to show which way he fled, and to facilitate his capture."[1] Oysters are procured from the coast of Chittagong, not so large, but fully as well flavoured, as those of Europe.

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[1] Elphinstone, p. 7.

[2] Buchanan, p. 7.

[3] Heber's *Journey*, vol. ii., p. 277.

[4] Elphinstone, p. 144.

[5] *Asiatic Annual Register*, vol. xxiv., p. 760.

[6] *Asiatic Journal*, vol. xviii., p. 391.

[7] *Ibid.*, vol. xix., p. 276.

Insects.

The insect tribes in India may be truly said to be innumerable; nor has anything like a complete classification been given of them in the most scientific treatises. The heat and the rains give incredible activity to innumerable noxious or troublesome insects, and to others of a more showy class, whose large wings surpass in brilliancy the most splendid colours of art. Stinging musquitoes are innumerable; and moths and ants of the most destructive kind, as well as others still more noxious and disagreeable. Amongst those which are useful is the silk-worm; the insect which produces the vermilion dye, the cochineal, a South American species; and that which produces lac, which is imported into Europe and used for varnish, and more recently for cochineal. Clouds of locusts are occasionally seen, which leave no trace of green behind them, and give the country over which they pass the appearance of a desert. Dr Buchanan saw a mass of these insects in his journey from Madras to the Mysore territory, about three miles in length, like a long narrow red cloud near the horizon, and making a noise somewhat resembling that of a cataract. Their size was about that of a man's finger, and their colour reddish. They did no damage at that time to the smallest vegetable, but at other times they eat up every green thing.

Mineral productions, &c.

From the wild and inaccessible nature of the country in many parts of Hindustan, its metallic products are but imperfectly known. It is found to produce all the metallic ores, as well as diamonds and precious stones, and other mineral substances. Gold is generally found in the sands of the mountain streams, and is extracted by washing. The head streams of the Ganges bring along with them particles of gold, which in Rohilcund are collected by a particular caste of people. It is found in various parts of Mysore, particularly 9 miles E. of Boodicotta, where the country is impregnated with it; also in the Nielgherry Mountains; and in great quantities in all that tract of country that lies west; and in the adjoining Koondanad and Ghaut Mountains. This whole tract, including the mountains, and comprising a space of 2000 miles, contains gold. Unrefined gold is regularly exchanged by many of the mountain tribes of the north for the produce of the plains. It is estimated that about 1000 men are continually employed in collecting this precious metal. Copper is produced in the province of Delhi, which the natives collect either on the surface or with very slight excavations; also in the Rajpoot principality of Jeypoor in the province of Ajmeer, and in other parts of the same province, there are copper mines, and in the Carnatic, about 40 miles N.E. from Cuddapah. The metal is found in layers about two inches, and occasionally two feet thick; they are coated with ochre, and are in general flat, as if they had undergone compression. The ore exists in nearly a metallic state, without any admixture of sulphur, arsenic, or any other substance that requires separation. The best ores yield fifty, and the worst six per cent. of pure metal. The granitic mountains of Nepaul and Northern Hindustan contain much iron, lead, and copper, with a little gold in the river courses. The copper mines are quite superficial, the ore being dug from trenches entirely open above, so that the work is laid aside in the rainy season. Iron ore is found in many parts of Hindustan. There are mines of iron in Lahore and in Ajmeer. In Orissa many of the natives are iron smelters, and most of the iron sent from Balasore to Calcutta is produced in this district. In Bejapoor the working of iron furnishes employment to many of the inhabitants, who extract it by a very rude process. At Porto Novo, in the British district of South Arcot, in the presidency of Madras, extensive iron-works have been erected by a joint-stock association called the East India Iron Company; to whom also belong the iron-foundry works at Beypoor, in Malabar, on the opposite coast of the peninsula. The ore smelted at these establishments is found in great abundance and of excellent quality in their respective vicinities. The Mysore country abounds in iron. There are also forges for manufacturing steel, which are minutely described by Dr Buchanan in his account of the Mysore country.[2] In Coimbetore and in Malabar the iron mines give employment to a considerable number of persons. The process and machinery for extracting the iron are very imperfect. Iron mines were formerly worked in the district of Boglipoor, but they have been long neglected. Rich iron ores are abundant in Cutch. The ore is gathered in baskets from the surface of the earth, and yields twenty-two per cent. of iron; and the steel which is made from this ore is the finest in the world. Lead is produced in various parts; also antimony, plumbago, sulphur, alum; and there are inexhaustible supplies of coal, though the mines are not worked with any effect. Coal is raised in Burdwan in considerable quantities and of a fine quality. Saltpetre is produced in Bengal and Bahar, though its manufacture does not go beyond the eastern limits of the latter province. It might, however, be attempted with success in Bengal, where the tendency of the soil to its production is very great; and there might be manufactories of salt in almost every part of the country, but they are restricted by the Company's monopoly. In the Mysore plains the wells are salt, and the ground is frequently covered with a saline efflorescence. A range of hills, extend-from the Indus to the Hydaspes, yields the famous rock-salt of Lahore, of which they are almost entirely composed.[3] Many quarries are found in the hilly districts, which produce fine stone, that is cut by the inhabitants into pillars, flags, statues, and used for other ornamental purposes. Dr Buchanan saw several fine-grained specimens of granite, also a black stone used in the construction of Hyder's monument, and a beautiful green stone which takes on a marble polish. The hills of Guzerat contain marbles exhibiting many colours and qualities; and marbles are seen in the various tombs and monuments of ancient art still remaining in the country, finely ground and of different colours, white and yellow with red veins, and green clouded with yellow and black, of which the quarries have never been discovered.

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[1] Heber, vol. ii., p. 467.

[2] *Journey from Madras*, vol. i., p. 170, 180; vol. ii., p. 139.

[3] See the observations of Lieutenant Burnes on the commercial relations of the Punjab.

Diamonds are no longer found in the celebrated mines of Golconda, but they are still gathered in the bed of the Krishna, and in the province of Gundwana. Near the confluence of the Hebe and the Mahanuddy, 13 miles beyond the town of Sumbhulpoor, after the rains, the natives find diamonds in the red earth washed down from the mountains. The matrix containing them is a clay which has a red appearance like burnt bricks.[1] There are diamond mines in the S. of India, about 7 miles N.E. of Cuddapah, on both banks of the Pennar River. These mines have been worked for several hundred years, and occasionally yield large diamonds, which are either found in the alluvial soil, or are recognised by their sparkling among the gravel after it is washed and spread out, or in rocks of the latest formation. The grounds are leased on behalf of the government to private speculators at a moderate rent. In Bundelcund, also, the table-land which surrounds Pannah, wherever the ground is of a gravelly nature, produces diamonds. The soil is from two to eight cubits deep, and diamonds are found intermixed with small pebbles, though not adhering to them. A very few diamonds in the course of a year repay the labours of the workmen. The diamonds found are mostly under the value of 500 rupees, or L.50, though some reach the value of from 500 to 1000 rupees. They are weighed and sold to the merchants residing at Pannah, and are by them carried to all parts of the country. The workmen are allowed three-fourths, two-thirds, or a half of the diamonds they find, according to their size, and any man is at liberty to dig; but the business is less prosperous than formerly, and the workmen are poor. The diamond grounds are strictly guarded against the contraband trader, and the least delinquency draws down the prompt and barbarous vengeance of the rajah. These are supposed to be the diamond mines mentioned by Ptolemy. Their annual produce was estimated, in the reign of Acbar, at eight lacs of rupees. In 1750 it had fallen off to one half; the amount, now comparatively insignificant, is divided between the rajahs of Pannah, Banda, and Chirkaree.

The other varieties of precious stones found in India are the ruby from the table-land of Mysore, the beryl, the topaz, the chrysolite, garnet, cat's eye, &c. There are cornelian mines in the province of Guzerat, in the wildest parts of the jungle. They consist of numerous shafts worked down perpendicularly, about four feet wide, and several of them to the depth of fifty feet. Some of them extend at the bottom in a horizontal direction, though not to any distance; the heavy rains cause the banks to fall in, so that new openings are always made at the end of the rainy season. The nodules weigh from a few ounces to two or even three pounds, and lie close to each other in abundance, not in distinct strata, but scattered about. They are of various colours when they are found—of a blackish olive, like common dark flints; others of a lighter hue, with a slight milky tinge; though it is quite uncertain what appearance they will assume after the process of turning. They are carried to Cambay, where they are cut, polished, and formed into the fine ornaments for which that city is so highly celebrated. Beautiful jaspers and agates are also found in this district, and in other parts of India.

Manufactures.

In every country the nature and quality of the manufactures must depend on the condition of the consumers, and amongst the despotic states of Asia these naturally consist of two classes,—1*st*, of the great and powerful, in whose hands the property of the country is accumulated, and who are comparatively few; and, 2*dly*, of the mass of the people, oppressed under native rule, and sunk in poverty. Such, accordingly, has been from time immemorial the state of Hindustan; and its manufactures, which are necessarily adapted to the use of these two classes, have always consisted of exquisitely fine fabrics of cotton, for the use of the imperial court or of the rajahs and princes of the country, or of coarse stuffs for the common people; and to such perfection have they attained, that the modern art of Europe, with all the aid of its wonderful machinery, has never yet rivalled in beauty the products of the Indian loom. Yet the Hindu workman has no advantage from capital, from machinery, or from the division of labour; he prepares the raw material with his own skilful hand, in all the various stages of its manufacture; his loom and all his implements are of the rudest construction; and yet, by patience, perseverance, and unusual skill, he produces an article which is prized all over the world for its inimitable richness and beauty, as well as for its durability. The native artisan distinguishes at once these fine fabrics from all counterfeits, by the eye, the touch, and the smell. In the district of Dacca are chiefly fabricated plain muslins, variously denominated, according to the closeness or fineness of the texture; also flowered, striped, or chequered muslins, denominated from their patterns; and the thinnest sort of muslins, for the manufacture of which the province is much celebrated, as is Coromandel in Southern India for its calicoes and other piece-goods, of the most brilliant and durable colours. Other kinds more closely woven are fabricated in the western parts of Bengal; and another sort, of a more rigid texture, in every district. Coarse muslins, in the shape of turbans, handkerchiefs, &c., are made in all parts of Hindustan; and in its northern provinces plain and flowered muslins, but of inferior quality to the beautiful fabrics of Dacca. In Moultan are manufactured silks which possess a strength of texture and brilliancy of hue that have secured for them a preference in the Indian market. They are woven into shawls and scarfs, which are in great demand, and which the Indian manufacturer in other parts has never been able to rival, either in colour or durability. Carpets are also manufactured in this province, though they do not equal those of Persia. Various articles of calico are made, which still retain their Indian denominations, as khasahs, which are manufactured north and east of the Ganges; cloths of nearly the same quality are made near Tanda in Oude. Near Luckipoor, on the western frontier of Benares, in the neighbourhood of Allahabad, and also in the province of Bahar, baftaes are manufactured; sanaes in Orissa, and in the district of Midnapoor; and a similar cloth under the same denomination in the eastern parts of the province of Benares; woven silk and taffeta, both plain and flowered, in the neighbourhood of Moorshedabad; tissues, brocades, and ornamented gauzes, at Benares; plain gauzes for domestic use, in the west and south of Bengal; and at Moulda, Boglipoor, and at several towns in the district of Burdwan, mixed goods of silk and cotton. Sackcloth is manufactured from packthread in many places, especially in the northern provinces, for the clothing of the mountaineers. Cotton is made into canvas in the neighbourhood of Chittagong, Patna, and other places; and blankets everywhere for common use. A coarse cotton cloth dyed red with cheap materials is very generally used, and is chiefly manufactured in the country between the Jumna and the Ganges. Fine and coarse calicoes are dyed with permanent and fugitive colours for common use in the pro-

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[1] See Hamilton, vol. ii., p. 20.

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vince of Benares, the city of Patna, and the neighbourhood of Calcutta. This art appears to have had its origin in India, and to have been there perfected to a degree never surpassed by Europeans. Dimities of various kinds, and damask linen, are made at Dacca, Patna, Tanda, and various other places. In Mysore, near Bangalore, silk is manufactured into different articles of dress, into strong cloths, which men, women, or boys wrap round them, and into turban pieces. These cloths are of a rich fabric, variously figured, and the pattern, if ordered, is elegantly wrought in gold thread. Turbans are made of cotton and silk. Thin white muslins with silk borders ornamented with gold and silver, and plain green muslins with silk borders, are manufactured for female dresses; also striped and chequered muslins; cloth like the khasahs of Bengal, for wrapping round the shoulders of men, sometimes with striped or silver borders. Handkerchiefs with red borders, a coarse thick white cotton cloth with red borders, and turbans ornamented with silver and gold thread at the ends, are also made in this district; and the dyeing of cotton cloth, cotton thread, and silk, is carried on by a set of people who act as tailors, cloth-printers, and dyers. Tanneries are established, and manufactories of oil.[1] At Chennapattana there are manufactories of glass-ware and of glass rings, universally worn as bracelets by the women of the Deccan. Steel wire is also made here for the strings of musical instruments. At Vizigapatam, in the Northern Circars, the inhabitants are very expert in carving curious little boxes of ivory and bone. Throughout Southern India manufactories of cotton and silk are generally established. In the Northern Circars the principal part of the East India Company's investment of piece goods was formerly provided. This country, extending about 500 miles along the coast of Coromandel, from the River Kistnah to the borders of Cuttack, has from very early times been the seat of an important and extensive manufacture of cotton piece-goods, of which the description of calicoes known as Madras long cloths and salempores are the chief, and, with Masulipatam dyed handkerchiefs, and other kinds of goods for the African and West India trade, have, until lately, been in great demand. Masulipatam goods have, however, for some years been entirely superseded by the manufactures of Manchester and Glasgow; and in all appearance the Northern Circars will at no distant period of time be deprived of the manufactures of white calicoes also.[2] A great change has indeed been brought about in the manufactures of India by the introduction of British goods, which, in many branches, have supplanted those of the country; the poor Hindu, notwithstanding the low rate at which he works, is thus undersold in his own market by the manufacturers of Manchester and Glasgow; and this competition of British goods nearly ruined the native manufacturers of India, deprived the workmen of employment, and reduced them to great distress; so that the directors remark concerning the Indian trade, that "it exhibits the picture of a commercial revolution, productive of much present suffering to numerous classes in India, and hardly to be paralleled in the history of commerce."

Commerce.

Hindustan, from its great extent, and the diversity of its soil and climate, supplies the materials of an extensive commerce. Its internal trade is great, whilst its rare and precious products are exported to the remotest regions of the world. An extensive commerce takes place between Bengal and the other maritime districts, and the western provinces of Hindustan, consisting in the exportation of grain from the corn districts, in exchange for salt, a great staple; for betel-nut, sugar, raw silk, silk and piece goods. From the native states of Central India Malwah opium is sent down to Bombay for exportation to China. In Bengal the culture and manufacture of opium are conducted under a state monopoly, and the produce is transmitted to Calcutta, where it is disposed of by public sale. The holy city of Benares is a great mart of trade, in which are exchanged the shawls of the north for the diamonds of the south, and for the muslins of Dacca and the eastern provinces; and it has, besides, very considerable silk, cotton, and fine woollen manufactures of its own, the produce of which is exchanged for other commodities. Through the northern provinces of Delhi and Lahore a great trade is carried on between the hill countries and the plains. The inconsiderable town of Hurdwar or Hardiwara, being a celebrated place of Hindu pilgrimage, is a great commercial emporium, to which multitudes resort for the purposes of trade, as well as from piety. This great annual concourse takes place in the spring, when the produce of the northern and western countries is exchanged for the manufactures of the lower provinces. The principal articles brought here for sale from Cabul, Candahar, Moultan, and the Punjab, are horses, mules, camels; some of these from Balk, Bokhara, and the countries on the northern side of the Hindu Coosh Mountains; a particular species of tobacco, antimony, assafœtida, dried fruits, such as apricots, figs, prunes, raisins, almonds, pistachio nuts, and pomegranates; from Cashmere and Amritsir, shawls, dootas, and pattoos; spotted turbans, looking-glasses, toys, with various manufactures in brass and ivory from Jeypoor; shields from Rohilcund, Lucknow, and Silhet; bows and arrows from Moultan and the Doab; rock-salt from Lahore; baftas and piece-goods from Rahn, a large city in the Punjab. The country of Marwar also supplies many camels, and a species of flannel called loo. In exchange are brought from the British provinces Kharwa muslins, mushroo or sarsnet, and woollen cloths, the coarsest of which only find a market. In this fair, Dutch and Venetian coins are current; and some toys of European manufacture were seen exposed to sale by Mr Webb. The northern merchants by whom it is frequented assemble at Amritsir in caravans about the end of February, and pursue their route in an easterly direction through the territories of the protected Seikh powers. Still farther to the N. and W. the provinces of Lahore and Moultan export to the countries to the W. of the Indus, sugar, rice, indigo, wheat, and white cotton cloths, hides, &c. The imports are swords, horses, fruit, lead, and spices; and into all these countries European goods are imported from the lower provinces. The southern provinces export to Bengal, pepper, betel-nut, sandal-wood, and cardamums, teak timber, &c.; whilst they receive in return salt and rice, cotton cloths, and articles of European manufacture.

A very considerable coasting trade is carried on between the different parts of Hindustan. Bengal exports to Madras and the coast of Coromandel, grains of different descriptions, sugar, saltpetre, molasses, ginger, long pepper, oil, silk wrought and unwrought, muslins, spirits, and provisions. The returns are salt, red wood, fine long cloth, izarees, and chintzes. From the Malabar coast the imports are sandal-wood, coir rope, pepper, cardamums; and the returns are generally in the annual supplies which Bombay receives from Bengal. From Bombay are brought teak timber, elephant's teeth, lac, &c.

From the reputed wealth and precious produce of India foreign nations were always desirous to participate in its trade. Prior to Alexander's expedition to the East it was scarcely known to the Greeks, nor is it certain that they had ever seen its productions. But we know that these were brought to Rome, especially silk, which so allured the vanity of the Roman ladies that it sold for its weight in gold. Other valuable commodities of India, such as calicoes, muslins, aromatics, ivory, diamonds, pearls, and other gems, precious aromatics, the pepper of Malabar, turtle shell, &c., and some dry sugar and indigo, were also imported into Alexandria, the chief emporium of eastern commerce, and were naturally attracted to the great metropolis of the ancient world. This trade was carried on from Myos Hormos, the chief port on the Red Sea, whence, after the conquest of Egypt by the Romans, the annual fleets, sometimes of 120 vessels, set sail, and, under the propitious influence of the S.W. monsoon, boldly stretched across the Indian Ocean for the western coast of Hindustan, which they reached in about forty days; and afterwards extended their voyage round Cape Comorin to the coast of Coromandel and the mouths of the Ganges. The high price received for these eastern luxuries in Rome encouraged the merchants to provide larger vessels, and a band of archers to defend them against the pirates, who then, and until very lately that they were extirpated by British ships of war, infested the western shores of India. The commodities of the East being landed at Myos Hormos, were carried on camels to Coptos, the seat of a flourishing trade, and thence by sea to the Nile, whence they reached Alexandria by water carriage, and were re-shipped to the different ports on the Mediterranean. The produce of India was also brought to Europe by other routes—namely, by the way of Palmyra, then a flourishing city, and thence to Rome and other western countries, through the ports of Syria; or across the Himalaya Mountains to the Oxus, thence to the Caspian, and afterwards to the Black Sea, and finally to its ulterior markets in Europe. But though there was a demand in Europe for the produce of India, there was no demand in India for the produce of Europe; and bullion was the only article that could be sent out in exchange. The annual drain of gold from Rome and its provinces for Indian goods was estimated by Pliny at 500 sestertia, equal to about L.400,000. In the convulsions which followed the decline of the Roman empire, the trade of the East was successively engrossed by the Persians and Arabians. The latter, in the year 636, built the city of Bassora, which soon grew into a great commercial mart; and to this place, and to Ormus, long celebrated for its vast riches and its trade, the spiceries and merchandise of India were brought, and distributed through the various ports of the Mediterranean. After the expulsion of the crusaders from Syria and Egypt, Alexandria again became the chief entrepôt of eastern produce, whence it was carried to Italy by the Venetians and others, and distributed throughout Europe. But the discovery of a passage to India in 1495 by the Cape of Good Hope changed the course of this trade, which now entirely left the Italians, and was engrossed by the Portuguese for nearly a century without any molestation from European rivals. At length the Dutch and the English became their competitors, and established joint-stock companies, with the exclusive privilege of the eastern trade. But their anticipations of profit were not realized. The great distance of Europe from India, and the want of an equivalent for its produce, precluded any extensive intercourse; the trade accordingly bore a very small proportion to the trade of the country; and being besides cramped by monopolies, it never attained its natural growth. In 1773 the average exports of Britain to India amounted to about L.489,000 a year; in 1793, on a like average, to about a million a year; and it does not appear that a greater trade was carried on with India from any other part of Europe. The commerce of nations is limited to the surplus produce which they can mutually exchange; and, from the great distance between India and Europe, this surplus produce was long confined to those few articles which, containing a great value in small bulk, could bear the expense of a long voyage. The demand was also altogether on the side of Europe, and its trade with India consisted merely in the purchase, with bullion, of a small quantity of precious articles for the consumption of the rich. The progressive improvement of industry in Europe, together with the entire opening of the trade to India and China since the year 1834, has occasioned not only a greater exportation of British goods, but a change also in the nature of the trade. It is not so much the produce of the labour as of the climate and soil of India, which no ingenuity can supply, that is in demand in Britain; and accordingly, whilst the import of Indian manufactures has fallen off, that of the raw material, and many varieties of vegetable produce, has increased. Thus the importation of cotton piece-goods—namely, white calicoes and muslins—which amounted in 1814 to 1,266,608 pieces, had decreased in 1853 to 428,294 pieces; whilst within the same period the importation of cotton wool had increased from 2,850,318 lbs. to 181,360,994 lbs., and the exportation of cotton manufactures in a similar ratio. Even the incomparable muslins of Dacca are in less demand since the introduction of British goods.[1] Thus, in the progress of the trade between India and Europe, the former country, notwithstanding its boasted wealth and superior industry, has taken the lowest place, exporting her rude produce for the manufactures of the richer country. This is the nature of the trade carried on between Britain and America and the countries in the N. of Europe, and is a sure index to the respective progress of the two countries in wealth and improvement. Those countries which cannot manufacture their own rude produce send it to Britain, which abounds in capital, and still more in art and industry; and both countries are benefited, the poorer country exchanging its surplus produce for a supply of manufactures of which it is in want, and the richer country the produce of its overflowing capital, for a supply of the raw material, which its own soil does not afford. This is now the relative condition of Great Britain and India. The former having outstripped the latter country in industry and wealth, sends out a supply of cheaper goods than the native workman can furnish; and so prodigious have been the improvements in machinery, that the raw material of cotton is imported from India, and, being manufactured in Britain, is re-exported and sold at a cheaper rate than it can be made at home, though loaded with the expense of a double voyage across half the globe; and thus it has become an important staple in the trade of Great Britain with the East. A notion was long and successfully propagated by the advocates of the monopoly, that the Hindus, from their poverty and their simple habits, would never become extensive consumers of European goods, and that the demand was amply supplied by the exports of the East India Company. Evidence to this effect was given before the committee of the House of Commons in 1810 by Sir Thomas Munro and other eminent servants of the Company. But such statements have been completely refuted by the rapidly increasing exportation of British goods to India since the complete opening of the trade in 1834. This will appear from the following table:—

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[1] Buchanan's *Journey through Mysore*, vol. i., 209, 229.

[2] See Copy of a Letter from the Secretary to the Court of Directors, to the Secretary of the India Board, dated East India House, 5th September 1828.

Value of Exports from Great Britain to Hindustan, exclusive of Bullion.

Years.	Exports.	Years.	Exports.
1834	L.2,682,221	1844	L.7,952,179
1835	3,135,410	1845	6,477,143
1836	3,830,504	1846	6,420,404
1837	3,210,663	1847	5,790,228
1838	3,505,930	1848	5,512,110
1839	4,289,489	1849	7,578,980
1840	6,014,339	1850	8,327,992
1841	5,439,564	1851	9,226,729
1842	5,354,901	1852	7,235,078
1843	6,347,349		

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[1] See Report of Lords' Committee on the Affairs of the East India Company, Evidence of W. Chaplin, Esq., p. 179.

The goods exported, as they are enumerated by Mr Rickards in his valuable work on India, consist of all the staple manufactures of Britain. "Woollens and cottons," he mentions, "of every variety and value; manufactured silks; hardware of all descriptions; iron, copper, lead, tin, and spelta, in large quantities; marine and military stores; machinery for various uses; glass-ware of the metal specimens, down to articles of the commonest use; china-ware or porcelain, the same; jewellery of all sorts; gold and silver plate and ornaments; clocks, watches, furniture, carriages, harness, haberdashery, hosiery, stationery, books; in short, every article of luxury, comfort, or convenience, which British industry can produce."[1] According also to all the most correct observers of Indian manners, the taste for European fashions, luxuries, and comforts, is rapidly extending among the Hindus. Bishop Heber, in his interesting journal of a tour through India, strongly confirms this fact. "The wealthy natives," he observes, "now all affect to have their houses decorated with Corinthian pillars, and filled with English furniture; they drive the best horses and the most dashing carriages in Calcutta. Many of them speak English fluently, and are tolerably read in English literature; and the children of one of our friends I saw one day dressed in jackets and trousers, with round hats, shoes, and stockings."[2] At Benares he found "English hardware, swords, shields, and spears, from Lucknow and Monghyr; and those European luxuries and elegancies, which are daily becoming more popular in India, circulate from hence through Bundelcund, Gorruckpoor, Nepaul, and other tracks which are removed from the main artery of the Ganges."[3] At Nusseerabad, in the province of Berar, the same traveller mentions that "English cotton cloths, both white and printed, are to be met with commonly in wear among the people of the country, and may, I learned to my surprise, be bought best and cheapest, as well as all kinds of hardware, crockery, writing desks, &c., at Pallee, a large town and celebrated mart in Marwar, on the edge of the desert, several days' journey west of Joudpoor, where, till very lately, no European was ever known to have penetrated."[4] In short, it appears that British and other European manufactures, from their quality and cheapness, are everywhere in demand. They penetrate into the remotest districts of Asia; and now that the termination of the East India Company's monopoly, which took place in 1834, has laid open Hindustan to the capital and enterprise of Britain, experience proves that an equal demand for them may be anticipated in that country. We subjoin the following tables, containing a view of the extent and value of the trade of India to all parts of the world. The excess of exports over imports arises from the necessity of making annual remittances to Great Britain to defray the interest of debt, and to meet the expenditure of the home government.

Imports of Hindustan.

Years.	MERCHANDISE.						TREASURE.				MERCHANDISE AND TREASURE.			
				TOTAL.										
	Bengal.	Madras.	Bombay.	United Kingdom.	Other Countries.	Total Merchandise.	Bengal.	Madras.	Bombay.	Total.	Bengal.	Madras.	Bombay.	Grand Total.
	L.	L.	L.	L.	L.	L.	L.	L.	L.	L.	L.	L.	L.	L.
1834-35	1,999,130	503,290	1,758,685	2,682,221	1,578,884	4,261,106	646,224	153,115	1,093,683	1,893,023	2,645,355	656,405	2,852,369	6,154,129
1839-40	3,341,591	683,307	1,806,337	4,289,489	1,541,747	5,831,236	1,226,786	112,406	606,071	1,945,264	4,568,378	795,714	2,412,408	7,776,501
1844-45	5,933,990	1,046,894	3,773,181	7,952,179	2,801,886	10,754,065	1,581,365	188,561	1,982,545	3,752,471	7,515,355	1,235,455	5,755,727	14,506,537
1849-50	5,283,170	906,004	4,110,713	7,578,980	2,720,907	10,299,888	1,214,865	121,437	2,060,505	3,396,807	6,498,035	1,027,441	6,171,218	13,696,696
1850-51	6,115,201	897,823	4,545,764	8,327,992	3,230,795	11,558,788	1,189,484	260,110	2,362,214	3,811,808	7,304,685	1,157,933	6,907,978	15,370,597
1851-52	7,087,406	906,435	4,246,647	9,226,729	3,013,760	12,240,490	2,306,470	297,398	2,448,190	5,052,059	9,393,877	1,203,834	6,694,837	17,292,549
1852-53	4,993,674	840,531	4,236,655	7,235,078	2,835,783	10,070,861	3,393,987	576,854	2,860,536	6,831,377	8,387,661	1,417,385	7,097,191	16,902,239

Exports of Hindustan.

Years.	MERCHANDISE.						TREASURE.				MERCHANDISE AND TREASURE.			
				TOTAL.										
	Bengal.	Madras.	Bombay.	United Kingdom.	Other Countries.	Total Merchandise.	Bengal.	Madras.	Bombay.	Total.	Bengal.	Madras.	Bombay.	Grand Total.
	L.	L.	L.	L.	L.	L.	L.	L.	L.	L.	L.	L.	L.	L.
1834-35	4,092,043	886,107	3,015,268	3,056,973	4,936,447	7,993,420	66,554	106,377	21,808	194,740	4,158,598	992,485	3,037,077	8,188,161
1839-40	6,800,925	1,228,467	2,833,352	5,969,951	4,892,793	10,862,745	200,017	127,446	143,059	470,523	7,000,943	1,355,914	2,976,411	11,333,268
1844-45	9,822,197	1,641,462	5,126,552	7,240,619	9,349,592	16,590,212	396,543	65,053	645,243	1,106,840	10,218,740	1,706,516	5,771,796	17,697,052
1849-50	10,148,038	1,272,884	5,891,376	7,026,470	10,285,828	17,312,299	354,205	72,637	544,400	971,244	10,502,244	1,345,522	6,435,776	18,283,543
1850-51	9,997,527	1,566,976	6,599,645	8,104,016	10,060,133	18,164,149	276,329	104,140	160,818	541,289	10,273,857	1,671,117	6,760,464	18,705,438
1851-52	10,423,970	1,658,808	7,796,474	7,138,888	12,740,517	19,879,253	250,588	215,768	452,732	919,088	10,674,559	1,874,576	8,249,207	20,798,342
1852-53	10,738,554	2,121,613	7,604,464	8,428,295	12,036,338	20,464,633	476,375	36,382	542,472	1,055,229	11,214,929	2,157,996	8,146,937	21,519,862

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[1] Rickards' *India*, or facts submitted to illustrate the character and condition of the native inhabitants, vol. i., p. 75.

[2] Heber's *Journal*, vol. iii., p. 252.

[3] *Ibid.*, vol. i., p. 381.

[4] *Ibid.*, vol. ii., p. 448.

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The following tables contain a view of the trade between Great Britain and Hindustan, and a list of the principal articles exchanged between the two countries, abridged from the parliamentary accounts:—

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Account of the Quantities and Declared Value of the principal Articles Exported from Great Britain to India in Three Years, from 1850–51 *to* 1852–53.

ARTICLES.	QUANTITIES.			VALUE IN STERLING.		
	1850–51.	1851–52.	1852–53.	1850–51.	1851–52.	1852–53.
	L.	L.	L.	L.	L.	L.
Apparel	...	...	...	261,209	250,931	256,213
Books, stationery, &c.	...	...	...	148,563	118,712	113,601
Cotton twist and yarn	...	...	...	1,011,262	1,373,949	1,102,500
... Piece goods	...	...	...	3,581,996	4,662,036	3,578,349
Fruits	...	...	...	975	943	121
Jewellery	...	...	...	52,164	56,934	28,564
Malt liquor	...	...	...	123,342	146,947	151,870
Machinery	...	...	...	19,052	11,541	23,126
Metals, Manufactured	...	...	...	201,082	230,105	182,944
... Copper, cwt.	118,982	44,004	24,796	611,719	216,342	114,631
... Iron, ...	984,433	688,722	338,795	457,503	267,462	140,005
... Lead, ...	...	...	...	58,446	27,329	17,992
... Spelter, ...	63,303	58,758	9,070	62,758	55,738	8,748
... Tin, ...	...	...	...	8,301	6,955	1,608
Salt	790,953	1,158,983	837,946	376,965	552,366	399,362
Silken goods	...	...	...	18,892	31,495	38,804
Spices	...	...	...	...	...	...
Spirits, gallons	89,251	96,863	68,526	42,927	49,648	33,482
Tea	...	...	...	...	...	...
Tobacco, cigars	...	...	...	516	913	534
Timber	...	...	...	1,014	1,086	1,252
Woollen goods	...	...	...	206,966	200,435	114,794
Wines, gallons	334,127	255,125	175,101	232,455	200,658	144,761
Miscellaneous	...	...	...	849,886	764,204	781,817
Total Merchandise	...	...	...	8,327,993	9,226,729	7,235,078
... Treasure	...	...	...	503,029	1,041,015	2,340,947
Total Merchandise and Treasure ...	...	...	...	8,831,022	10,267,744	9,576,025

Account of the principal Imports into Great Britain from India in Three Years, from 1850–51 to 1852–53.

ARTICLES.	QUANTITIES.			VALUE IN STERLING.		
	1850–51.	1851–52.	1852–53.	1850–51.	1851–52.	1852–53.
	L.	L.	L.	L.	L.	L.
Coffee, lbs.	4,209,717	6,324,435	4,244,845	61,484	58,429	61,029
Cotton, raw, lbs.	141,446,798	81,104,223	181,360,994	2,059,718	1,171,280	2,525,186
Grain, cwt.	779,809	624,167	1,157,985	131,634	105,335	177,459
Indigo, lbs.	8,723,343	8,193,236	6,773,160	1,525,962	1,444,705	1,136,887
Ivory, cwt.	2,753	5,149	3,375	40,953	85,949	51,078
Lac, cwt.	42,040	30,448	52,543	78,446	58,041	104,043
Pepper, lbs.	1,332,128	1,918,973	1,208,945	11,412	16,335	10,479
Piece goods, Cotton, pieces	142,380	208,723	428,550	48,801	71,071	136,622
... Silk, „	560,484	408,304	502,947	311,210	224,830	267,855
... Shawls, „	9,975	7,496	11,211	134,738	113,848	179,410
Rum, gallons	391,151	224,463	171,984	19,462	10,814	8,447
Silk, raw, lbs.	1,271,249	1,437,658	1,381,203	609,450	680,537	664,454
Saltpetre, cwt.	282,538	254,670	339,444	216,062	196,848	258,787
Sugar, ...	1,488,879	1,506,051	1,356,630	1,709,743	1,689,153	1,605,321
Wool, lbs.	4,492,794	7,056,713	12,000,999	65,525	100,606	171,169
Miscellaneous	...	...	...	1,079,411	1,111,108	1,070,069
Total Merchandise	...	...	...	8,104,011	7,138,889	8,428,295
... Treasure	...	...	...	10,164	7,051	128,919
Total Merchandise and Treasure ...	...	...	...	8,114,175	7,145,940	8,557,214

The British possessions in India are intermixed with the dominions of various native governments, with which political relations varying in nature and degree are maintained. The following table exhibits the relative area and population of the presidencies of Bengal, Madras, and Bombay, and those also of the native states of Hindustan[1] :—

Area and Population of the British Presidencies and the Native States of India.

British Presidencies.	Division.	Area in square miles.	Population.
Bengal	Lower Provinces	119,633	37,262,163
	Saugur and Nerbudda Territories	15,388	1,929,587
	Jaloun	1,873	176,297
	British Mhairwarrah	282	37,715
	Umballah, Loodianah, and Territory lately belonging to Seikh chiefs	4,559	2,311,969
	North-eastern frontier, including Assam, &c.	29,900	1,180,935
	Arracan	15,164	321,522
	South-west frontier, including Sumbulpore, Chota Nagpore, &c.	30,589	2,627,456
	Nagpore or Berar	76,432	4,650,000
	The Punjab and Kooloo Territory	78,447	9,153,209
	Tenasserim Provinces	29,168	115,431
	Jhansi	2,532	200,000
	The Sunderbunds, &c.	6,500	Unknown.
	North-western Provinces, including Delhi, Agra, Benares, &c.	72,052	30,271,885
	Butty Territory, Deyrah Dhoon, Kumaon, Gurhwal, &c.	13,599	600,881
	Total	496,118	90,839,050
Madras	Regulation Provinces	116,248	19,847,305
	Non-Regulation Districts	19,444	2,454,392
	Total	135,692	22,301,697
Bombay	Regulation Provinces	57,723	9,015,534
	Non-Regulation Districts	62,342	2,093,533
	Total	120,065	11,109,067
The Eastern Settlements of Singapore, Prince of Wales Island, and Malacca.		1,575	202,540
Native States within the Presidency of Bengal	Oude, Hyderabad, Bhopal, Bhurtpore, Scindias and Holkar's Dominions, &c.	503,554	38,259,862
Do., within the Presidency of Madras	Cochin, Mysore, Travancore, &c.	51,802	4,752,975
Do., within the Presidency of Bombay	Guzerat, Cutch, Colapore, &c.	60,575	4,460,370
Foreign European Possessions	French (Pondicherry, &c.)	188	171,217
	Portuguese (Goa)	1,066	313,262

Abstract of the foregoing.

		Area of square miles.	Population.
British Possessions	Bengal	496,118	90,839,050
	Madras	135,692	22,301,697
	Bombay	120,065	11,109,067
	Eastern Settlements	1,575	202,540
Native States	Bengal	503,554	38,259,862
	Madras	51,802	4,752,975
	Bombay	60,575	4,460,370
Foreign European States	French	188	171,217
	Portuguese	1,066	313,262
	Total of India	1,370,635	172,410,040

Races.

A country of such vast extent, under one common appellation, and subdivided by many impassable tracts of mountain and jungle, comprises, as may readily be imagined, numerous races, differing in their origin, in their physical aspect and frame, in their manners, customs, in their respective advances in civilization and pursuits, as well as in their modes of faith and language; and accordingly Bishop Heber, who excels all other writers in the delineation of Indian manners, observes, that "it is a great mistake to suppose that all India is peopled by a single race, or that there is not as great a disparity between the inhabitants of Guzerat, Bengal, the Doab, and the Deccan, both in language, manners, and physiognomy, as between any four nations of Europe;" and in another passage he says, "the inhabitants of the presidencies of Madras and Bombay, and of the Deccan, are as different from the nations I have seen, and from each other, as the French and Portuguese from the Greeks, Germans, and Poles."[2] A minute account of the various races and castes, with the still more various subdivisions into which the inhabitants of Hindustan are distinguished, would fill a volume, and would besides be exceedingly tedious. A general description, however, of the most remarkable tribes which compose the mixed population of this extensive country, forms an essential part of its history. The great division of the people is into Hindus and Mohammedans, in the proportion of about seven to one. And these two great classes are distinguished not more by their religion than by their peculiar disposition and character. The Hindu is careful, penurious, and abstemious in his habits; timid, obsequious, and fawning in his manners; chiefly attaining his ends by deceit and cunning, the usual resource of weakness; whilst the Mussulman still retains the haughty and irascible character of a conqueror, and his hostility to the English, which he is at no pains to conceal, like the Hindu, by an obsequious demeanour. He is withal prodigal, luxurious, fond of ease and pleasure, and dissolute to excess in his morals; more courageous and martial, however, with more energy of purpose and elevation of sentiment, and more cultivated, than the Hindu of Bengal. In the population of Bengal these two races may easily be distinguished from each other; and amongst the Mohammedans, the Mogul, the Afghan, and their immediate descendants, may be known amongst the native Mussulmans. The features of the Bengalee distinguish him from the other inhabitants of Hindustan. He is stigmatised as of a cowardly disposition, and, from whatever cause, is not esteemed throughout the country. With these two principal classes are intermingled, in very small proportions, British, Armenians, a peaceable race, and highly honourable in their dealings, Portuguese, and other Christians. The Parsees are numerous in the island of Bombay, where they amount to 114,698; they are descendants of the Guebres or fire-worshippers, are a fine race, being generally engaged in traffic, and distinguished in their dealings by the highest integrity and intelligence. The Jews are numerous in India, and many are to be found in the Bombay army, where they have often behaved bravely. The Asiatic Jews are distinguished by a large Roman nose. The Mahrattas, a powerful tribe, have been long distinguished in the wars and politics of India. They are chiefly found within the presidency of Bombay and the province of Nagpore, recently lapsed to the British government. They were originally a pastoral and warlike people from the mountains of Berar, who with a host of cavalry invaded and desolated the adjacent provinces with fire and sword, and at length acquired an extensive empire. Minute shades of difference prevail amongst them, but no distinctions of caste; every Mahratta eating with his neighbour, unless, which often happens, he be expelled from his caste. They are not a military caste, as appears from the names of farmer, shepherd, and cowherd, by which their principal tribes are known; and also from their exterior, which marks an origin different from that of the military Rajpoot. They are of a diminutive size, generally badly made, and of a mean look and rapacious disposition; whilst the Rajpoot has both personal grace and dignity. The memorable battle of Paniput, fought in 1761, gave a blow to the Mahratta power, from which it never recovered; and the confederacy was entirely dissolved in 1817, when the peshwa, the great feudal chief of the empire, surrendered to the British, and was by them confined as a state prisoner. The nation derives its name from Mahrat, a province of the Deccan; though it is the opinion of some that the Mahrattas migrated from Persia about 1200 years ago.[1] The Mahratta language is widely spread over India. It is remarkable, that in proceeding northward into Northern and Central India, and into the Rajpoot states, the people far excel in strength and stature the feeble Hindu of the southern provinces, being fully equal in their bodily frame to Europeans. "They despise," says Bishop Heber, "rice and rice eaters, feeding on wheat and barley bread, exhibiting in their appearance, conversation, and habits of life, a grave, proud, and decidedly a martial character, accustomed universally to the use of arms and athletic exercises from their cradles, and preferring very greatly military service to any other means of livelihood." The character of the Rajpoots, the Sikhs, and the Jauts, fully answers to this animated description of a warlike race. The tribe of Jauts or Jats was little known in India till about the year 1700, when they migrated from the banks of the Indus, and became industrious cultivators in the Doab, or the country between the Ganges and the Jumna. During the civil wars which ensued on the death of Aurungzebe, they acquired a large extent of territory, in which they built forts, and accumulated wealth. They were noted plunderers; and it was out of the spoil taken from Aurungzebe's army in its retreat from the Deccan that the fortress of Bhurtpore was erected, in the gallant defence of which against the British they fully sustained the character of brave soldiers. Their claim to the distinction of a military caste has, however, been disputed; and it is said, that though success has emboldened them to assume that honourable title (*khetri*), they were originally a low tribe of sudras or labourers. They also affix to their name *singh*, a lion, which probably belongs only to the Rajpoots. The Jauts are said by Bishop Heber to be the finest people in bodily advantages and in martial spirit which he had seen in India, and their country one of the most fertile and best cultivated. They have a high character for valour throughout Hindustan; insomuch, adds the writer above quoted, "that when I was passing through Malwah, 'gallantee shows,' like those carried about by the Savoyards, were exhibited at the fairs and in the towns of that wild district, which displayed, amongst other patriotic and popular scenes, the red coats driven back in dismay from the ramparts, and the victorious Jauts pursuing them sabre in hand."[2] The lower classes of Jauts found in the barren tracts of Ajmere, and in Northern India, are however differently described, being of small stature, ill-looking, and black in complexion, and their condition that of squalid poverty. The Sikhs were originally a religious sect, of which the founder, Nanak, was born A. D. 1419, in the province of Lahore; and the word Seik, properly Sikh or Siksha, in the old Sanscrit, signifies a disciple or devoted follower. He left two sons, from whom are descended 1400 families, called Shahzadehs, who live at Dera, in the Punjab, highly respected. His successors were spiritual chiefs, until the year 1675, when Gooroo Govind, a warrior, succeeded. He converted the Sikhs from religious sectaries into ferocious soldiers; he changed their name from Sikh to Singh, signifying a lion, the title claimed and highly prized by the Rajpoots; and enjoined his followers to cut off their hair, or to shave their beards. The tribe consider this chief to be the founder of their political independence, and Nanak of their religion. The Sikhs acquired power during the convulsions that followed the death of Aurungzebe, and after the invasion of Nadir Shah. They were severely checked by the Mahommedans, and were nearly exterminated by the victorious Afghans after the battle of Paniput in 1761. But their valour still triumphed in the struggle, and led to the acquisition of the Punjab, over which they retained dominion until the death of their ruler Runjeet Singh, soon after which event the country of the "Five Rivers" fell to the British by conquest, and became incorporated with their vast empire of India. In horsemanship the Sikhs are not excelled by any other nation either of Europe or Asia. Colonel Todd, in his great work on Rajast'han, describes the appearance of the Rajpoot cultivators in the valley of Odeypoor, who came to meet him in a body, "as being so striking as to draw forth the spontaneous exclamation from his friend, 'what noble looking fellows!" "Their tall and robust figures," he adds, "sharp aquiline features, and flowing beards, with a native dignity of demeanour, though, excepting their chiefs, who wore turbans and scarfs, they were in their usual labouring dresses, immense loose breeches, and turbans, compelled admiration and respect."[3] Their cast of countenance is Hindu, somewhat altered by their long beards; they are active, and more robust than the Mahrattas, owing to better living and a healthier climate; and rival in courage the most renowned tribes of India. They evince in battle the most determined contempt of personal danger, and are easily roused to desperation by prejudice or religion; they act as infantry in foreign armies, and as cavalry at home. Their address is bold and somewhat rough; they speak invariably in a loud bawling tone of voice; and are dissolute in their habits, indulging so freely in spirituous liquors, which their religion allows, though tobacco is prohibited, and in opium and bang, an intoxicating drug, that a Sikh soldier is rarely sober after sunset. The Sikhs are allowed to eat the flesh of all animals except the cow. They are strict in their religious observances; and converts, whether Hindu or Mahommedan, must give up all customs which infringe the tenets of Nanak, or the military institutes of Gooroo Govind. The military class highly relish the flesh of the jungle hog, of which they compel Mahommedan converts to partake, and also to abstain from circumcision. The Sikh merchant or cultivator, if he be a Singh, is still a soldier in his habits, as he wears arms, and is well trained from his infancy to the use of them. The original followers of Nanak, the Kalasa Sikhs, differ widely from the warrior tribe. They are as pliant, versatile, and insinuating in their manners as the lower class of Hindus, whom they so much resemble in their dress and appearance as not to be readily distinguished. The descendants of Nanak are a mild, inoffensive race; and the other religious tribes retain their peculiar manners.

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[1] Notwithstanding the ravages committed by incessant wars and revolutions, as well as by famine and pestilence, their usual concomitants, India has, from the earliest times, been a densely-peopled country. In different states of society, the law of the increase of mankind will vary according to their relative circumstances and position, and the same or nearly the same principle will be found to apply to those classes who are placed at the opposite extremities of the scale. Amongst a people who are possessed of affluence, or the means of commanding the necessaries and comforts of life, the exercise of moral restraint is unnecessary; amongst those who are reduced to a mere physical subsistence, without the possibility, and consequently without the desire, of improving their condition, it will be disregarded; and hence the same results will follow from causes in their own nature diametrically opposite. But in India the great mass of the population have for ages been placed in a situation which excludes all idea of improvement; and religion has lent its powerful aid to obstruct the operation of those natural causes which, in other countries, have served to ameliorate the condition of the people. It may, however, be permitted to hope, that though India always has been, it will not always be, what it now is; that the extension of commerce, under the protection of a vigorous and impartial government, will awaken new ideas in the minds of the people; that security to person and property will give a strong stimulus to industry; that the habitual contact with a higher and more rational form of civilization will serve to mitigate their prejudices, and, in time, to destroy the influence of a debasing superstition; and that, in proportion as their wants are multiplied, their efforts to ameliorate their condition will be increased.

[2] Heber's *Journal*, vol. iii., p. 349.

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[1] *Indian Recreations*, vol. i. p. 20. Hamilton's *Description of Hindustan*, vol. ii. p. 483.

[2] Heber's *Journal*, vol. iii. p. 369.

[3] *Annals and Antiquities of Rajast'han*, vol. i. Personal Narrative, p. 667.

The Rajpoots inhabit the Rajpoot states of Mewar or Odeypoor, Marwar or Joudpoor, Bicanere and Kishenagur, Kotah, Boondi, Amber or Jeepoor, Jesselmere, and the Indian desert to the valley of the Indus. They are the children of the sun and the moon; and, in memory of their great ancestor the radiant Surya, or Apollo, many of them wear badges of gilt metal round their necks with the image of a sun and moon on horseback. The lineage of both the solar (Soorya) and lunar (Indu) tribes is given by Colonel Todd, on the authority of the Puranas (sacred books), a copy of which, obtained from the library of the Rana of Odeypoor, he carefully consulted, in the presence of a body of learned pundits. This work contains the valuable results of his learned researches into the antiquities and history of the Rajpoot tribes, which were conducted with all the patience and perseverance that an enthusiastic devotion to the subject can alone inspire; and being guided by philosophy, and the most profound knowledge of oriental literature, have thrown great light on the history and character of the ancient inhabitants of Rajpootana. Vyasu, the Hindu historian, gives fifty-seven princes of the solar line from Menu to Rama; and fifty-eight from the same period of the lunar race, from Buddha, its founder, to Krishna. The establishment of these two grand races in India is fixed by Colonel Todd at about 2256 years before the Christian era. From Rama all the tribes termed Sooryavansa or Race of the Sun, claim their descent, namely, the present princes of Mewar, Jeepoor, Marwar, Bicanere, and their numerous clans; whilst from those of Buddha and Krishna the families of Jesselmere and Cutch, extending over the Indian desert, from the Sutledge to the ocean, deduce their pedigrees. Colonel Todd draws a parallel between them and the ancient Scandinavians and Scythians; and the striking resemblance that appears in the manners, customs, and religious opinions of the two nations, he insists, strongly suggests the idea of a common origin. These ancient tribes were devoted to the god of war; and the Rajpoot, he observes, "delights in blood; his offerings to the god of battles are sanguinary, blood and wine. The cup of libation is the human skull. He loves them because they are emblematic of the deity he worships; and he is taught to believe that Hor loves them, who in war is represented with the skull to drink the foeman's blood, and in peace is the patron of wine and women. With Parbutti on his knee, his eyes rolling from the juice of the p'foot and opium, such is this Bacchanalian divinity of war." "Is this Hinduism," he adds, "acquired in the burning plains of India? Is it not rather a perfect picture of the Scandinavian heroes."[1] This hypothesis of a common origin Colonel Todd further supports from the Rajpoots slaying the buffalo, hunting the boar and the deer, shooting ducks and wild fowl; from their ancient use of the war-chariot, as appears from the inscriptions and engravings on their monuments; from the order of the birds common amongst them; from their passion for gaming and intoxicating liquors; from their sensual and slothful habits; from their funeral ceremonies, particularly from their immolation of females, a barbarous custom now abolished through the strenuous exertions of the British government. The Rajpoots claiming so splendid a descent are distinguished above all other tribes by rank and pride of birth, and high aristocratic feeling; and hence the origin of a barbarous custom among the chiefs of putting to death their female children as soon as they were born, lest they should contract any base alliance. Others say that this custom was occasioned by the practice amongst the Rajpoot princes of providing splendid dowries for their daughters, by which they were frequently impoverished, and to avoid which they murdered them in infancy. Colonel Todd, the depth of whose researches into the ancient literature of the Hindus appears in his accurate and lively delineation of the national character and manners of the Rajpoots, ascribes to their chiefs a more ancient and chivalrous descent than many of the royal houses of Europe. "From the most remote periods," he observes, "we can trace nothing ignoble, nor any vestige of vassal origin. Reduced in power, circumscribed in territory, compelled to yield much of their splendour and many of the dignities of birth, they have not abandoned an iota of the pride and high bearing arising from a knowledge of their illustrious and regal descent. The poorest Rajpoot of this day," he adds, "retains all the pride of ancestry, often his sole inheritance; he scorns to hold the plough, or to use his lance but on horseback. In these aristocratic ideas he is supported by his reception among his superiors, and the respect paid to him by his inferiors." These honours and gradations of rank are supported by peculiar privileges, each of the superior orders being entitled to a banner, to kettle-drums, preceded by heralds, and silver maces, with peculiar gifts and personal honours in commemoration of some exploit of their ancestors. Armorial bearings are used by the martial Rajpoots; a golden sun on a crimson field adorns the great banner of Mewar; those of the chiefs bear a dagger, whilst others display a fine coloured flag; and the lion rampant in an argent field was the warlike emblem of the now extinct state of Chanderi.[2] The Rajpoots are divided into thirty-six royal races, described by Colonel Todd; to each is attached a bard, who is acquainted with all the peculiarities, religious tenets, and ancient history of the tribe. These are subdivided into an infinite variety of lesser clans, each more or less honourable as they can trace their pure descent from the original and illustrious founders of their race. The character of the Rajpoots, as given by Bishop Heber on the authority of Captain Macdonald, the political resident of the Company in that district, is far from favourable. "The people," he observes, "who are generally oppressed, and have been, till very lately, engaged in incessant war, have the vices of slaves added to those of robbers, with no more regard to truth than the natives of our own provinces, exceeding them in drunkenness, fondness for opium, and sensuality, whilst they have a blood-thirstiness from which the great mass of the Hindus are very far removed. Their courage, however, and the gallant efforts they made to defend their territories against the Mahrattas, deserve high praise." They are extremely attached to their respective chiefs, to whom they yield a feudal obedience. The lands are let at low rents, on the condition of military service, every village furnishing its contingent of horsemen on the shortest notice. One of the chiefs who visited the above traveller, and who is said by him to have been a striking specimen of the tribe, is described as "young and handsome, but dirty in his dress, boisterous in his manner, talking with a great deal of gesticulation, many winks, nods, beckonings, and other marks of intelligence; and half drunk." Colonel Todd's work contains an accurate and instructive delineation of the manners and feudal relations amongst the Rajpootana chiefs; of their martial virtues, their romantic fidelity and honour, and their high pride, the parent at once of the noblest deeds and the deepest crimes; with which, according to their enthusiastic annalist, Colonel Todd, their history is stained. Family feuds are frequent amongst them, and last for centuries. They are handed down, as an inheritance, from generation to generation; and thus the debt accumulates with interest, "the deep reversion of delayed revenge," till it is extinguished in the blood of the hostile tribes. Hence murders, burnings, poisonings, mingle in their domestic annals with traits of generosity and romantic valour; and the modern Rajpoots, though they are certainly not improved, differ little in their manners and prejudices from their ancestors.[1]

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[1] See *Annals and Antiquities of Rajast'han*, by Lieutenant-Colonel Todd, p. 68.

[2] *Ibid.* p. 138.

The Bheels, another predatory tribe, inhabiting the mountains situated near the Nerbuddah and the Tuptee rivers, thence extending northward towards Rajpootana, westward towards the province of Gujerat, where they meet the Coolies, and eastward to Gundwana, where they come in contact with the Gonds, two other predatory tribes, are supposed to have been the aborigines of Central India. All these tribes are averse to industry, and subsist by plunder, by hunting, or by cultivation, when all other expedients fail. The Coolies near the sea-coast lived, until lately, by fishing or piracy. The Bheels inhabit the interior; and during the unhappy period of disorder and rapine in India, terminated by the triumph of the British arms in 1817, they had by their inroads laid waste several districts, and were rapidly increasing in power. They were frequently hired by the native chiefs to assist in their desolating wars, as horsemen or as infantry, armed with bows and arrows, and nearly naked. Thieves and savages as they are, Bishop Heber found that the British officers stationed in that district thought them, on the whole, a better race than their conquerors. "Their word," he observes, "is more to be depended on; they are of a franker and livelier character; their women are far better treated, and enjoy more influence; and though they shed blood without scruple in cases of deadly feud, or in the regular way of a foray, they are not vindictive or inhospitable under other circumstances, several British officers having with perfect safety gone hunting and fishing into their country without escort or guide except what these poor savages themselves cheerfully furnished for a little brandy." The Bheels in the south of Malwah were partly reclaimed by the wise and conciliatory policy of Sir John Malcolm. In the mountainous tracts of the province of Guzerat they were at first harshly treated, and severity only tended to confirm their primitive habits. Subsequently a milder and more enlightened course of policy was pursued by the British government, and the results proved highly satisfactory. "The Bheels," says Captain Graham, "from outcasts have become members of civil society, daily rising in respectability, and forming useful and obedient subjects of the state." The Gonds are a miserable race in Gundwana, occupying the fastnesses of the mountains. They approach nearly to a state of nature, and frequently descend from the mountains, especially during the harvest, to plunder their ancient inheritance in the plains. Having within the last fifty years acquired a taste for salt and sugar, they have begun to cultivate the land, in order to obtain these luxuries. The Gonds bear a striking resemblance to the African negro. The Grassias are another race of plunderers who are numerous in Gujerat, the most western province of India. They have or pretend to have ancient claims on the land, many portions of which were either surrendered to them by the proprietors for the secure possession of the remainder; or they received an annual payment in money (toda) in full of all demands, as black-mail was paid in Scotland to the Highland robbers during the disorders of the feudal times. The Grassias seldom levied these claims in person; but, assuming the character of chieftains, they rallied around them a band of adventurers, who levied their *grassia* claim, and who, under this authority, plundered and laid waste the country. These Grassias are of no sect or caste; they include Hindus and Mahommedans indiscriminately. But, of all these predatory races in Hindustan, the Coolies, who haunt the shores of the great salt marsh called the Runn, near the Gulf of Cutch, are the most untameable. They resist every approach to civilization, and pride themselves upon their mean and filthy dress. The tribes of thieves which are found in India, under the various designations of Grassias, Catties, Bhatties, or wandering outlaws who worship the sun and moon, Coolies, Bheels or Mewassies, Meenas, Buddicks, Cozauks, and the like, generally wander along the rugged banks of rivers, or among inaccessible mountains. The Bhats are a singular race, who are most numerous in Gujerat. Some are cultivators, others beggars and itinerant bards or traders; whilst a few are contractors for the payment of the public revenue, receiving a small per centage on the amount, or guarantee the observance of private agreements and awards. The Cherons are a sect of Hindus nearly resembling the Bhats in their manners and customs. They are carriers of heavy goods, such as grain and other articles, in which they are also dealers, and possess large droves of cattle for carriage. They are likewise engaged to protect travellers in the wild parts of the country, and take an oath to die by their own hands in the event of those who are under their protection being plundered; and the superstitious thieves of Hindustan are always overawed by this threat of the Cherons, whom they hold in great veneration.[2] The population of Hindustan contains other tribes or sects, too numerous and diversified to be described in detail, and differing, if not in language, at least in dialect, and in their manners, customs, and occupations. The Phasingars in the south of India, and the Thugs, are professional murderers; the latter are composed of men of all castes, even Brahmins, who, when murders are committed, are frequently the chief directors in the scene. Their practice is to decoy the traveller into the midst of their band, and then, drowning his cries by the noise of pretended revelry, to strangle him by suddenly throwing a noose round his neck, after which the body is cast into a grave previously dug for it. But this tribe, together with the Gwarriahs, who live by stealing children, are fast disappearing under the strict rule of the British. The Brinjarrees and Loodanahs, or carriers of grain, are a singular wandering race, who dwell in tents, and have no home; passing their whole time in transporting grain from one part of the country to another. They move about in large bodies with their wives, children, dogs, and loaded bullocks; and carry arms, with which they stoutly defend themselves against petty thieves. In war they are allowed to pass and repass quietly as neutrals between hostile armies, and to sell supplies of grain to either party. It was from the Brinjarrees that Lord Cornwallis received all the supplies for his army when he advanced against the capital of Mysore in 1799. The Oorians, a singular race, who inhabit Orissa, are distinguished by their feminine appearance, so that they are often mistaken for women. They are timid, dissolute in their manners, and more practised in low cunning than any other people in the East, though they are said to be honest and industrious. The pastoral tribes, the Todawars or Toderies, and the Koties, inhabit the table-land of Mysore; the first a manly race in features, and of a proud and independent character, strongly resembling the ancient Romans; the second more diminutive, with darker complexions, and less expressive features. They are considered as the aborigines of these highlands. The Toderies are herdsmen, wandering from pasture to pasture, and they and the Koties always go bare-footed and bare-headed. The Nairs in Malabar form a singular caste, from their peculiar manners and customs. Pretending to be soldiers by birth, they disdain all industry; and are often seen parading up and down fully armed, each man with a firelock, and with at least one if not two sabres, which they more frequently use in secret assassination than in open war. Amongst the Nairs marriage is a mere form, and both sexes indulge in a promiscuous intercourse. The women are married before they are ten years of age; but the husband never cohabits with his wife. He allows her a suitable maintenance, whilst she lives with her brothers, and cohabits indiscriminately with any person of an equal or higher rank. Owing to this irregular intercourse, no Nair knows his own father; and every man considers his sister's children as his heirs."[1] The Nestorian Christians are numerous in the S. of India, and are a peaceful and industrious race. The Roman Catholics, the descendants of the Portuguese, French, Dutch, and other Europeans or converts to their faith, are sunk in idolatry not much superior to that of the Hindus. The foreign races in India are the mercenary Arabs, who are brave soldiers, ready to fight on any side for good pay; and the Chinese, who are fast increasing in Calcutta; their number, according to the last census of that city, amounting to nearly 1000. Another race has sprung up in India since the country was occupied by the British, who are known by the various names of Europeans, Anglo-Indians, Indo-Britons, half-castes, and the like, but who have now assumed the appellation of East Indians. They are the descendants of Europeans, either British or others, by native mothers, legitimate and illegitimate. They speak the English language, and follow all the European habits, and the Protestant religion. The number residing in Calcutta in 1850 was 4615. These are subject to the law administered by the crown judges in the Queen's court at Calcutta, but beyond the limits of the jurisdiction of this court, East Indians are amenable to the judicial courts, over which the Company's civil servants preside. In these courts the judge has not the power of life and death, but he is competent to sentence to long terms of imprisonment. All capital cases are referred for the disposal of the Nizamut Adawlut, the highest of the Company's courts in India. East Indians and others not professing the Mohammedan faith, are not tried under the provisions of the Mohammedan criminal law, but under regulations passed by the Government of India, the judge being assisted by assessors or by a jury, but having power to overrule their opinion. In the year 1793 East Indians were excluded by express enactments from the civil and military service of the Company, and were only eligible to subordinate situations in public offices; though of late years this exclusion was only applied in its rigour to the immediate descendants of European and Indian parents, all others being eligible to civil and military offices. Prior to 1793, the East Indians were freely admitted into the army, and several of them attained to the rank of generals and colonels, and commanded large bodies of troops with efficiency and success. Notwithstanding the restrictive law, there were still examples of their admission into the Company's service. Those who are not engaged in the public service follow other professions. Some have acquired high reputation and large fortunes by medical practice. Others are employed as planters, schoolmasters, architects, printers, carvers and gilders, or engaged in commerce. The laws passed in 1833 and 1853 for regulating the Company's affairs, abolish these unjust and illiberal distinctions, and render every class, of whatever caste or religion, eligible to all offices civil and military.[2]

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[1] *Annals of Rajast'han*, vol. i. chap. 3.

[2] For a more full account of some of these tribes, see the article on GUJERAT, a province in which they abound.

Such are some of the principal tribes who inhabit the low country of Central and Northern India, "whilst the mountains and woods, wherever they occur, show specimens of a race entirely different from all these, and in a state of society scarcely elevated above the savages of New Holland or New Zealand." It is finely observed by Sir John Malcolm in his *History of Persia*, that, in the conquest of a country, the rocks and the mountains often afford a last asylum to the brave and the free; and accordingly, many of the native tribes in Hindustan, flying from the destroying sword, have thus maintained for ages a savage independence, and all the distinct traces of an original race. The elevated tract in Bengal, reaching from Rajamahal to Burdwan, is inhabited by several tribes of mountaineers, and amongst them the barbarous Santals, who are probably the aborigines of the country; and, from their features, language, civilization, and religion, are obviously of a different stock from those in the plains. Amongst the Puharrees, who inhabit this tract, the Hindu institution of castes is unknown; the Hindu deities are equally so; and they have no idols, being nearly in the condition of savages. They subsist by the chase, their arms are bows and arrows, and they are nearly naked. They formerly waged incessant war with the cultivators of the plains, whom they robbed and murdered, and were in their turn hunted by the Mohammedan zemindars like wild beasts. Having been kindly treated and conciliated by the British, they are so far reclaimed from their wild habits, that a battalion of sepoys has been raised from amongst them. The peculiar features of the rude tribes in the eastern hills of Bengal, and the adjacent plains, equally indicate a distinct origin. The Kookies, who live in the mountains to the N.E. of the Chittagong district, have all the peculiar features of a Tartar countenance; the flat nose, the small eyes, and the broad round face. They are stout and muscular, though not tall; and they are hunters and warriors, armed with bows and arrows, clubs and spears. They live in the most inaccessible hills, in a state of constant warfare, and, like all savages, are cruel and vindictive.

Religion.

The inhabitants of Hindustan rank much lower in the scale of civilization than the nations of Europe. They are far behind them in literature, science, and the arts, and in all the civil institutions of society; and their religion is that of a rude people, consisting in an endless detail of troublesome ceremonies, which are deeply interwoven with the whole system of life. The reason of man, in contemplating the wonders of creation, is directed by the light of nature to one great First Cause; and in the structure of the universe are clearly seen the divine attributes of goodness, wisdom, and almighty power. Accordingly, Brahm, or God, is declared, in many passages of the Vedas or sacred writings of the Hindus, to be the almighty, infinite, eternal, self-existent being, who sees all things, and is everywhere present; the creator and lord of the universe, its preserver and its destroyer, who can neither be described nor adequately conceived by the limited faculties of man. But with these simple conceptions of the divine majesty other grosser ideas are combined, and a system of polytheism, accompanied by the most extravagant and obscene fables, and all the disgusting, cruel, and blood-thirsty rites of an abominable idolatry. Whilst Brahm, the Supreme Being, is supposed to remain in holy obscurity, he has distributed respectively to three other deities, Brahma, Vishnu, and Siva, the power of creating, preserving, and destroying the world. But it does not appear that these deities are strictly confined to their separate functions; Vishnu, the preserver, frequently employing himself in acts of destruction; and Siva, on the other hand, in acts of beneficence. In short, the Hindu creed presents no clear nor determinate ideas. All is vague, inaccurate, and confused. Brahma, the creator, is represented as a golden-coloured figure, with four heads and four arms. Vishnu, the preserver, is represented of a black or blue colour, with four arms, and a club to punish the wicked. The emblems under which he is represented refer to his vindictive character. He has three eyes, to denote the three divisions of time past, present, and future. A crescent in his forehead refers to the measuring of time by the lunar revolutions, as a serpent denotes it by years; and the necklace of skulls which he wears, the extinction of mankind in successive generations. The great ends of his providence are brought about by various incarnations of the Hindu deity. Of these visible appearances, denominated avatars in the Hindu mythology, there are ten, of which nine have already taken place; and although the Hindu account of what took place at these times is a tissue of absurdity, extravagance, and indecency, yet we may trace, under a mass of fable, the Scripture account of the deluge, with various other points of the Christian theology. But the history of the creation from a seed deposited in the waters, which became an egg, from which Brahma the creator was born, is in the highest degree absurd and profane. At the tenth avatar, which is yet to come, Vishnu, as is foretold, will appear on a white horse, with a scimitar blazing like a comet, for the everlasting punishment of the wicked who shall then be on the earth. Each earthly incarnation of the divinity gives rise to a new deity; and there are, besides, innumerable other minor deities, amounting, it is said, to 330 millions. All the great elements of nature are deified by the extravagant superstition of the Hindus; also the firmament of heaven, the sun, moon, and stars; every river, fountain, and stream, is either a deity in itself or has a divinity presiding over it, nothing being done without some supernatural agency; and there are, besides, innumerable myriads of demigods, to whose honour idols are erected and worshipped by all classes with much apparent devotion. Stocks and stones, or a lump of clay smeared over with a little red paint, are converted into a god, and reverenced, by the ignorant Hindu. Any figure, either of brute or man, or any monstrous combination of both, with a multiplicity of heads and hands, mark a Brahminical place of worship. In the lapse of ages, great changes have been introduced into the religious practices of the Hindus; and sectaries have arisen amongst them, each with peculiar objects of adoration and modes of worship. Five great sects worship exclusively a single deity; one recognises the five divinities that are respectively reverenced by the other sects, but they select one object for daily adoration, whilst they perform only occasional rites to the other deities. The Vedas, or the Hindu Scriptures, were revealed before the appearance of Buddha, the ninth incarnation of Vishnu, which is supposed to have taken place in the year 1014 before the Christian era. He appears to have borrowed his theology from the system of Capila, in which the unlawfulness of killing animals is inculcated as an essential point. But the overthrow of the Buddhists did not revive the religious system inculcated in the Vedas. The doctrines taught in these sacred books are now mostly obsolete, and in their stead new forms and ceremonies have been instituted, and new orders of devotees. In particular the goddess Kali, the consort of Siva, who delights in blood, has been propitiated by the sacrifice of animals; and the worship of Rama and Krishna, incarnations of Vishnu, and of Siva the destroyer, appears to have been introduced since the persecution of the Buddhists and Jains.

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[1] Buchanan's *Journey from Madras*, vol. ii., p. 412.

[2] Minutes of Evidence before Select Committee on the Affairs of the East India Company, on a Petition of certain Christian Inhabitants of Calcutta, &c., presented to the House of Commons on the 4th May last. (21st June 1831.)

The worshippers of Buddha, though they believe in the incarnation of Vishnu, are regarded as heretical by the Hindus, and have been compelled, by persecution, to fly to other countries. They have now propagated their faith over the greater part of Eastern India, in China, and as far as Japan; also in Thibet and Ceylon. The Jains are another sect of Hindus, who acknowledge only as subordinate deities some, if not all, of the gods of the Brahmins, and the prevailing sects; and assign the highest place to certain deified saints, who, according to their creed, have risen to the dignity of superior gods. They neither address prayers nor perform sacrifices to the sun or the fire; and they reject the authority of the Vedas, as do also the Buddhists. The presence of umbrella-covered pyramids, or semi-globes, and of plain human figures sitting cross-legged, or standing in an attitude of contemplation, point out the temple or excavation of a Buddhist. The twenty-four saintly figures, without the pyramid, indicate a Jain temple.

The sacred books of the Hindus, though they inculcate generally all the moral duties of justice, mercy, and benevolence, yet seem, like every other system of false religion, to give the first place to the ceremonial law; and accordingly the devotion of the Hindus consists in mere outward observances, and is not inconsistent with the most scandalous crimes. Under the Christian system, there can be no piety to God without benevolence to man. But the troublesome ceremonies of the Hindu religion encroach, not only on all moral duties, but on the whole business of life; and confer such a stock of atoning merit that they seem to supersede the weightier matters of the law. The observances which are imposed upon a Brahmin commence when he rises in the morning, and consist in divers ablutions and prayers, in the worship of the rising sun, in the inaudible recitation of the gayatri, or the holiest text of the Vedas, in holy meditation, and in other ceremonies. He has then to perform the five sacraments, which consist in teaching and studying the scriptures, which is the sacrament of the Veda; in offering cakes and water, which is the sacrament of the manes; in an oblation of fire, the sacrament of the deities; in giving rice and other food to living creatures, which is the sacrament of spirits; and in receiving guests with honour, which is the sacrament of men. The whole day would not suffice for the punctual performance of these ceremonies; and they are of necessity abridged, to give time for the proper business of life. In almost all the religious traditions of the world we find traces of the Scripture revelation, however corrupted; and the Hindu system seems to have borrowed, and to have greatly extended, the typical impurities of the Mosaic law. The rules on this subject, pointing out the causes of defilement, and the modes of purification, are numerous, many of them to the last degree absurd and troublesome. The death or the birth of a child renders all the kindred unclean. Any one who touches a dead body, a new-born child, an outcast, &c. is unclean; or a Brahmin who has touched a human bone. The natural functions of the body give occasion to many minute and disgusting regulations; and the modes of purification are equally strange and ridiculous. Of these, bathing is the most rational; the other modes are by stroking a cow, looking at the sun, or having the mouth sprinkled with water. He who is bitten by any animal frequenting a town, or by a mare, a camel, or a bear, is unclean; and he is purified by stopping his breath during one inaudible repetition of the gayatri. Inanimate substances may also be unclean, and the various modes of purifying them rival in absurdity the other extravagances of the Hindu code of religious observances.

The expiation of sin by voluntary penance is another favourite doctrine of the Brahmins, by which they contrive to awe superstitious minds into subjection; and in their estimate of offences, with a view to suitable penances, they subvert all moral distinctions. "Acts naturally indifferent," says the author of *Indian Recreations*, "are put on the same footing with immoralities; eating certain articles of food, drinking certain liquors, or touching certain objects, are declared forfeitures, and are expiated by penance as immoral conduct. Forgetting texts of scripture is classed with perjury; eating things forbidden, with killing a friend; incest and adultery are compared to slaying a bull or a cow; drinking forbidden liquor, to killing a Brahmin. In several instances, actions highly meritorious according to our notions, are put on the same footing with a conduct implying great infamy. Working in mines of any sort, engaging in dykes, bridges, or other great mechanical works, is classed with subsisting by the harlotry of a wife, and preparing charms to destroy the innocent."[1] To these artificial offences, penances are either affixed by the Brahmins, or are voluntarily undertaken by their pious votaries; and these generally consist in fasts, mortifications, watchings, and other bodily privations. "If a Brahmin," says Menu, "have killed a man of the sacerdotal class without malice, he must make a hut in a forest, and dwell in it twelve whole years, subsisting on alms, for the purification of his soul. If the slayer be a king, he may perform sacrifices, with presents of great value; if a person of wealth has committed this offence, he may give all his property to some Brahmin learned in the Veda." In some cases the penances consist in eating what is filthy and disgusting. If a Brahmin kill by design a cat, or an ichneumon, the bird chisha, or a frog, a dog, a lizard, an owl, or a crow, he must perform the ordinary penance required for the death of a Sudra, one of the lowest caste, who are thus no more valued than a cat or a frog. A particular class of devotees, namely, the Fakirs, signalize their piety by enduring the severest tortures, and with a constancy worthy of a better cause. Bishop Heber describes, with his usual force, the appearance of these eastern monks as he entered the holy city of Benares. "Fakirs' houses," he observes, "as they are called, occur at every turn, adorned with idols, and sending forth an unceasing tinkling and strumming of vinas, byyals, and other discordant instruments; while religious mendicants of every Hindu sect, offering every conceivable deformity which chalk, cow-dung, disease, matted locks, distorted limbs, and disgusting and hideous attitudes of penance, can show, literally line the principal streets on both sides. Here," he adds, "I saw repeated instances of that penance of which I heard much in Europe, of men with their legs and arms voluntarily distorted by keeping them in one position, and their hands clenched till the nails grew out at the backs. Their pitiful exclamations as we passed, '*Agha Sahib, Topee Sahib*,' the usual names in Hindustan for an European, '*khana ke waste kooch cheez do*,' give me something to eat, soon drew from me the few pence I had; but it was a drop of water in the ocean; and the importunities of the rest, as we advanced into the city, were almost drowned in the hubbub which surrounded us."[2] The tortures which these fanatics endure exceed all belief. A penitent who went through the ceremony of sitting between five fires, is described by Fraser, who witnessed the penance at a public festival. Being seated on a quadrangular stage, after the sun began to have considerable power, he stood on one leg gazing stedfastly at its scorching beams, whilst fires large enough, says the traveller, to roast an ox were burning around him, the penitent counting his beads, and occasionally adding fuel to the flames. He stood upright on his head in the midst of these fires for three hours; and then seating himself with his legs across, he remained till the end of the day exposed to the scorching heat of both the sun and the fires.[3] Other cruel and bloody rites are contrived by those devotees, the worshippers of Siva or his consort the goddess Kali. At one of the festivals in honour of this goddess, Bishop Heber, who was present, relates, that one of these self-tormentors had hooks thrust through the muscles of his sides, which he endured without shrinking, and a broad bandage being fastened round his waist to prevent the hooks from being torn through the flesh by the weight of his body, he was fastened to a long pole, and, by means of another pole fixed in the ground, he was swung aloft and whirled round in the air; on a motion being made to take him down, he made signs for them to proceed, a mark of constancy received with shouts of applause by the ignorant multitude. Other devotees were seen going about with small spears thrust through their tongues and arms, or with hot irons pressed against their sides. Bishop Heber saw another of these penitents who was actually half roasting himself by a fire which he had kindled in a hole dug in the ground; another was seen hopping on one foot, having made a vow never to use the other, which was now contracted and shrunk up; and a third had held his hands above his head so long that he had lost the power of bringing them down to his sides. Some are seen buried up to the neck in the ground, or even deeper, with only a small hole for breathing. Some lie on beds of iron spikes, or tear their flesh with whips, or chain themselves for life to the foot of a tree, or remain in a standing posture for years, till their legs swell, and break out into ulcers, and become at last too weak to support them; others exhaust their bodily strength with long fasting, or gaze on the blazing sun, till their eyesight is extinguished. These devotees subsist entirely by charity; and Dr Buchanan mentions a class of them in the south of India, who wander about with bells tied to their legs and arms, in order to give notice of their presence as they approach the villages.[4] They are always naked, and filthy in the extreme, being covered with cow-dung and chalk; and for the tortures which they endure in public they indemnify themselves in private by the utmost license of sensual indulgence.[5] Amongst other observances, the Hindus have always been much given to religious pilgrimages; and their holy places have been generally established near the sea, the sources and junctions of rivers, which are held in peculiar veneration, the tops of remarkable hills, hot springs, caves, waterfalls, or any other place of difficult or dangerous access. A pilgrimage to Gangoutri, near the sources of the Ganges, is accounted the great achievement of Hindu piety. To the waters of this river the superstitious Hindu ascribes peculiar sanctity, and devoutly worships it throughout its whole course. But there are particular spots more sacred than others; and so great is the resort of pilgrims, and such their ardour to wash in the sacred stream, that numbers, in the crush and tumult, are hurried into the water and drowned, or trodden to death in the crowd.

It is not doubted that, at a period not very remote, the bloody deities of the Hindus were propitiated with human sacrifices, and some of the rites still in use amongst them confirm this suspicion. In some of the native states the Brahmins, in resisting oppressive demands, resort to a contrivance, in which a human victim is really sacrificed. They erect a circular pile of wood, on the top of which they place a cow or an old woman; and if the demand is insisted on, they set fire to the pile, and consume the sacrifice, which is supposed to entail on the oppressor the deepest guilt. Bishop Heber gives, in his narrative, an example of the sacrifice of an old woman, who, in a quarrel which her husband had with his neighbour respecting some land, was thrust into a Mahbout's hut, and there burned, in order that her spirit might haunt the spot, and entail a curse upon the soil. Children were also formerly sacrificed, by throwing them to the sacred sharks of the Ganges, till the practice was forbidden by the British government; and a voluntary sacrifice of themselves by individuals, in honour of the gods, is still reckoned meritorious. At the festival of Juggernaut, the idol is placed on a ponderous machine or chariot, and dragged forward by a crowd of devotees and priests, when numbers of the people, even fathers and mothers, with their children in their arms, throwing themselves in the way of the chariot, and being crushed to death under its ponderous wheels, amidst the fanatical cries of the multitude, are supposed to be conveyed immediately to heaven. Numerous victims of both sexes drown themselves annually at the junction of the sacred streams;[1] many strike off their own heads as a sacrifice to the Ganges, whilst others expiate their sins by casting themselves into the avenging flames. This act of devotion is accompanied by atrocities that are truly shocking, the devotee previously laying open his bowels with the stroke of a sabre, tearing out his liver and giving it to a byestander, conversing all the time with apparent indifference.[2] Many other enormities are practised at the festivals in honour of their gods, which it would be endless and disgusting to detail. The custom of a widow burning herself on the funeral pile of her husband is a noted rite of the Hindu religion, but the practice has been for some time abolished within the British territories, and more recently several of the native princes of India have been also prevailed upon to prohibit the rite of Suttee within their respective dominions. The Hindus in this, as in many other instances, evince a singular indifference about their own lives; which also appears in the frequent instances of suicide amongst them. "Men," says Heber, "and still more women, throw themselves down wells, or drink poison, for apparently the slightest reasons, generally out of some quarrel, and in order that their blood may be at their enemy's door." Obscenities mingle with these bloody rites, and the most indecent figures are pourtrayed on the chariots used at the temples, many of them large and richly carved. "These," says Dr Buchanan, "representing the amours of the god Krishna, are the most indecent that I have ever seen."[3] Equally indecent representations are carved on the sacred cars fixed at the temples, in which the musicians and dancing girls are all prostitutes to the Brahmins, and turned out to starve when they grow old, unless they have a handsome daughter to support them from the wages of iniquity. The state of morals among the Hindus is such as might be expected from a religion so impure, and from the gross emblems which are used on sacred occasions; their writings and their conversation are shocking to European ears; and even the Hindu women hear without a blush and join in language the most gross and disgusting. They are sensual in all their ideas, and pursue the intercourse of the sexes with little more discrimination than the brute creation. Fidelity to marriage vows is scarcely known amongst them, at least amongst the men.

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[1] See Tennant's *Indian Recreations*, vol. i. p. 155.

[2] Heber, vol. i. p. 373.

[3] Mill's *History of British India*, vol. i. p. 353.

[4] *Journey from Madras, through Mysore, Canara, and Malabar*, vol. i. p. 238.

[5] Martin, vol. i. p. 291.

A superstitious tenderness for the brute creation is a peculiar tenet of the Hindu creed, which prohibits the use of animal food excepting at the great festivals, when the sacrifices of beasts propitiate the bloody deities, and serve the natives for a feast.[4] But the same abstinence from animal food is not general throughout Hindustan. In the north of India it has already been mentioned that it is freely used by the inhabitants; and, according to Dr Buchanan, there are castes in the south of India who eat sheep, goats, hogs, fowls, and fish, though there are others who religiously abstain from these, and from all spirituous liquors.[5] Several animals, as the cow and the monkey, are objects of veneration. Bishop Heber, so often quoted, mentions, that on entering the holy city of Benares, "the sacred bulls devoted to Siva, of every age, tame and familiar as mastiffs, walk lazily up and down the narrow streets, or are seen lying across them, and hardly to be kicked up; any blows, indeed, given them must be of the gentlest kind, or woe be to the profane wretch who braves the prejudices of a fanatic population, in order to make way for the tonjon. Monkies, sacred to Hunimaum, the divine ape, who conquered Ceylon for Rama, are, in some parts of the town, equally numerous, clinging to all the roofs and little projections of the temples, putting their impertinent heads and hands into every fruiterer's or confectioner's shop, and snatching the food from the children at their meals."[6] To such a length is this superstition carried, that they have established an hospital for sick and infirm beasts, and for fleas, lice, and insects, though it does not appear, as reported by some travellers, that they feed these loathsome creatures on the flesh of beggars hired to lodge in the hospital for that purpose. An hospital for animals is to be seen at Broach in Gujerat, which has considerable endowments in land, and in which, are monkies, peacocks, horses, dogs, cats, and little boxes filled with fleas and lice. This hospital was described to Bishop Heber by the British commercial agent resident at Broach. The funds, however, are said to be alienated by the avaricious Brahmins, and the animals allowed to starve. With all this veneration for animals, they are nowhere more cruelly treated. They are overworked and abused in a manner shocking to a European. "They treat their draft horses," says Bishop Heber, "with a degree of barbarous severity which would turn an English hackney coachman sick;" nor do they show any greater sympathy for human beings, who are allowed to perish before their eyes from hunger or disease. Lepers, according to their base and irrational superstition, are treated as objects of the divine wrath; they are cruelly neglected, and regarded with abhorrence rather than with sympathy.

The transmigration of souls is another favourite tenet of the Brahmin superstition. The souls of good men migrate in the next world into hermits, religious mendicants, Brahmins, demi-gods, genii, or other celebrated intelligences; and the best ascend to the condition of Brahma with four faces. The next gradation allotted to souls filled with passion is into men and not into deities, into cudgel players, boxers, wrestlers, actors, or those of a higher class into the bodies of kings, and the highest become genii, attendants on the superior gods; whilst souls filled with darkness are degraded into the lower animals, such as worms, reptiles, cattle, &c. or into elephants, horses, Sudras (the lowest caste), or into the still more degraded class of men of no caste, or into lions, tigers, &c.; to the highest are allotted the forms of dancers, singers, &c. birds, giants, blood-thirsty savages. Particular migrations are assigned as the punishment of certain enormities; but it is useless to pursue the system further into its absurd and disgusting details.

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[1] Tennant, vol. ii. p. 250.

[2] Mill's *History of British India*, vol. i. p. 358.

[3] *Journey from Madras, through Mysore, Canara, and Malabar*, vol. ii. p. 237.

[4] *Journey from Madras*, &c. vol. i. p. 262.

[5] *Ibid.* vol. i. p. 248.

[6] Heber's *Narrative*, &c. vol. i. p. 373.

Manners. The religion of Hindustan is so closely interwoven with its customs, manners, and laws, that they can scarcely be described separately. The division of a Hindu community into castes is an institution, not of policy, but of religion, which embraces the whole detail and intercourse of life. There are four original or pure castes, namely, 1*st*, the Brahmins, or priests; 2*d*, the Cshatriyas, or military caste; 3*d*, the Vaisyas, or husbandmen; and, 4*th*, the Sudras, or labourers. Of these the Brahmins are declared to hold the first rank, and to be the lords of all the other classes. A want of due reverence to them, especially by the lowest or the Sudra class, is accounted one of the most atrocious crimes. The laws and manners equally concur to maintain the honour, and all the substantial privileges, of this sacred order. They are exempted from taxation, and from the sanguinary laws which affect the other classes. Neither the life nor property of a Brahmin can be touched, even though he commit the most atrocious crimes; and the whole scope of the Hindu religion is to heap gifts and wealth upon them. "Every offence," says Orme, "is capable of being expiated by largesses to the Brahmins, prescribed by themselves, according to their own measures of avarice and sensuality."[1] The duties of the Brahmins are to meditate on divine things, to read the Vedas, to instruct the young Brahmins, and to perform sacrifices and other religious acts. The Cshatriyas, or the military rank, is next in order to that of the Brahmins. Their duty is to bear arms in defence of the state, and they rank as high above the lower orders as the Brahmins do above them. The Vaisyas, the third caste of Hindus, tend cattle, or engage in trade and agriculture. They rank only above the Sudras, from whom, however, they receive the same deference and submission which they give to the higher castes. To the Sudra, or the lowest class, are allotted all the meanest and most servile duties; they are regarded with abhorrence by the other tribes, to whom religion prescribes their most abject submission, as well as every other species of degradation. They are in a manner excluded from the privileges of the social state. They pay a higher rate of interest for money than any of the other classes, they are more cruelly punished for crimes committed against them, whilst an injury to a degraded Sudra is a light and venial offence. They are held to be in a state of slavery, they cannot possess property, and at any time a Brahmin may seize the goods of his Sudra slave. So degraded are they, that under this gloomy, unsocial superstition, a Brahmin cannot lawfully read the Veda in presence of any of them, nor give them spiritual counsel or instruction, under pain of sinking with them into hell. To each of these classes, into which society is divided, are assigned, under the severest penalties, particular and hereditary employments. But the rigid severity of this law is softened by the following exceptions. A Brahmin who cannot find employment in his own spiritual line, may descend to the exercise of military duties, or to tillage and attendance on cattle, or to traffic, only avoiding certain commodities. In like manner, a Cshatriya in distress may have recourse to all inferior employments, though not to the higher duties of the Brahmins. The practice of medicine and other learned professions, of painting and other arts, common labour, menial service, begging, or serving, may be resorted to upon the plea of necessity. A Vaisya may descend to the servile work of a Sudra; and a Sudra may subsist by handicrafts, as joinery, masonry, painting, and writing, by which he may serve the higher classes; or by trade or husbandry. The loss of caste is one of the most serious calamities which can befall a Hindu, and may in fact be compared to the spiritual anathemas of the Catholic church during the dark ages of Europe. If the loss of caste were the penalty of immorality, the fear of it would impose a salutary restraint. But this is far from being the case. The most abandoned Brahmin retains his rank, notwithstanding his crimes; but he will entirely forfeit it and lose all countenance in society by touching impure food, or by some such petty delinquency. To sit down at a meal with one of an inferior caste, would be deemed a monstrous pollution; and a naked Hindu would think himself defiled by the presence of the first monarch of Europe at any of his meals. "While dinner is preparing," says Tennant, "and during eating, a small circle is drawn round the company, which an European, if he pass, infallibly defiles the meal; it is thrown to the dogs, and other victuals provided, though a single one be all the treasure of the family."[2]

Such may be considered as in theory the structure of a Hindu community. But since, in the progress of society, this strict division into classes with distinct employments could not long be maintained, we accordingly find that, by illicit connexions, the pure races are intermixed, and children born who, being of no caste, are therefore impure, and objects of execration to all the other tribes. This impure race, denominated the Burren Sunker, and classified into distinct tribes, have become artisans and handicraftsmen of every description. From the intermixture of these various races innumerable mixed tribes have sprung, and the pure blood of the four original tribes is scarcely to be found; so that Mr Rickards, in his accurate account of Indian manners, says, "I have never met with a person who could prove himself a genuine Cshatriya, Vaisya, or Sudra; whilst of those who pretend to be of pure descent, Brahmins and other respectable and intelligent Hindus have assured me that they have no right to the distinction; that the genuine tribes above named are extinct, and their descendants in this generation all of mixed blood. If, however, any do now exist, they must be too thinly scattered to affect the general interests of society by their privileges or numbers. "A real Cshatriya prince," he adds, "is not to be found in these days; all the greater princes of India, excepting the peshwa, a Brahmin, are base-born."[3] Nor, amidst this confusion of ranks, has it been possible to adhere to the strict allotment of certain employments to particular castes. The Brahmins no doubt still form a distinct order; their privileges are willingly conceded to them by the superstitious multitude, and the inferior castes have never encroached on their holy functions. But those of the other castes have been confounded. War has not been the exclusive employment of the Cshatriya caste; for the Indian armies are recruited from all denominations and castes. Nor have the Vaisya and the Sudra castes been more successful in the monopoly of their employments; seeing that all the various castes follow their allotted duties, and fill every branch of agriculture, commerce, handicraft, and menial service.[4] But the institution of castes, though it has not been strictly acted upon, being at variance with the fixed order of human society, has nevertheless deeply affected the aspect and structure of the Hindu communities; and whilst it exalts the order of priests, it degrades the lower classes to the level of the brutes. It is the source of cruel and anti-social prejudices, entirely opposite to those Christian feelings of benevolence by which man is bound to his fellow men; and by which the different orders of society, instead of being harshly separated, are softened and blended, as in the communities of Europe, into one harmonious whole.

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[1] Orme *On the Government and People of Hindustan*, p. 433.

[2] See *Indian Recreations*, vol. i. p. 121.

[3] *India, or Facts submitted to illustrate the Character and Condition of the Native Inhabitants*, &c. By R. Rickards, Esq. vol. i. p. 29.

[4] *Ibid.* p. 30.

Besides these degraded castes, whose condition is little better than that of slaves, numbers of unfortunate persons were until very recently reduced to actual slavery throughout India.[1] All the jaghiredars, zemindars, principal Brahmins, and talookdars employed domestic slaves in their establishment; and in every Mahratta household of consequence they were considered as indispensable. They were also employed in the labours of the field, in the cultivation of rice, and were in the lowest state of degradation, ill-fed and worse clothed, and most wretched in their appearance. But the British parliament, in legislating in the year 1833 for the better government of India, made it incumbent upon the governor-general in council to take into immediate consideration the means of mitigating the state of slavery, and of ameliorating the condition of slaves; and of extinguishing slavery throughout the territories subject to their jurisdiction so soon as such extinction should be practicable and safe. The result was the passing of a legislative act by the government of India, which, by refusing to recognise the right to property in slaves, and by extending protection to both the persons and property of parties so styled, has substantially put an end to the institution of slavery within the territories under the government of the East India Company. The British Government has also strenuously laboured to procure the abolition of slavery in the native states of India, and its efforts have been generally successful. In Travancore it still exists, and the slaves are described as in the lowest possible state of degradation. Not only are they held by private persons, but some are the property of the government, which derives a small revenue from letting out their services to such cultivators as require them. The British resident has pressed upon the minister the manumission of the children of these slaves; in addition to which the home authorities have suggested the emancipation of the parents also; and the subject of prædial slavery generally, with a view to its entire abolition at an early period, has been recommended to especial attention. In consequence of this pressure a proclamation was issued in 1853, declaring free the children of slaves of the state who may be subsequently born; forbidding the seizure of private slaves in satisfaction of debts; recognising the rights of slaves to possess property and to enjoy the protection of the law; directing the emancipation of slaves connected with property lapsing to the state, and prescribing regulations intended to preserve that unhappy class from oppression. How far these rules will be effective against the opposition of both prince and people remains to be seen; but it is something to have obtained a recognition of the right of slaves to be dealt with as human beings.

The Hindus are by no means a moral people. Notwithstanding the gentleness and feminine softness of their manners and address, they frequently commit the most revolting acts of cruelty. The practice of murdering children for the sake of the silver ornaments in which, by the vanity of their parents, they are attired, is common among them; and the gang-robbers of India are noted for the horrible tortures which they inflict on their unhappy victims, in their eager search after their hidden treasures. "Pestilence, or beasts of prey," says Dr Buchanan, "are gentle in comparison of Hindu robbers." According to the observation of Orme, the politics of Hindustan would afford in a century more frequent examples of sanguinary cruelty than the whole history of Europe since the reign of Charlemagne. "How many princes," observes this writer, "have been stabbed in full durbar" (in open court). "How many have been poisoned in their beds. Chiefs of armies circumvented and cut off at conferences in the field. Favourite courtiers strangled, without previous notice of their crime, or while they thought themselves on the eve of destroying their masters."[2] Murders amongst the Hindus, even by poison, excite no feeling of deep abhorrence, as among the nations of Europe; and the cold-blooded villany of the Hindu is often remarkable. Mr Holwell mentions, that when he sat as judge at Calcutta, he had heard it stated in defence of the most atrocious murders, that it was the Cali age, when men were destined to be wicked.[3] The Hindus, like all the other Asiatics, are great masters of dissimulation; they are cunning and treacherous, addicted to falsehood to a degree that can scarcely be conceived by a more refined and moral people. Perjury in courts of justice is universal, amongst high as well as low, and amongst both the Hindus and Mussulmans, without the least remorse or shame. The Europeans in the office of judges in India complain of being perplexed by a host of perjurers on each side, swearing in the teeth of one another. They are acute dissemblers in all affairs of interest, and are the sharpest buyers and sellers in the world, maintaining through all their bargains a degree of calmness which no art can penetrate.[1] A want of sympathy with the sufferings of his fellow-creatures is another trait of the Hindu character, and a sure index to the low state of refinement amongst them. They treat their sick and dying with indifference, and in many cases with shocking inhumanity. The sick whose life is despaired of are carried to the banks of the Ganges, and their mouth, nose, and ears are closely stopped up with mud; water is then poured upon them from large vessels, and thus, amidst the agonies of disease and of suffocation, life terminates. The corpse is then burned, if the survivors can pay the expense, and the relatives retire with every appearance of insensibility.[2] The effeminacy of their persons, and their timidity, prevent them from fighting or boxing in their quarrels. But this forbearance seems to proceed from no want of malignity or passion, as, in the event of any misunderstanding between two persons meeting accidentally in the street, they upbraid each other with the foulest epithets, accompanied by the utmost violence of gesticulation.

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[1] See Papers relative to slavery in India; Return to the House of Commons, 6th March 1834; Evidence of Joseph Fenn, nine years a missionary in Travancore; Answers to Questions on Slavery, circulated by the Commissioners for the affairs of India; Evidence of T. H. Baber, Esq. thirty-two years resident in India; of the Honourable J. Harris, principal collector in Canara; and of Mr Warden, collector in Malabar. The evidence of T. H. Baber discloses a regular and shameful traffic in slaves, carried on by Mr Brown, a servant of the Company, and under the authority of the Bombay government. "How or whence," he observes, "this oppressive and cruel practice, not only of selling slaves off the estate where born and bred, but actually of separating husbands and wives, parents and children, and thus severing all the nearest and dearest associations and ties of our common nature, originated, it would be difficult to say; but I have no doubt, and never had in my own mind, that it has derived support, if not its origin, from the impolitic measure in 1798, of giving authority to the late Mr Murdoch Brown, while overseer of the Company's plantations in Malabar, from the difficulties he experienced, even with 'the assistance of the tchsildar' (the head native authority) and 'his peons' (armed persons with badges of office), to procure workmen, and 'of the price of labour being more than he was authorized to give,' to purchase indiscriminately as many slaves as he might require to enable him to carry on the works of that plantation; and of actually issuing orders to the European, as well as to the native local authorities, to assist him, and even to restore slaves who had run away and returned to their homes (without any orders to inquire the reason of their absconding), and who, as has been actually ascertained from the surviving slaves themselves, had been actually kidnapped by the doragha (head police officer), and sent up to North Malabar, to Mr Brown, which person had continued up to 1811, or for a period of twelve years, under this alleged authority, granted by the Bombay government, to import slaves and free-born children from Travancore, when, by the merest accident, this nefarious traffic came to my knowledge, and which, *after a considerable opposition on the part of the provincial court of circuit*, I succeeded in putting a stop to, after having restored to liberty and their country 123 persons who had been stolen, of whom 71 were actually found in Mr Brown's possession." Mr Brown's agent, Assen Ally, acknowledged, that during the time he was at Aleppi, at Travancore, in 1810, no less than 400 children had been transported to Malabar. The advocate-general's report alludes to "Mr Baber's perseverance in restoring the kidnapped children, in spite of very extraordinary opposition," and to the "extraordinary support Mr Brown appears to have received in these dealings in stolen children." (Fol. 788.) The still more objectionable practice of realizing the public dues by the seizure and sale of slaves off the land, must have confirmed proprietors in their idea of accounting the slaves their property. Mr Vaughan, collector, Malabar, in a letter dated 20th of July 1819, argues in favour of this inhuman practice, saying, "that the partial measure of declaring them not liable to be sold for arrears of revenue, will be a drop in the ocean; though, why government should give up the right every proprietor enjoys, is a question worthy of consideration." Par. 3, 4, 5, &c. Highest class slaves sold for 250 gold fananas, L.6. 5s.; average price, L.3. 6s.

[2] Orme's *Historical Fragments of the Mogul Empire*, p. 340.

[3] Mill, vol. i. p. 407.

Mr Rickards, in his valuable work upon India, seems to imagine that European writers have exaggerated the vices of the Hindus, and he exhibits them in a more favourable light. "Having lived," he observes, "twenty-three years in India, and passed much of that time in intimate intercourse with various natives, I have a different opinion of their character to that given in several printed works. I have constantly seen, in their acts and conduct, the practice of the most amiable virtues. I have experienced from many the most grateful attachment. I believe them capable of all the qualities that adorn the human mind; and though I allow many of their imputed faults (where is the individual or nation without them?) I must still ascribe these faults more to the despotisms under which they have so long groaned, and which unhappily we have but slenderly alleviated, than to natural depravity of disposition, or to any institutions peculiar to themselves."[3] No writer ascribes to the Hindus any greater natural depravity than other nations. But certainly their peculiar religion, its indecent and bloody rites, and the laws and usages founded on it, more especially the institution of castes, tend to extinguish in the breast all humane, enlightened, or moral feelings; and though, even amongst the Hindus, exceptions may be found, and the occasional practice of amiable virtues, yet the crimes which are proved to be committed openly and without shame or remorse sufficiently attest the want of morality, intelligence, and every humane and social feeling amongst them, and seem to place them in this respect entirely on a level with the other Asiatic nations. Ignorance is the parent of cruelty and vice, and with the progress of knowledge and of civil institutions certain crimes entirely disappear; and hence their existence amongst the Hindus bespeaks not so much any innate or peculiar depravity, as a low state of civilization, and a state of thraldom to a base superstition and to the dominion of priests, under which the social virtues are blighted in the bud, and selfishness and vice spring up in the congenial soil.

In every nation the condition of the female sex affords a sure index to the state of manners and the progress of civilization. Amongst savages, women are ill treated because they are weak and helpless, and there is no moral restraint on the tyranny of the men. In Hindustan, as over all the East, where polygamy prevails, they are a degraded caste, shut up in the harem or the seraglio, and not, as in Europe, the seat of a purer faith and more refined system of manners, the friends, the advisers, and equal companions, of their husbands. And both the laws and manners of the East lead to this unhappy effect. Whilst marriage is enjoined as a religious duty, not to be neglected except for the higher duty of becoming a devotee, the character of women is described in the Hindu books of law as stained with almost every vice. Pride, anger, envy, violence, deceit, falsehood, immoderate desires, infidelity to their husbands, and idleness, are pointed out as their ruling passions; and the treatment they meet with corresponds with those ideas. They are wholly uneducated, excluded from the sacred books, and from all knowledge of expiatory texts, and from any share in the paternal property; and they are held unworthy to eat with their husbands. They are the slaves of their domestic tyrants, and often receive the most barbarous treatment, being beaten and otherwise ill used; but they are not allowed to leave them, whilst the husband, on the other hand, may divorce his wife upon any plausible pretence. Such is the condition of women by the laws of Hindustan, which, we have no reason to believe, are softened in domestic life. Certain it is, that women, as long as they are uneducated, will be in a degraded state. It is only when they cultivate their minds that they can mix with advantage in society, and that, respecting themselves, and respected by others, they can acquire that ascendency to which they are entitled, and give, by the delicacy of their manners, that tone and polish to society which it cannot receive from the other sex.

The ceremonial of marriage is conducted amongst the Hindus with great solemnity and expense. The parties, who are of equal rank, and any other alliance would be accounted infamous, are betrothed during their infancy by their parents, but on a full consideration of their respective rank, skilful genealogists being consulted previously on this important point. These preliminaries being settled, the transaction terminates with an elegant feast; and when the wife comes of age she is conducted to her husband's home, with all due ceremony, and a concluding entertainment; another set of observances take place when she becomes pregnant, when she passes her seventh month, and when she is safely delivered. These festivals amongst the rich are extremely expensive.

The Hindus are ignorant and illiterate. The children of the poor seem to be mostly uneducated. Those in a higher station are taught by the Brahmins to read and write, and to cast accounts, the calculations being performed by pebbles or small shells. The pupil first begins to write upon the sand with his finger, and he afterwards uses palm leaves. After being thus initiated in the rudiments of literature, he enters on the course of his professional study, in which he has no choice, every one following the profession of his father. A student is instructed chiefly in the Vedas, and in the ceremonial of his religion; and his course of discipline in the three Vedas may be continued for thirty-six years, in the house of his preceptor, or for a half or quarter of that time, until he comprehend them. To the state of the student succeeds that of the married man or the housekeeper, when the youth begins to sustain his part in the business of life. He may, however, continue his whole life a pupil, waiting upon and serving his preceptor the Brahmin until his death. By this devotion to him he acquires a title to the highest rewards of religion. Of the common people, a few individuals only are taught to read or write. The great body of the people remain in ignorance. They can explain nothing of their own religious system, nor of the ceremonies which they attend. This gross and universal ignorance, whilst it is the parent of crime, exposes the Hindus to all the artifices of priestcraft, and of every quack who pretends to skill in any art or science whatever. The unbounded influence of the priests is highly inexpedient, and has in some instances been found dangerous to the public peace. On one memorable occasion, as related by Bishop Heber, this influence became a political engine, which was wielded with great effect, to the alarm of the local government. Among other superstitions of the Hindus, it is well known that they inflict evils on themselves or others, even to the sacrifice of their lives, under the idea that they will be avenged on their enemies. One of these practices is to sit "dhurna," or mourning, in a fixed posture, without food, and exposed to the weather, until the person against whom the religious rite is directed agrees to give redress. It is firmly believed, that if the person dies in this mourning state, his avenging spirit will ever afterwards haunt and torment him whose obstinacy may have occasioned his death. The Hindus resort to this practice in order to enforce payment of a debt, or forgiveness of one; and it is a notion amongst them, that whilst an aggrieved person sits at their door "dhurna," they can neither eat nor undertake any business. Brahmins are even sometimes hired to sit *dhurna*, and their sacred character is supposed to give a peculiar awe to the ceremony. It was in opposition to an unpopular and heavy tax on houses in the city of Benares, against which they had in vain remonstrated, that the whole population, far and near, resolved to sit "dhurna" till it was repealed. On this occasion the leading Brahmins took their measures with surprising concert and unanimity. Handbills were circulated explaining the causes and necessity of the measures, "calling on all lovers of their country and national creed to join in it, and commanding, under many bitter curses, every person who received it to forward it to his next neighbour. Accordingly," adds Bishop Heber, "it flew over the country like the fiery cross in the Lady of the Lake; and, three days after it was issued, and before government was in the least apprised of the plan, above 300,000 persons, as it is said, deserted their houses, shut up their shops, suspended the labour of their farms, forbore to light fires or dress victuals, many of them even to eat, and sat down with folded arms and drooping heads, like so many sheep, on the plain which surrounds Benares." There was every reason to dread some violent issue to such an extraordinary transaction. The local government, exceedingly perplexed by so strange and vast an assemblage, acted with consummate prudence; and this motley multitude being let alone, gradually dispersed. The rulers of India, thus admonished, were fain to repeal the obnoxious tax. The ignorance of the great body of the Hindus exposes them to impositions of every description. In the medical art, charms, incantations, exorcisms, and the shallowest tricks, are substituted for professional skill; and other impostors, generally Brahmins, practise astrology, and cheat them out of their money by pretended prophecies, from the aspect of the skies. The belief of sorcery and witchcraft is universally prevalent amongst them, and leads, as it formerly did in our own country, to cruel enormities. Persons suspected of witchcraft are the objects of fear and hatred; and their neighbours often assume the right of trying them for this crime, by charms and incantations, such as planting a branch of the saul tree in water, with the name of the suspected person, and if it wither within a certain time, the evidence against the accused is considered conclusive.

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[1] Orme *On the Government and People of Industan*, p. 431.

[2] Rickards' *India*, p. 3.

[3] Tennant, *Indian Recreations*.

The Hindu is distinguished by the slenderness and delicacy of his corporeal frame, which is partly the cause of his peculiar timidity. His make, his physiognomy, and his small degree of muscular strength, convey a remarkable idea of effeminacy, especially when contrasted with the robust stature of a European who is making the observation. "The sailor," says Orme, "no sooner lands on the coast, than nature dictates to him the full result of this comparison. He brandishes his stick in sport, and puts fifty Indians to flight in a moment." The Indian, however, greatly surpasses the European in the sensibility of his touch, and in the flexibility of his limbs; and hence, with tools which would scarcely enable the clumsy fingers of the one to make a piece of canvass, he weaves the finest cambrics; and in all feats and contortions of the body, in the art of tumbling, and in juggling tricks, the Hindus excel all other nations. They are also patient of bodily fatigue, and in running or marching will distance more robust competitors. An Indian messenger will travel on foot fifty miles a day for twenty or thirty days without intermission. They are withal remarkable for bodily inertness, and the love of repose. "It is more happy," they say, "to be seated than to walk; it is more happy to sleep than to be awake; but the happiest of all is death." Their amusements are accordingly all of the sedentary kind. A game which resembles chess and draughts, though without either the variety or interest of the former, is one of their favourite amusements; and, like all rude nations, they are passionately fond of gaming, though it is contrary to the Gentoo code; also of feats of agility and legerdemain; and a juggler who erects a stage in any part of the East is sure to draw a crowd of spectators. Buffoonery, story-telling, music, consisting of simple melodies, and dancing, which they enjoy as spectators, complete the catalogue of Hindu amusements. Their extreme fondness for hunting forms an exception to their general indolence; all the different races in India, Europeans, Moguls, and Hindus, shaking off their natural supineness, are seen to concur in the ardour of the chase. Hawking is also keenly pursued by natives of distinction. Besides falconers, fowlers, and game-keepers, Hindus of rank employ persons to ensnare wild animals; and the contrivances they resort to are not less ingenious than successful.

Many have given credit to the Hindus for cleanly habits, from their frequent ablutions; but the reverse is the case. A taste for cleanliness is a proof of refinement; it is a sure mark of a highly civilized people; and accordingly it is not to be found in any part of Asia. Almost all the Asiatic cities are distinguished by narrow streets, into which, as there are no police regulations, all sorts of filth are indiscriminately thrown. The Hindus form no exception to this general censure. In all the great towns the streets are filthy. Nor are the Hindus more cleanly in their persons. Their linen, being dyed, is seldom washed; and, like the Chinese, they frequently allow their robes to drop off with filth before they think of changing them.

Government.

A simple and despotic monarchy is the only form of government which was established under the native princes of Hindustan; and it was a despotism in the true Asiatic sense of the word, under which neither laws nor manners restrained the excesses of absolute power. In the most despotic states of Europe, the authority of the monarch is controlled by the influence of manners, and life and property are perfectly secure. But this was far from being the case in India; the sovereign was supreme arbiter of the lives and properties of all his subjects. Nor was this power allowed to lie dormant; it was frequently enforced in cruel and arbitrary acts; and the annals of India are accordingly stained with the most revolting outrages of abused power. Wealth presented too tempting a prize to lawless violence; and its possessor, if he neglected to make large and seasonable presents, was sure to be accused of some pretended crime, thrown into a dungeon, and plundered. "Instead of giving him poison," says Orme, in his just estimate of the people and government of Hindustan, "which would not answer the end proposed, as his treasures are buried, he is beset with spies, who watch his minutest actions, and probably propose to him a commerce with the enemies of the province. If he avoid these snares, a profitable post in the government is proposed to him, which, if he accepts, his ruin is at hand, as the slightest of the villanies practised in every branch of it affords grounds for making him a public criminal. Should he have escaped this too, it remains that some more glaring and desperate measure of iniquitous justice hurry him to destruction." Mr Orme then proceeds to mention the case of a wealthy banking-house, the partners of which were personally known to him, who, having dexterously avoided all the snares laid for their property and life, were at length involved in an accusation by the accident of one of the dead bodies which are continually floating on the Ganges being thrown ashore under the walls of their house, on which it was surrounded by the officers of the civil magistrate, who dragged them to prison as the murderers of a son of Mahommed, and having ordered them to be severely scourged, extorted from them as the price of their liberty a present of 50,000 rupees. Another wealthy individual was forced to give in one present, to the nabob of Bengal, a sum equal to three hundred thousand pounds sterling.[1] Bishop Heber relates of the Rannee, or princess of Jeepoor, that she murdered a female attendant, a woman of character, and possessed of considerable wealth, who was believed, until that time, to stand high in her mistress's confidence. Eight other women of the Zenana believed themselves marked out for destruction. Another princess, who possessed a jaghire or landed estate near Meerut, frequently ordered the ears or noses of her attendants to be cut off for slight offences; and one of her dancing girls was imprisoned under ground, and starved to death, she herself keeping watch until she heard the last faint moans of her expiring victim.[2] Such enormities present a dreadful picture of Indian despotism, and fully bear out Mr Orme in his contrast between the manners of Europe under the influence of Christianity, and those of Hindustan, under which poisonings, treachery, and assassinations, are daily committed by the votaries of ambition, as are rapines, cruelty, and extortions, by the ministers of justice.

From the great extent of the Mogul empire, the influence of the supreme power was but feebly felt in its distant parts, and the kingdom was accordingly divided into distinct provinces, in which deputies or viceroys, called nabobs, ruled with delegated power. Those provinces were again subdivided into districts, which were committed to the subordinate administration of rajahs. These districts might consist of one town and its territory, or of a thousand towns; and hence the Hindu system of provincial government comprehended different degrees of princely dignity and dominion, according to the extent and value of the lands that were assigned. But all these various rulers, though each was amenable to the one above him, exercised supreme and despotic sway within their own districts. There was also a special rank of princes called subahdars, who ruled in the extremities of the kingdom, in which the rigour of the supreme authority was weakened by distance, with higher rank and greater powers than the rajahs. The Deccan was under the administration of a subahdar, as was also the extensive and distant province of Bengal. The absolute power of the Great Mogul descended without any loss of vigour to all its inferior delegates; and in this manner the whole of the country groaned under the dominion of numerous tyrants. From this extensive delegation of the superior power, it happened, that on the decay of the Mogul empire, the provincial rulers gradually acquired independence, and, in their warfare with each other for dominion, filled the country with rapine and bloodshed. "Hindustan," says Major Rennell, "even under the Moguls, may be considered as a collection of tributary kingdoms, each accustomed to look no farther than its own particular viceroy, and of course ever in a state to rebel, when the imbecility of the emperor, and the ambition of the viceroy, formed a favourable conjuncture;" and accordingly he observes that "rebellions, massacres, and barbarous conquests, make up the history of this fair country, which, to an ordinary observer, seems destined to be the paradise of the world."[3] And to the same purpose Orme remarks: "If the subjects of a despotic power are everywhere miserable, the miseries of the people of Hindustan are multiplied by the incapacity of the power to control the vast extent of its dominion; and thus," he adds, "the contumacy of vicegerents resisting their sovereigns, or battling among themselves, is continually productive of such scenes of bloodshed, and of such deplorable devastations, as no other nation in the universe is subject to."[4]

In the Mogul sovereign was vested the whole administration of the state, the executive as well as the legislative and judicial powers. In his executive duties the law assigned him a council of state, the functions of which generally devolved on some favourite minister. His legislative duties were simple, seeing that religion was the law, and that the sacred ordinances constituted the judicial code, which it would be impiety to alter. The Brahmins being the sole interpreters of the holy books, acted as assessors to the nabob or rajah, or his delegates in the judicial office. The mode of administering justice had an appearance of openness and fairness, and the forms of the court were extremely simple. The seat of justice was exposed in a large area, capable of containing the multitude; and here justice was administered by the duan or judge, in the absence of the nabob; the plaintiff having attracted attention by his importunate clamours, was ordered to be silent, and to advance before the judge, to whom, after having prostrated himself, he told his story in the plainest manner. He visited the judge in private, gave the jar of oil, and his adversary bestowed the hog, which broke it; the friends who had influence interceded, but it was the largest bribe that ultimately gained the cause. The forms of justice were no doubt preserved; witnesses were heard, but browbeaten, and removed if their evidence did not please the judge. "Proofs of writing," says Orme, "are produced; but deemed forgeries and rejected, until the way is cleared for a decision, which becomes totally or partially favourable, in proportion to the methods which have been used to render it such; but still with some attention to the consequences of a judgment which would be of too flagrant iniquity not to produce universal detestation and resentment." In Hindustan, accordingly, the judicial tribunals afforded no refuge to the oppressed; they were rather instruments of tyranny, by which the unhappy people were plundered under the forms of law. Avarice is the reigning vice of Hindustan, and power afforded all public functionaries the means of its gratification. The havildar, the head of a village, called his habitation the durbar, and plundered of their meal and roots the wretches within his jurisdiction; the zemindar fleeced him of the small pittance of silver which his penurious tyranny had scraped together; the phoosdar, or military commandant of the province, seized on the zemindar's collections, and bribed the nabob's connivance in his villanies by a share of the spoil; the covetous eye of the nabob ranged over his dominions for prey, and employed the plunder of his subjects in bribing or in resisting his superiors. "Subject to such oppressions," says Orme, "property in Hindustan is seldom seen to descend to the third generation." It is not therefore surprising that the Hindus prefer English courts of law to those with which they were cursed while under the rule of their native princes.

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[1] Orme *On the Government and People of Indostan*, p. 450.

[2] Heber, vol. ii. p. 278, 279.

[3] Rennell, *Memoir of a Map of Hindustan*, p. xlix.

[4] Orme *On the Government and People of Indostan*, p. 309.

Taxation. This important subject will perhaps be more properly considered when we come to treat of the political transactions of the British in India, and of their administration of the revenues of the Mogul empire. In the mean time it may be observed, that those revenues chiefly arose from a tax on the land, imposed by the sovereign, or from a share in its produce, which, according to some, he received as proprietor of the soil. The tax was immediately paid into the imperial treasury by the zemindar, who collected it from a variety of under tenants, holding by peculiar tenures, which will be afterwards more particularly considered. The proportion of the crop claimed by the government varied, according to the fertility of the land, from a sixth to a twelfth part; and being ascertained by the proper officers, it was either paid in kind or in money. Custom-duties were levied on imports by sea, and by land on the transit of goods at the different toll-bars in the country. These were sometimes farmed out by the local authorities. Other taxes are enumerated in the sacred books, on mercantile profits, on which was levied a fiftieth, or even a twentieth part; on the accumulation of property in gold, silver, precious stones, cattle; on the purchases and sales of merchants; and on mechanics and serving-men, who were liable for a contribution of labour at the rate of a day in each month. A trifling poll-tax was imposed on the meaner inhabitants. Exclusive rights of manufacture, and trade in certain articles, such as salt, arrack, betel-nut, and tobacco, were also granted to the inhabitants for an annual payment.[1] The Hindu rulers, however ignorant in other matters, thus appear to have been familiar with all the most approved modes of plundering their subjects; and these failing, they had recourse to open violence. It is mentioned by Mr Rickards, whose views of Indian manners seem to be equally judicious and accurate, that those revenue systems of India never were, "because they never could be, literally enforced, the real practice being to exact and plunder, without any fixed rules, all that could be squeezed out of defenceless subjects." After enumerating the various revenue officers who acted under the sovereign, such as nabobs, dewars, foujedars, amildars, tehsildars, jaghiredars, zemindars, polygars, talookdars, rajahs, naiks, wadeyars, &c., he adds, "swarms of harpies were thus spread in every direction, even to the mundils and potails of villages; and despotism established, as it were, in detail, in every corner of the land. Power was here a license to plunder and oppress. The rod of the oppressor was literally omnipresent; neither persons nor property were secure against its persevering and vexatious intrusions. The common transactions of life became objects of punishment or extortion. And no other principles being known or dreamt of in India than arbitrary power on the one hand, and abject submission on the other, a state of society was fixed and rooted in the manners, the poverty, and the ignorance of the people, of which no parallel nor resemblance is anywhere to be found in European states."[2]

Hindu laws. The laws of the Hindus which apply to property, and which regulate sales or purchases, loans, transfers, and deposits of goods, though they are founded on the principles of justice, are frequently rude, loosely expressed, and such as, along with a corrupt judicature, must leave every thing to the discretion of the judge. The law fixes the price of commodities, regulates the interest on money, and on the loan of goods, such as grain, fruit, &c.; and, by a peculiar injustice, imposes a greater interest on the servile castes than on the Brahmins and soldiers. The modes of enforcing debts are the same as in all other countries. The creditor may seize upon the property or person of his debtor, whom he may beat or otherwise maltreat, and, if he be of an inferior caste, compel to labour for his profit. He may even confine his wife or children. Another mode of enforcing payment is by sitting dhurna, a ceremony already explained. The laws of inheritance form an important branch of the Hindu code, though it is justly remarked,[3] that "the slavery to which the rights of parent and husband subject the female, abolishes at once all suits of dowries, divorces, jointures, and settlements." On the death of the father, his property is divided amongst his children, who frequently live together, with the elder brother as their head. If they separate, the eldest receives one twentieth more than the others. Science and good conduct are mentioned as grounds of preference, as vice of exclusion; and thus is laid the foundation of endless disputes. In some cases the gross and cruel superstition of the Hindus subverts the principles of justice; the blind, the deaf, the dumb, or those affected with leprosy, or any other incurable disease, being deprived of their share in the paternal inheritance. Children of different castes inherit according to the rank of the mother, and those of concubines receive only half the share of legitimate children. Until the practice was legalized by the British government, the Hindus had no idea of devising by will; nor were any members of the family at liberty to alienate, except in certain particular cases, any part of the common stock.

The criminal code of the Hindus, though no longer in operation except in some few states, governed by Hindu princes, merits a brief notice. The offences of the low-born tribes against the higher receive a full measure of vengeance, whilst the latter are but slightly punished for the injuries which they inflict on their inferiors. It is enacted, that if a Sudra strike a Brahmin with hand or foot, the offending member shall be cut off; if he insult him with his tongue, it shall be slit, or a red-hot iron shall be thrust into his mouth. Murder is punished with death, theft with fine, and the more heinous cases with various degrees of mutilation, with impaling, burning alive, and crucifixion. The multifarious cases of offence which are detailed in the Hindu code, such as throwing ordure, or the refuse of victuals, on another, spitting upon him, &c., are many of them insignificant, and scarcely merit the minute enumeration which is given. The illicit intercourse of the sexes is a complicated subject, into the details of which it is unnecessary to enter. It seems principally directed against the want of chastity in women, which is punished as the most shocking of crimes, by burning on a heated plate of iron; or against the lower tribes, in whom adultery with a Brahmin woman is considered as the climax of human depravity, scarcely to be avenged by any punishment, however dreadful. On the other hand, crimes committed by the higher classes against the lower are very slightly punished; the scale of punishment being in all cases graduated in an inverse ratio to the rank of the offenders.

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[1] See *Fifth Report of Committee of the House of Commons*, 1810, p. 83.

[2] *India, or Facts submitted to demonstrate the Character and Condition of the Native Inhabitants*, by R. Rickards, Esq. p. 255.

[3] Orme *On the Government and People of Indostan.*

Architecture.

In architecture, in the fine arts, in painting and music, the Hindus are greatly inferior to the Europeans. The pagodas, the tombs, and other structures, the only remaining specimens of their architecture, are, according to some, more remarkable for the magnitude of their dimensions than for their just proportions or fine taste. "The columns and pillars," says Tennant, "which adorn their immense pagodas, are destitute of any fixed proportions; and the edifices themselves are subjected to no rules of architecture." He afterwards adds, that the celebrated mausoleum at Agra has little to boast of either in simplicity or elegance of design. "The immensity of its size, its costly ornaments, and the minute exactness of its decorations in particular parts, are worthy of notice; but they afford much stronger proofs of the wealth and magnificence of Shah Jehan, than the correctness of its taste." The tombs and religious edifices of Hindustan are, on the other hand, highly commended by Bishop Heber for delicacy, beauty, and taste. The mausoleum at Agra he celebrates as the most splendid building, in its way, that he had seen in India.[1] Humaion's tomb at Delhi he also praises as a noble building of granite, inlaid with marble, and in a very chaste and simple style of Gothic architecture; and of the imanbara or cathedral at Lucknow he remarks, "The whole is in a very noble style of eastern Gothic, and, when taken in conjunction with the Roumi Durwazu which adjoins it, I have never seen an architectural view which pleased me more, from its richness and variety, as well as the proportions and general good taste of its principal features."[2] There seems no doubt, from the splendid structures that are still found in different parts of Hindustan, that architecture and the kindred arts had flourished amongst the Hindus of a remoter age; though it is mentioned by Colonel Todd, that very few good specimens of the art have been executed within the last 700 years. His description, however, of the splendid Jain temples at Ajmeer and other parts, some of them erected long prior to the Christian era, and distinguished alike by chasteness and beauty of design, and by rich and exquisite finishing, must convince the most incredulous, that in these remote times the arts had made great progress in Hindustan. These structures are not merely monuments of labour, but of taste; they evince the perfection of art; and in symmetry, beauty of proportion, unity of design, and splendid ornament, they rival the noblest productions of classical Europe. The history of the people who have raised these structures presents a wide field for antiquarian research, on which Colonel Todd has entered with the brilliant promise of interesting results; and to his learned inquiries and eloquent and poetical descriptions we refer for a further account of those ancient monuments of Hindu art.[3]

Painting.

Of the Hindu paintings the chief merit is brilliancy of colour, rather than taste in the design or liveliness of expression. They imitate most exactly, and are excellent draughtsmen; and they draw specimens of natural history with much neatness and accuracy. "The laborious exactness with which they imitate every feather of a bird," says Tennant, "or the smallest fibre on the leaf of a plant, renders them valuable assistants in this department; but farther than this they cannot advance one step. If your bird is to be placed on a rock or upon the branch of a tree, the draughtsman is at a stand; the object is not before him, and he can supply nothing.[4] Since this period, however, the Hindus have made great advances in the art of painting; and some of their portraits display taste and expression that would not discredit European artists.

Music.

The music of the Hindus is rude and inharmonious. They have numerous instruments, but those are preferred which make most noise; the beating of the great drum is reckoned an emblem of sovereign power.

Literature.

The literature of the Hindus has been generally rated very low by European writers, and has been represented as consisting in long desultory poems, inflated and extravagant in their style, containing, under the idea of a history, a tissue of absurd fables, interspersed with passages or episodes that are tender and passionate, and possess all the sweetness of pastoral poetry. They are said to be totally destitute of historical annals, and their geography is a mass of errors. Nor has their astronomy those claims to antiquity which were at first allowed. Accurate inquiry has proved this science to be in its infancy amongst them.[5] The want of historical records by the Hindus is strongly denied by Colonel Todd, who has himself composed a history of the Rajpoots from native works, which he found in the libraries of their princes, and he asserts that in those depositories of Hindu literature many more works exist, which would reward the researches of the learned. "The works of the native bards," he observes, "afford many valuable data in facts, incidents, religious opinions, and traits of manners." "In the heroic history of Pirthi-raj, by Chund," he adds, "there occur many geographical as well as historical details, in the description of his sovereign's wars, of which the bard was an eye-witness, having been his friend, his herald, his ambassador, and finally discharging the melancholy office of accessory to his death, that he might save him from dishonour." The Brahminical accounts of the endowments of temples, of their dilapidation and repairs, supply historical and chronological details; also the legends respecting places of pilgrimage and religious resort. Much historical information lies hid in the controversial records of the Jains; and, says Colonel Todd, "those different records, works of mixed historical and geographical character, which I know to exist, *rasahs* or poetical legends of princes, which are common, local *puranas*, religious comments and traditionary couplets, with authorities of less dubious character, namely, inscriptions cut on rocks, coins, copperplate grants, containing charters of immunities, and expressing many singular features of civil government, constitute, as I have already observed, no despicable materials for the historian." Colonel Todd is of opinion that the ancient records of the Hindus are more complete than the early annals of the European states.

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[1] The following is his description of this monument of Hindu art:—"It stands in a square area of about forty English acres, enclosed by an embattled wall, with octagonal towers at the angles, surmounted by open pavilions, and four very noble gateways of red granite, the principal of which is inlaid with white marble, and has four high marble minarets. The space within is planted with trees, and divided into green alleys, leading to the central building, which is a sort of solid pyramid, surrounded externally with cloisters, galleries, and domes, diminishing gradually in ascending it, till it ends in a square platform of white marble, surrounded by most elaborate lattice-work of the same material, in the centre of which is a small altar tomb, also of white marble, carved with a delicacy and beauty which do full justice to the material, and to the graceful forms of Arabic characters, which form the chief ornament."

[2] Heber, vol. ii. p. 65.

[3] *Annals of Rajast'han*, vol. i. chap. xxv. p. 670; chap. xxx. p. 779.

[4] Tennant, vol. i. p. 299.

[5] For more full details on this subject, the reader is referred to Mill's *History of British India*, vol. ii. p. 85, *et seqq.*

History.

Prior to Alexander's expedition into India, which took place 327 years before the Christian era, the Greeks appear to have known little of these eastern countries, except from the confused accounts of travellers; and nothing whatever of the countries beyond the sandy desert of the Indus, which, with its tributary streams, was the limit of Alexander's progress eastward. The men of science who accompanied this warlike prince brought to Europe full and accurate accounts of the countries which he had conquered; and the spirit of inquiry, now awakened amongst the Greeks, was still further gratified by the ample accounts of Megasthenes, the ambassador sent to India by Seleucus, and who resided long at Palibothra, the capital of the Prasii, near the mouth of the Ganges. The Greek writers, drawing their information from those sources, describe the leading features of Indian society and manners, and with an accuracy which stamps authenticity on their narratives. It is unnecessary to dwell upon the particulars of Alexander's expedition, which are fully described in many other works; and from that until the period of the Mahommedan conquest, when the native records commence, there is nearly a complete chasm in the annals of Hindustan. The Hindus had either no records, or these had been destroyed during the intestine commotions which have always prevailed in India. The historical poem, the Mahabarat, is a tissue of extravagant fables. Ferishta's history, written early in the seventeenth century, is supposed to have been collected from Persian authors; and the most valuable part of it begins after the commencement of the Mahommedan conquests. It was about the year 1000 that Hindustan, formerly ruled by a pure Hindu monarchy, fell under the sway of the Mahommedan conquerors, who subdued all the provinces west of the Ganges, and formed them into one great empire. On the fall of this empire, India became one scene of commotion and war, and her finest provinces were laid waste. It was then that the Mahratta empire arose, like a meteor in the political sky, blazing for a while, and soon fading into obscurity; and by its fall paving the way for the ascendency of the British, whose powerful sway now extends from the Himalaya Mountains to Cape Comorin. We shall endeavour to sketch the leading and most eventful scenes of that political drama, which has thus terminated in the subjection of all India to one great ruling power.

Conquest by the Mahommedans.

The Mahommedan powers having subdued Persia and the neighbouring countries, made occasional inroads into India; and, about A. D. 1000, Mahmoud entered Hindustan, in which he effected a permanent establishment. This prince was the grandson of Subuctagi, the ruler of Ghizni, consisting of the tract which composed the kingdom of Bactria after the division of Alexander's empire, namely, the countries lying between Parthia and the Indus, and south of the Oxus. He invaded India twelve several times, massacring in his intolerant rage the Hindus as infidels, and defacing and destroying their temples. "Nothing," observes Major Rennell, with his usual force, "offends our feelings more than the progress of destruction, urged on by religious zeal, as it allows men to suppose themselves agents of the divinity, thereby removing those checks which interfere with the perpetration of ordinary villany, and thus makes conscience a party where she was meant to be a judge." The last invasion of India by Mahmoud was in 1024, and in four years afterwards he died. His dominions comprehended the eastern provinces of Persia, nominally all the Indian provinces westward of the Ganges, to the peninsula of Gujerat, and from the Indus to the mountains of Ajmere. The Punjab, or the tract watered by the Indus, and its five tributary rivers, was all that was subjected to the regular government of the Mahommedans. The rajpoots of Ajmere defended their rugged mountains and close valleys with obstinate valour. The Ghiznian empire was in the year 1158 divided into two; the western portion being seized on by the family of the Gaurides (so denominated from Gaur or Ghir, a province or city lying beyond the Indian Caucasus), whilst the countries on the Indus were possessed by Chusero or Cusroe, who fixed the seat of his empire at Lahore. The Mahommedans now extended their conquests eastward; and Mahommed Gori, in 1194, took the city of Benares, which he abandoned to pillage. He carried his arms to the south of the river Jumna, and took the fortress of Gualior; he also reduced the eastern frontier of Ajmere. He was succeeded in 1205 by Cuttub, who fixed his capital at Delhi, and founded in Hindustan the dynasty of the Patans or the Afghans, who inhabited the mountainous tract situated between India and Persia. The Emperor Altmush succeeded him in 1210, and extended his conquests over Bengal. In his reign the renowned Ghenghiz Khan subdued the western empire of Ghizni; and the Moguls, or the Monguls, his successors, about the year 1242, made frequent irruptions into the north-western provinces of Hindustan. The country was in the mean time a scene of intestine commotion, from the contests of rebellious chiefs aspiring to supreme authority, and from the irruptions of the predatory hill tribes into the plains below. In 1265, about 100,000 of these plunderers were put to the sword, and a line of forts constructed along the foot of the hills. In the mean time, the Patan monarchs of Delhi were prosecuting their conquests eastward, and the Moguls were making incursions into the western provinces; and a considerable number of them under Ferose II. were at length permitted to settle in the country in the year 1292. In 1293 this emperor invaded the Deccan, or the country lying to the south of the Nerbuddah and the Cuttack rivers. He was deposed and murdered by Alla, the governor of Gurrah, who advised the expedition, and who extended his conquests in the Deccan. Cafoor, one of his generals, penetrated into the Carnatic, or the peninsula lying to the south of the Kistna river, in 1310. Rebellions breaking out in Tellingana, a principality in the Deccan, it was again subjugated in 1322 and in 1326, in which year Alla died, and the Carnatic was ravaged from sea to sea. Under a succeeding emperor, Mahommed III., the Mahommedans were driven from the Deccan and Bengal, and lost much territory in Gujerat and the Punjab. Ferose III., who succeeded, was more intent on domestic improvement, and in constructing canals, than on foreign conquest. He died in 1388, and Mahmoud III. succeeded, during whose minority great confusion ensued; and in 1398 the country was invaded by Tamerlane, who advanced to Delhi, which submitted without a struggle, and was abandoned to the fury of the soldiery, who continued for several days to massacre the defenceless inhabitants. The military irruption of Tamerlane into Hindustan was more for the sake of plunder than of conquest, though it added to the existing anarchy of the country. In 1413 Mahmoud died, and with him ended the Patan dynasty, founded by Cuttub in 1205. A period of great confusion followed, and numerous competitors contended for dominion. This state of anarchy, which came to a height under Ibrahim II. in 1516, paved the way for the conquest of Hindustan by Sultan Baber, a descendant of Tamerlane and of Ghenghiz Khan, who reigned over a kingdom composed generally of the provinces situated between the Indus and Samercand. Being dispossessed of the northern portion of his dominions by the Usbecks, he invaded India, and in 1525 defeated the emperor of Delhi, and conquered the north-eastern provinces of India. He was succeeded, after a reign of five years, by his son Humaioon, who was driven from his throne by the rebellion of Sheer Khan, whose successful usurpation was succeeded by such a period of disorder, five sovereigns having appeared on the throne in the course of nine years, that Humaioon was recalled in 1554, and died the following year, leaving his son, the celebrated Acbar, only fourteen years of age, the heir to the throne. His was a long and glorious reign of fifty-one years, in which the revolted provinces were reduced from Ajmere to Bengal, and consolidated into one empire by the unlimited toleration of the Hindus and all others, and generally by a just and wise policy. In 1585 and the subsequent years he invaded the Deccan, which, by the dissolution of the Bahmenee empire, was divided among the sovereigns of Bejapoor, Ahmednagur, and Golconda, whilst another army was reducing the country of Cashmere in an opposite direction. At the time of Acbar's death in 1605, he had possession of the western part of Berar, Candeish, Tellingana, a division of Golconda, and the northern part of Ahmednagur, the capital of which was taken in 1601, after a long and bloody siege, and an unsuccessful attempt to relieve the place by the confederated princes of the Deccan.[1] Acbar died in 1605, at which time his empire was divided into fifteen viceroyalties, called subahs; namely, Allahabad, Agra, Oude, Ajmere, Gujerat, Bahar, Bengal, Delhi, Cabul, Lahore, Moultan, Malwah, Berar, Candeish, and Ahmednagur. He was succeeded by his son Selim, under the title of Jehanguire. It was in his reign, in 1615, that Sir Thomas Roe, the first English ambassador, was sent to the Mogul emperor of Hindustan; and the Portuguese had by this time acquired considerable settlements in Bengal and Gujerat. Shah Jehan, who disturbed his father's reign by constant rebellions, succeeded to the throne in 1627, and pursued his conquests in the Deccan with renewed vigour, filling the country with plunder and devastation. It was in this reign, in the year 1633, that the first serious quarrel took place between the Portuguese and the Moguls, when the former were expelled from Hooghly on the Ganges. In 1658 the country was again distracted by the civil wars of the emperor and his sons, and of the sons amongst themselves contending for dominion. Shah Jehan died on the 21st of January 1666, after being seven years confined in the castle of Agra. The Mogul empire at his death extended from Cabul to the Nerbuddah, westward of this river to the Indus, and eastward it comprehended Bengal and Orissa; and to the south the Moguls had reduced a large tract of country bounded by Berar on the east, westward by the hills towards Concan, and by the dominions of Golconda and Bejapore to the south. These convulsions, by which India was at this time distracted, ended in the elevation to the throne of the renowned Aurungzebe, the youngest son of Shah Jehan, whom he had deposed; he had also murdered or expelled his three brothers. In 1660, Aurungzebe, who took the title of Allumgere, or Conqueror of the World, was firmly seated on the throne; and from that period until the year 1678, Hindustan enjoyed more profound peace than it had ever before known. In the mean time Aurungzebe invaded the Deccan, which during the latter part of his reign was, with the exception of a few mountainous tracts, subdued by his victorious arms, and rendered tributary to the ruler of Delhi. He was afterwards engaged, in 1678, in quelling the rebellion of the Patans beyond the Indus, and the Rajpoot tribes, by whom he was hemmed in amongst the mountains, and narrowly escaped. He again invaded the country in 1681, and took and destroyed Cheitore, the capital, and all the objects of Hindu worship found there. The obstinate resistance of these gallant mountaineers at last extorted peace from the mighty monarch of the Mogul empire.

Reign of Acbar;

of Aurungzebe.

Progress of the Mahrattas.

But Aurungzebe had now to contend with another enemy for the dominion of India. In the south the Mahratta power was fast rising into importance. Sevajee, the founder of this new state, was a military chief, the illegitimate son of the rana of Odeypoor, the chief of the Rajpoot princes. In his youth he resided at Poonah, on a zemindary estate obtained by his father. Here he collected around him a numerous banditti, and plundered the country. The number of his followers gradually increasing, he extended his ravages still farther into the dominions of Bejapore, and acquired an immense booty, which enabled him to increase his force, and openly to resist the troops of Aurungzebe which were sent against him. He expired in his fortress of Raynee, of an inflammation in the chest, at the age of fifty-two, on the 5th of April 1682. His whole reign was one continued scene of war and political intrigue, in which he displayed the talents of a consummate general and an able and crafty statesman. "He met," says Orme, "every emergency of peril, however sudden and extreme, with instant discernment and unshaken fortitude; the ablest of his officers acquiesced in the eminent superiority of his genius, and the boast of the soldier was to have seen Sevajee charging sword in hand."[2] At his death, his empire, with the exception of the small territory of Goa on the south, Bombay, Salsette, and an inconsiderable tract on the north, comprised a tract of country about 400 miles in length and 120 in breadth. He was besides in possession at one time, towards the Eastern Sea, of half the Carnatic. By his own talents he had thus acquired a permanent sovereignty, "established," says Orme, "on a communion of manners, customs, observances, language, and religion, united in common defence against the tyranny of foreign conquerors, from whom they had recovered the land of their own inheritance." Sevajee was succeeded by his son Sambajee, who was afterwards betrayed into the hands of Aurungzebe, and barbarously put to death. Aurungzebe died in 1707, in the ninetieth, or, according to some, the ninety-fourth year of his age, at Ahmednagur, in the Deccan, in the subjugation of which he had been engaged from the year 1678 until his death. He was for the most part engaged in the field during the last fifteen years of his life. Whilst he was absent in the Deccan, the peace of the empire was disturbed by insurrections of the Rajpoots in Upper India, and of the Jauts, now for the first time known in any other character than that of banditti.[3] Under his reign the Mogul empire attained to its height. His dominions extended from the tenth to the thirty-fifth degree of latitude, with nearly as many degrees of longitude; and his annual revenue was equal to thirty-two millions sterling.

Internal disorders.

After the death of Aurungzebe, the sovereignty of the empire was disputed by his four sons, Munzum, Azem, and Kaum Buksh, who severally contended with their elder brother, and Acbar, who thirty years before had been engaged in rebellion, and fled to Persia. Munzum and Azem met in the field with armies of 300,000 men on each side, when the latter was defeated and slain, and Munzum ascended the throne under the title of Bahader Shah. He reigned five years, and the empire had been so distracted by civil wars and anarchy, that it required all his exertions to restore order. He was soon after his accession called into the Deccan by a rebellion of his brother Kaum Buksh, which was quelled by his death. He now turned his arms against the Rajpoots and the Sikhs, who for the first time appeared in arms in the province of Lahore. These insurgents he reduced after much trouble and delay; and he took up his residence at Lahore, where he died in 1712, after a short illness, having never during his reign visited either Agra, or Delhi his capital. He left four sons, who immediately commenced a contest for the throne. Azem Ooshawn, who took possession of the treasures, was killed in a battle with his other brothers. Jehan Shah, the youngest, next lost his life in a battle with Jehamder Shah, who was the eldest, and who successfully disputed the possession of the throne with the remaining brother. At the end of nine months, however, he was dethroned by Feroksere, a son of Azem Ooshawn, and great grandson of Aurungzebe, who was elevated to the throne by the influence of two brothers, Abdoola Khan and Hussun Khan, Seids by birth, or descendants of the prophet, whose talents had raised them to reputation and power. It was in this reign that the English East India Company obtained their famous firman or grant, by which they were exempted from all custom duties on the export and import of their goods. This was considered as the commercial charter of the Company as long as they required protection for their trade. In 1717 Feroksere was deposed and blinded by the two Seids, Hussun and Abdoola, to whom he owed his elevation to the throne. In his place they chose Ruffieh-ul-Dowlat, a son of Bahader Shah; and in less than a year deposed and put him to death. His brother, who by their means was also made king, met with the same treatment; so that in the course of eleven years from the death of Aurungzebe, four princes of his line had ascended the throne, whilst six others had met the usual fate of unsuccessful aspirants to that dignity. Mahommed Shah, the grandson of Bahader Shah, was placed on the throne by the Seids in 1718, from whose influence he contrived at length to free himself, though not without a rebellion and a battle, in which they were both slain. In the mean time Mahommed Shah was deficient in the vigour which his difficult situation required, and the provincial governors at a distance began to show symptoms of independence. Nizam-ul-Muluck, the viceroy of the Deccan, was the most formidable of those pretenders to sovereignty. He had reduced the provinces of Gujerat and Malwah; and having paid a visit to the imperial court, and observed the dissolute administration of affairs, he quitted the capital in disgust, under pretence of a hunting excursion, for his government of the Deccan. He was deprived of the administration of Gujerat and Malwah, the two provinces which he had acquired. In revenge he encouraged the rulers of these provinces to resist the imperial authority; whilst at his instigation also the Mahrattas invaded the country, and after a severe struggle succeeded, about the year 1732, in completely reducing this long-disputed territory.

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[1] Rennell, p. lix.

[2] Orme's *Historical Fragment of the Mogul Empire*, p. 94.

[3] Rennell, *Memoir of a Map of Hindustan*, p. 62.

Invasion of Nadir Shah.

But a more dreadful calamity was now impending over the distracted empire. The sceptre of Persia had been long swayed by a feeble race of monarchs, and the country became an easy prey to the hardy mountaineers of Afghanistan, who in 1722 laid siege to Ispahan, when the feeble Hussun Shah surrendered the crown to the invader. He had a son Thamas, however, who escaped from the general massacre which ensued, and who was joined by many partisans, amongst others by Nadir, the son of a shepherd of Khorassan, who, with his band of followers, soon distinguished himself as a brave and active supporter of the fallen prince. In 1729 he retook Ispahan, and finally, by his talents, raised himself to the throne of Persia in 1736, having put out the eyes of the unfortunate son of the late monarch. Being afterwards engaged in an expedition against the Afghans, he advanced to the frontier of Hindustan, but without any ulterior views of hostility, when a messenger and his escort, whom he had despatched to the emperor at Delhi, were murdered at Jellalabad by the inhabitants; an outrage which being approved by Mahommed Shah, Nadir prepared for revenge. He gave up the offending city to be pillaged by his soldiers; and advancing to Delhi, was met by the imperial troops, who were totally defeated. The views of the conqueror, however, were not hostile, and two crores of rupees would have purchased his retreat from Hindustan. But this amicable arrangement was frustrated by a dispute between Saadut Khan, subahdar of Oude, and the nizam of the Deccan, for the vacant office of Ameer-ul-Omrah, formerly paymaster of the forces. Saadut Khan, the disappointed candidate, persuaded Nadir Shah that the proffered sum was no adequate ransom for Hindustan; on which Nadir advanced to the capital, which opened its gates to receive him; and for two days thereafter the Persian troops observed the most exact discipline. But in the course of the night a rumour was spread that Nadir was killed, on which the inhabitants rose against their invaders, and massacred many of them. Nadir took severe and immediate revenge. He dispersed his irritated soldiers throughout every quarter of the city, with orders to spare neither age nor sex; and in this indiscriminate slaughter 100,000 persons are said to have perished, whilst the city was set on fire in several places. The imperial treasure was plundered; plate, jewels, and specie, were carried off to the incredible amount of thirty-two millions sterling. Rich bankers and others were forced by torture to disclose their hidden wealth, and a heavy contribution of thirty millions was imposed on the city by the relentless conqueror. Nadir Shah departed from Delhi, of which he had held possession thirty-seven days, in the year 1739; and the nizam still retained possession of the whole power of the empire, which he sacrificed to his own views in the Deccan, where he established an independent kingdom. Nadir Shah died in 1747. In the subsequent confusion, the eastern provinces of Persia, and those bordering on India, were formed by Abdalli, one of his generals, into an independent state, which comprised the ancient empire of Ghizni, and was known under the name of the kingdom of the Abdalli. Mahommed Shah died the same year, after a reign of twenty-nine years. Every day had disclosed the growing weakness of the empire, and strong symptoms of its early and entire dissolution. In 1738 Bengal became independent under Aliverdy Khan, and it was soon afterwards invaded by a numerous army of Mahrattas from Poonah and Berar. About the same time the Rohillas, a tribe from the mountains which separate India from Persia, erected an independent state on the Ganges, within eighty miles of Delhi. Mahommed Shah was succeeded by his son Ahmed Shah, and in the reign of the latter the Mogul empire was finally dismembered. A small territory around Delhi was all that remained to the house of Timur, and it was the scene of devastation, massacres, and famine. The last imperial army that ever assembled was defeated in 1749 by the Rohillas. The Jauts founded a state in the province of Agra; the nizam and Aliverdy ruled in Bengal and the Deccan; Oude and Allahabad were each seized by independent chiefs; Malwah was divided between the Poonah Mahrattas and several native princes and zemindars. Ajmere reverted to its ancient lords, the Rajpoot princes. The Mahrattas, who now contended for the dominion of India, possessed, in addition to their share of Malwah, the greatest part of Gujerat, Berar, and Orissa, besides their ancient domains in the Deccan. "The whole country of Hindustan proper," Major Rennell remarks, "was in commotion from one extreme to another, each party fearing the machinations or attacks of the other; so that all regular government was at an end, and villany was practised in every form. Perhaps in the annals of the world it has seldom happened that the bonds of government were so suddenly dissolved, over a portion of country containing at least sixty millions of inhabitants."[1]

Decay of the Mogul empire.

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[1] Rennell's *Memoir of Hindustan*, p. lxx.

In 1753 the Emperor Ahmed Shah was deposed by Gazi, the son of Gazi o'Dien, vizir to Mahommed Shah, who placed on the throne Allumguire II., grandson of Bahader Shah, and invested himself with the office of vizir. His perfidious conduct to the family of the viceroy of the provinces of Moultan and Lahore, under Abdalli, the king of the Afghans, involved the emperor in a quarrel with that powerful prince, who advanced from Candahar to Lahore, and thence to Delhi, the gates of which were opened by the feeble emperor, and the defenceless city abandoned for weeks to a licentious soldiery. After the retreat of the Abdallis, the vizir advanced with an army to Delhi, which he entered after a siege of forty-five days. The Mogul emperor was now reduced to the most abject state of dependence, and was at last assassinated by order of the vizir, who was irritated by his correspondence with the Afghan monarch Abdalli Shah, the Rohillas, and the nabob of Oude, with whom he himself was at war. His son took the title of Shah Aulum; he escaped from Delhi when it was besieged by the vizir, and, after a series of misfortunes, at last surrendered to the British, who gave him an asylum, and a pension for his support; and with him, the last of the Mogul sovereigns who enjoyed independent power, closes for ever the glory of this renowned empire.

Contest between the Mahrattas and the Afghans.

In the mean time, amidst anarchy and desolation, the Mahrattas were daily increasing in power; they were engaged in every scene of politics and warfare, from Gujerat to Bengal, and from Lahore to the Carnatic; they possessed extensive sway and vast armies; and their ambition was now to reconstruct a new Hindu empire out of the decayed fragments of the Mogul power. The rising influence of the Afghans under the rigorous sway of Abdalli was the only obstacle to this patriotic or ambitious scheme; and the Mahrattas, in the progress of their conquests northward, encountered for the first time their great rival for the dominion of India. Ahmed Abdalli, king of the Afghans, was taken prisoner when very young by Nadir Shah; he was first his slave, afterwards his mace-bearer, and at his death, having collected a body of troops and other adventurers, he proceeded to his own country, and proclaimed himself king of the Afghans, with the title of Doordowran, or pearl of the age, which was corrupted into that of Dooranee, and became the name of one of the Afghan tribes. Ahmed had extended his dominion over the frontier provinces of Moultan and Lahore, which, in retiring from India, he had left under the administration of his son. These provinces were first invaded by the Sikhs, and afterwards by the Mahratta generals, who advanced to Lahore and expelled the Abdalli prince, and afterwards extended their conquests to the Indus. Ahmed Shah, roused by the loss of his provinces and the dishonour of his arms, collected his troops, and encountered the Mahratta army, amounting to 80,000 veteran cavalry, which was almost entirely destroyed, and the general Duttah Sindia slain. The news of this defeat spread alarm amongst the Mahrattas, and roused them to the greatest exertions. A vast army, consisting of 140,000 horse, besides a numerous train of camp followers, commanded by the most renowned chiefs, took the field, and being unable to cross the Jumna, still swollen by the rains, proceeded to plunder Delhi, the capital. Ahmed Shah, with 150,000 well-disciplined troops, now advanced, and, in his impatience to meet the enemy, plunged with his whole army into the foaming waves of the Jumna, which he crossed in safety. The Mahrattas, struck by this daring exploit, retired to the plain of Paniput, and the armies continued in sight of each other from the 26th October to the 27th January 1761, during which interval several bloody skirmishes took place. On this latter day was fought the battle of Paniput, one of the most decisive and sanguinary recorded in history. The Mahrattas were overthrown with a dreadful carnage. The general, Bhaow, the nephew of the peshwa, the chief of the Mahratta nation, was killed early in the action; most of the other chiefs were slain, and those of the soldiers who escaped from the slaughter of the field were massacred by the irritated peasantry, in revenge for the depredations of the Mahratta cavalry. And of the mighty host engaged in this fatal conflict, only a small remnant, with three generals, returned to the Deccan. This great battle gave an irreparable blow to the Mahratta power, which from this time sensibly declined, and the victorious Abdalli sought no other fruit of his victory. He returned to his capital after remaining a few months at Delhi, having recognised the grandson of Allumguire as emperor, under the title of Shah Aulum the Second.

Battle of Paniput.

Rise of the European power.

A new scene was now about to open in India. The Europeans, who as traders had long maintained establishments on the coasts, began to assume an entirely different character; to contend with each other in the field for dominion, and to mingle in all the wars and politics of the interior. It was necessary, for carrying on the domestic trade of India, and more especially in providing goods for the supply of Europe, that a body of experienced servants should reside on the spot, in order to collect and to purchase commodities for exportation; an employment which, owing to the poverty and abject state of the natives, and their peculiar customs, involved duties of the most minute and laborious detail. During the decline of the Mogul government, the tranquillity of India was frequently shaken by the contentions of rival chiefs; and the slight security afforded, even in the best times, to commerce, became in this manner more imperfect. For the reception of the goods which it was necessary to collect and store up, that cargoes might always be in readiness for the Company's ships, warehouses were built, which, with the counting-houses, and other apartments for the agents and business of the place, constituted the factories of the Company. These factories contained a valuable store of property, which, in the disordered state of India, it became necessary to secure from the rapacity both of governments and of individuals. They were therefore strongly built and fortified; their inmates were armed and disciplined; and, for better security, regular troops were occasionally maintained in those mercantile garrisons. In these defensive arrangements of the Company we may discern the rudiments of their future empire.

The territorial acquisitions of the European companies were, however, still inconsiderable. The English East India Company had in 1698 been permitted to purchase the zemindaryship of the three towns of Sootanutty, Calcutta, and Govindpore, with their districts, to which was afterwards added a district extending ten miles from Calcutta, on each side of the river Hooghly, containing thirty-seven towns. On the Coromandel coast the English possessed Madras, with a small adjoining territory five miles along the shore, also Fort St David, in 11. 40. north latitude, with other places, such as Vizigapatam and Balasore; and on the west coast their principal settlement was the island of Bombay. Factories were also established at Surat, Tellicherry, and several other places. The business of the Company was managed by the three independent presidencies of Bombay, Madras, and Calcutta. The presidency consisted of a governor and council of nine, twelve, or any greater number of members, as might seem expedient, in a majority of whom all power was vested. The members of the council were not excluded from other more lucrative offices, which were, in general, shared amongst them. These offices were chiefly in the gift of the president, and, by means of his influence, the council were, in a great degree, placed under his control. The governor and council exercised the most ample powers over the servants of the Company; and with regard to all others, they could seize and imprison them, and afterwards send them to England. The powers of martial law were bestowed on them at an early period, for maintaining the discipline of the troops under their orders; and, in 1661, a charter of Charles II. gave them the power of administering civil and criminal justice according to the laws of England.

Pondicherry, with a small appendage of territory, was the principal seat of the French power on the continent of India. It had under its authority three factories, one at Mahé, on the Malabar coast, not far south from Tellicherry; one at Karical, on the Coromandel coast; and one at Chandernagore, on the river Hooghly, in Bengal. The form of government was the same in the French as in the English settlements.

In 1744 France and England, from being auxiliaries, became principals in the war which was then raging in Europe, and the flame soon communicated to their distant colonies. In India the two rival powers were quickly involved in hostilities, which, however, were followed by no important result; and the English settlement of Madras, which had been taken by the French king, was restored at the peace of Aix-la-Chapelle. It was soon after this that the French and English, in supporting the contending claims of the native princes, again came into collision. At the respective settlements of the two Companies, the number of troops assembled during the previous war was greater than was necessary for defence, and the servants of the Companies, with such means at their disposal, now began to meditate schemes of conquest. The intricacies of Indian politics, and the family connexions of the different claimants who contended for power and dominion, need not be described in detail, as it would neither be instructive nor acceptable to the general reader. A brief sketch is all that will be necessary to explain the nature of those transactions which so deeply affected the future condition of India, and the relations of the parties engaged in them.

When Nizam-ul-Mulk was appointed ruler of the Deccan, with the title of subahdar, by the Emperor Aurungzebe, a chief named Sadatullah was nabob of the Carnatic. At his death, his son Doost Ali succeeded him as nabob, which proved displeasing to the nizam, who claimed the right, as delegate of the emperor, to appoint the viceroy of the Carnatic. He accordingly chose, first his general Cojah Abdoolla, and afterwards Anwar ad Dien Khan, known to the English as Anoverdy Khan, to be governor of the Carnatic in 1745. It was between these two families that the contest now began for the government of the Carnatic; Chunda Saheb, a distant relative of the family of Sadatullah, being supported by the French under their aspiring and ambitious governor Dupleix. The death of Nizam-ul-Mulk, in 1748, at the extreme age of 104, occasioned another dispute in the succession to the government of the Deccan, between Nazir Jung, his son, who was supported by the English, and Mirzapha Jung, his grandson by a daughter, who was aided by Chunda Saheb and the French. The latter in 1749, with 40,000 native troops, 400 French, 100 Caffres, and 1800 Sepoys, advanced against Anwar ad Dien. His camp was gallantly stormed by the French troops, he himself was slain, at the age of 107, his eldest son was taken prisoner, and his second son, Mahommed Ali, with the wreck of his army, escaped to Trichinopoly. Nazir Jung, hearing that the nabob of the Carnatic was defeated, collected an army, and summoned Mahommed Ali from Trichinopoly to his aid. He also requested assistance from the English, who sent Major Laurence from Fort St David with 600 Europeans to join his army. When the armies approached each other, D'Auteuil the French commander, being deserted by some of his officers, suddenly retreated to Pondicherry, leaving to their fate Mirzapha Jung, who surrendered to his uncle, and was immediately put in irons, and Chunda Saheb, who followed with his troops to Pondicherry. But the enterprising Dupleix made new exertions, and having again taken the field, he attacked the camp of Nazir Jung, his former ally, who in the confusion was shot through the heart. Mirzapha Jung being now freed from imprisonment, assumed the authority of subahdar. He was afterwards shot dead with an arrow in an action with the rebellious Patan chiefs, and, by the influence of M. Bussy, who commanded the French troops, Salabut Jung, the eldest surviving son of Nizam-ul-Mulk, was raised to the government. After some unsuccessful operations, the English, with their allies, were compelled to take shelter under the walls of Trichinopoly, which was now besieged, though with little effect, by the enemy.

In this indecisive state of affairs at Trichinopoly, it was suggested by Captain Clive, who had already distinguished himself by desperate bravery and great military skill, that it would be advantageous to carry the war into the enemy's country; and being intrusted with the execution of his own bold designs, he began an attack on Arcot, the capital of Chunda Saheb. He had under him 210 Europeans and 500 Sepoys; and so secret and sudden were his motions, that he was master of the enemy's capital ere they were apprised of his march. Here he was soon invested, in the fort which defends the town, by a numerous army, and several practicable breaches being made, an assault took place, which was repulsed with loss; the assailants were finally compelled to raise the siege, and being pursued by Clive, were attacked and totally defeated on the plain of Arani, on the 3d of December 1751. The forts of Tinnery, Conjeveram, and Arani, immediately surrendered to Clive, who returned in triumph to Fort St David. He was soon recalled by the operations of the enemy, who were encouraged by his absence again to take the field. With a very inferior force he adventured on a battle, and by the well-concerted manœuvre of sending round a detachment to fall upon the rear of the enemy, whilst the English charged with the bayonet in front, he obtained a decisive victory, and the hostile army was saved from total ruin only by the darkness of the night. On his return to Fort St David, Clive was superseded in his command by Major Laurence, who detached him with 400 Europeans, a few Mahratta soldiers, and a body of Sepoys, to cut off the enemy's retreat to Pondicherry, in which he was, as usual, completely successful, having made the French commander M. d'Auteuil prisoner, with all his troops. The enemy were now greatly distressed for want of provisions; and Chunda Saheb, deserted by his troops, surrendered to the king of Tanjore, an ally of the English, by whom he was beheaded, in order to prevent all disputes with the Mysorean and Mahratta chiefs about the custody of his person. After the flight of Chunda Saheb, his army was attacked and routed by Major Laurence; and the island of Syringham, where his troops were encamped, was taken, with about 1000 French soldiers, under the command of Mr Law, the son of Law the author of the Mississippi scheme. Notwithstanding these disadvantages, Dupleix was not discouraged. The English resolved to commence the siege of Gingee, which was garrisoned by the French. In this operation they failed. But the French were afterwards defeated in an action near Bahoor, two miles from Fort St David; and the two forts of Coveling and Chingleput were reduced by Captain Clive.

Early in January 1753 the two armies again took the field. The French force consisted of 500 European infantry, sixty horse, 2000 Sepoys, and 4000 Mahrattas, commanded by Morari Row. The English had 700 European infantry, 2000 Sepoys, and 1500 horse belonging to the nabob. The two armies, avoiding a general action, watched each other's movements, when General Laurence was apprised that Captain Dalton, the commandant of Trichinopoly, had only provisions to serve him three weeks. He immediately marched with all his forces to his relief, and being followed by the French, this place became the object of an active contest, from May 1753 till October 1754. We have already stated that the two main points of dispute between the French and English were, first, the succession to the government of the Deccan; and, secondly, to that of the Carnatic; the English, in the first of the disputes, supporting the claims of Nazir Jung, the son of Nizam-ul-Mulk, against Mirzapha Jung, the grandson of the nizam, who was supported by the French. After the death of Nazir Jung, who was killed in the attack of the French upon his camp, Mirzapha Jung succeeded to the subahdarship of the Deccan. He was killed in battle, as already related, by an arrow, when, through the influence of the French commander, M. Bussy, Salabut Jung, the eldest surviving son of Nizam-ul-Mulk, was raised to the vacant throne. But on the death of Nazir Jung, his eldest son Ghazee ad Dien solicited and received from the Mogul the appointment of subahdar of the Deccan; and he appeared at Aurungabad in October 1752, to support his title, at the head of 150,000 troops. The Mahrattas at the same time supported him, and entered the province of Golconda with 100,000 horse. The French general Bussy and Salabut Jung now took the field to meet these armies, with very unequal numbers, when Ghazee ad Dien Khan suddenly died. The Mahratta generals continued the war, but in every encounter they were repulsed with such fearful loss by the French, that they agreed to conclude a peace on the cession of certain frontier districts, to which Salabut Jung willingly agreed.

In the other point in dispute, namely, the government of the Carnatic, the English espoused the cause of Mahommed Ali, the second son of Anwar ad Dien, who was appointed nabob by Nizam-ul-Mulk; and the French supported Chunda Saheb, the heir of the first deputy Sadatullah, appointed also by Nizam-ul-Mulk. On his death they claimed the right of appointment for Salabut Jung, the subahdar, and who, owing his throne to their powerful support, had become a passive tool in their hands. From him M. Bussy had obtained the cession of the four important provinces of Mustaphanagar, Ellore, Rajamundry, and Chicacole, called the Northern Circars. It was in these circumstances that a suspension of arms was agreed upon in October 1754; and on the 26th of December following a provisional treaty was signed at Pondicherry, by which both parties agreed to abstain from interfering in the internal affairs of the country, and to establish their territorial acquisitions on a principle of equality. These terms were entirely in favour of the English, as they left Mahommed Ali nabob of the Carnatic, and obliged the French also to the cession of the four Circars which they had obtained from Salabut Jung. But this treaty was in truth a dead letter; and the moment it was concluded the English, in virtue of their alliance with the nabob, proceeded to reduce to obedience, and to collect the revenues of the districts of Madura and Tinnevelly. Here, however, they encountered the Colleries, a fierce tribe inhabiting the hilly districts, who obstinately contested every inch of ground; so that they got abundance of hard blows, and little money, scarcely enough indeed to pay the expense of this plundering adventure. The English, when they made their first conquests in India, having conceived vast ideas of its wealth, set no bounds to their rapacity; they were eager to revel in the spoil of the country, and it was only stubborn facts and repeated disappointments that at last dispelled their dreams of avarice. The French, after remonstrating in vain against this conduct of the English, proceeded to follow their example, by reducing to obedience and plundering the petty chiefs of the country.

Whilst the two contending armies were maintaining this predatory warfare, the active and enterprising Bussy was in another quarter securing the ascendency of the French; and, whether in the cabinet or in the field, he still signalized his talents as a warrior and a statesman. Salabut Jung, influenced by his courtiers, had induced the French troops to quit his territories, which order Bussy speedily obeyed, and commenced his march. Finding that he was betrayed, and his progress intercepted by hostile chiefs, he skilfully selected a strong position, which he defended till succours arrived from Pondicherry; when the fickle prince again solicited his alliance, and he was restored to still higher influence than before. Salabut Jung, when he had resolved to dismiss the French troops, had applied to the presidency of Madras for a force to supply their place; and this opportunity of extending their influence would have been eagerly embraced by the English, but their power was now threatened in another quarter, by new and unexpected dangers. Bengal now became the great scene of Indian warfare, in which were concentrated all the resources of the English, from every part of their territories. This extensive province, with Orissa and the province of Allahabad and Berar, was governed, towards the latter end of Aurungzebe's reign, by his grandson Azeem Ooshaun, second son of Shah Aulum, who succeeded to the throne. Jaffier Khan was appointed his deputy; and, as frequently happened during the decline of the Mogul empire, from a deputy he became an independent sovereign. Sujah Khan, who was married to the daughter of Jaffier Khan, was appointed his deputy in the government of Orissa. In this elevated station, a distant relative, Mirza Mahommed, who had once been in the service of Azeem Shah, the second son of Aurungzebe, and had since fallen into poverty, resorted to his court for employment, and he was kindly received. He was followed by his two sons Hadgee Ahmed and Mirza Mahommed Ali, who both obtained employment; and, by their respective talents for business and war, they soon acquired favour and influence in the court of Sujah Khan. Jaffier Khan died in 1725, and was succeeded by Sujah Khan, who supplanted Sereffraz Khan, the destined heir. In 1739 he added to his dominions the province of Bahar, and intrusted its administration to Mirza Mahommed Ali, under the title of Aliverdy Khan. In 1739 Sujah Khan died, and was succeeded by his son Sereffraz Khan, who hated Aliverdy Khan and his brother, and took no pains to conceal it. Aliverdy in the mean time obtaining from the imperial court his nomination to the government of Bengal, collected his troops, and having defeated Sereffraz in a battle in which he was slain, he reduced the country to subjection, and governed it with a regard to justice and humanity very unusual in the East. His reign was, however, one continued scene of commotion, from the irruptions of the Mahrattas, who, though they were often vigorously repelled by Aliverdy and his troops, always returned with new vigour to the invasion of the country. Aliverdy died on the 9th of April 1756, at the age of eighty, and was succeeded by his nephew Suraja Dowla, who had all the vices of a regularly educated prince. His first act was to plunder the sister of Aliverdy Khan, who was reputed to possess great wealth; he gave orders to seize the treasurers of her family, one of whom, however, contrived to escape, and found an asylum in Calcutta. Incensed by the protection given to this fugitive, and jealous besides of the designs and growing power of the Europeans, he took the field on the 30th of May 1756, with an army of 40,000 foot, 30,000 horse, and 400 elephants. The factory at Cossimbazar was seized, and its chief, Mr Watts, and his surgeon, who accompanied him, were retained prisoners. Calcutta was invested on the 18th of June. It was feebly defended, and at last a retreat was resolved upon, which was executed so precipitately that numbers were left behind in the fort by the ships and boats. In this trying situation Mr Holwell was chosen commander, who, seeing no chance of a successful defence, proposed a capitulation in a letter which he threw over the ramparts. In the mean time the troops having gained access to the liquor, were so intoxicated as to be incapable of defence, and the enemy entered the fort without resistance. The subahdar appears on this occasion not to have intended any inhumanity to the garrison; and when Mr Holwell was brought into his presence with his hands tied, he ordered them to be loosed, and pledged his honour as a soldier to him and his companions that not a hair of their heads should be touched. But, notwithstanding these assurances, the tragical scene which ensued has no parallel in the annals of human misery. When night approached, it became necessary to secure the prisoners in some place of confinement; and for this purpose the common prison of the garrison was chosen, which was about eighteen feet square, with only two small windows barred with iron. Into this small apartment the garrison, 146 in number, were compelled to enter, by threats of being instantly cut down if they resisted. Their sufferings from want of air were dreadful, and bribes were offered to the guard to obtain a room for them in which they could breathe. But none dared to awake the sleeping tyrant whose prisoners they were; and, after a night of inexpressible horror, only twenty-three out of 146 were found alive in the morning. The presidency of Madras being apprized of these disasters, determined on sending Colonel Clive, who had now returned to India, to Bengal, with as large a force as could be collected; and an armament accordingly sailed from the roads of Madras on the 16th of October, consisting of five king's ships under Admiral Watson, besides transports having on board 900 European troops and 1500 Sepoys. Having arrived in the Ganges on the 20th of December 1756, they found the fugitives at Fulta, a town at some distance from Calcutta, down the river. The first operation was against a fort; and Clive, lying in ambush to intercept the garrison, was himself surprised by the troops of Suraja Dowla, and, after a conflict long doubtful, extricated himself from the dangers that surrounded him, by that admirable presence of mind which never deserted him in the hour of danger. On the 2d of January 1757, the armament arrived at Calcutta, which surrendered after a cannonade of two hours. Almost the whole property of the Company was recovered, having been preserved for the subahdar; but the houses of individuals were all plundered. On the 10th of January, the city of Hooghly, about twenty-three miles higher up the river, was attacked, and a breach being made, and an assault begun, the garrison sought safety in flight. In the mean time, intelligence was received from Europe of the commencement of hostilities between France and England, which placed in a very critical situation the Company's settlements in Bengal. The English were already engaged in a war with a powerful prince, who had a formidable army in the field; and a coalition with the French, who could muster 300 European troops, with a train of artillery, would have overwhelmed their infant power. Happily for them, the French were desirous of a neutrality, and refused the alliance of Suraja Dowla, who advanced with his whole army and surrounded Calcutta. The perils which now environed the English roused the daring spirit of Clive, and he resolved to surprise the enemy's camp before daylight. But this bold enterprise failed in the execution; the troops suffered severely, and a thick mist augmented the causes of confusion; still the boldness of the design produced the desired effect, by alarming the subahdar, and inclining him to peace. He accordingly concluded a treaty with the English, by which he agreed to restore to the Company their factories, and all their former privileges; to make compensation for the losses they had suffered, and to permit them to fortify Calcutta. The danger which now threatened the Company being averted, the active mind of Clive was directed to other objects; and as war was now declared between France and England, he resolved, in return for the neutrality observed by the French when the English were involved in hostilities with the nabob, to attack their settlement at Chandernagur. This scheme was opposed by the nabob, and was disapproved by the council and Admiral Watson. Reinforcements, however, arriving, the attack was resolved on, and the English force advanced. The French defended themselves with gallantry; and the nabob, alarmed, began to put his army in motion. But the fort was in the mean time reduced by the irresistible fire of the ships. The nabob viewed these proceedings with secret alarm and resentment, and refused to give up the other French factories and subjects in his dominions. He even afforded protection to the fugitives from Chandernagur, and evinced his decided hostility to the English, until he received intelligence of the progress of the Afghans in the north, when he became extremely desirous of peace. But the English were now dazzled with other schemes, and Clive strongly insisted on the rooted disaffection of the nabob to the English, and on the necessity of dethroning him, and of elevating Meer Jaffier, who had married the sister of Aliverdy Khan, to the throne in his stead. It is unnecessary to dwell particularly on the dark intrigues by which this scheme was carried into effect. It was concerted that, for the destruction of Suraja Dowla, the English should take the field; and that Meer Jaffier, who still had a considerable force under his command, should join them at Cutwa. The English, having arrived at Cutwa, found not their expected ally Meer Jaffier; only an intimation from him that he could not join them before the day of battle, but that during the action he would desert the nabob and join his enemies. This intelligence damped the ardour of the English, and it was deemed hazardous to advance further, and to risk a battle, when, "if defeat ensued, no one would return to tell it." But caution at length gave way to bolder counsels; the army crossed the river a little past midnight, at Plassy. Here also was intrenched the army of the subahdar, consisting of 50,000 foot, 18,000 horse, and fifty pieces of cannon. The English force consisted of about 1000 Europeans and 2100 Sepoys. During the battle, which took place on the 23d of June 1757, Meer Jaffier was observed moving off with his troops. Clive, now assured of his intentions, ordered an attack; the subahdar's army was dispersed, and he himself fled from the field with only 2000 attendants. Arriving at his palace, he found no friend on whom he could rely; and disguising himself as a fakir, he escaped, with a favourite concubine and a single eunuch, intending to make his way to the French. But he was discovered at Raje Muhl, dragged back to Moorshedabad, and placed under the custody of Meer Jaffier's son, who gave orders for his assassination. On the 25th of June, Clive arrived with his victorious army at Moorshedabad. Meer Jaffier took possession of the capital, and on the 29th was installed into his high office, in the presence of the rajahs and grandees of the court. Enormous sums were exacted from Meer Jaffier as the price of his elevation; for the Company 10,000,000 rupees, as a compensation for losses; 5,000,000 rupees to the English inhabitants, 2,000,000 to the Indians, and 700,000 to the Armenians; for the squadron 2,500,000; an equal sum for the army; and for the members of the council, which they actually received, namely, for Mr Drake the governor, and Colonel Clive, 280,000 rupees each; and Mr Becker, Mr Watts, and Major Kilpatrick, 240,000 each; the whole amounting to

L.2,697,750. The English, deluded by their avarice, still cherished their extravagant ideas of Indian wealth; nor would they listen to the ungrateful truth. But it was now found that there were no funds in the Indian treasury to satisfy their inordinate demands. They were in the end obliged to be contented with one half the stipulated sum, which, after many difficulties, was paid in specie and in jewels, with the exception of 584,905 rupees.

The Company's servants, whilst their force was so actively engaged in Bengal, were anxious to remain quiet in the Carnatic. In endeavouring to collect the land-rents of the nabob Mahommed Ali, they, however, undertook the reduction of Madura and Tinnevelly; but with no great success, Captain Calliaud being repulsed in an assault on the fort of Dindigul, and another division of the English force at Nelore. The French now resolved to take advantage of the division of the enemy's force, and to strike a decisive blow; and having collected every soldier that could be spared from garrison duty, they suddenly with their whole force invested the fortress of Trichinopoly. On the 14th of May 1757, Captain Calliaud being apprized of their design whilst he was besieging Madura, instantly began his march for the relief of this important place. It was surrounded by an army five times as numerous as his own force, and every avenue to it was strongly guarded. But the English commander, well acquainted with the localities, took his route through a large plain consisting of rice fields covered with water, which was deemed impassable by the French, and therefore left unguarded; and thus he entered the fort. The French general, disconcerted by this successful stroke, drew off his forces and returned to Pondicherry. Having thus secured Trichinopoly, Colonel Calliaud resumed the siege of Madura, and being repulsed, with heavy loss, in an attempt to storm, he turned the siege into a blockade. He was at last received into the town on payment of 170,000 rupees. In the mean time Bussy was eminently successful in all his operations within the Circars; he reduced the fortress of Vizigapatam held by the English; and, after some uncertainty in the unstable councils of Salabut Jung, he finally established an entire ascendency over that prince and throughout the Deccan.

On the commencement of the war between France and England in 1756, the French ministry resolved to send a formidable armament to India; and the Count de Lally, an Irishman, who had left his country with James II., and who had distinguished himself in the battle of Fontenoy, was appointed commander-in-chief of all the French forces in India. Count Lally, with his armament, arrived on the coast of Coromandel on the 25th of April 1757. The English Admiral Pococke had been previously joined by a squadron of five ships of war, and an engagement took place between the two fleets, which terminated to the advantage of the English. Another action took place after the ships were refitted, with the same result. But neither was decisive; and, notwithstanding these successes at sea, the French had a preponderating force on shore, which consisted of 2500 Europeans, and the same number of Sepoys. With this force they commenced, on the 17th of May 1758, the siege of Fort St David. The place capitulated on the 1st of June, and its fortifications were razed. Devicottah surrendered on the 7th of June, and the English now fully expected that Lally would next lay siege to Madras. But the want of money embarrassed all his operations; and in order to relieve his necessities, he undertook the siege of Tanjore. A breach was effected, and preparations made for an assault, when the arrival of the English fleet, after another engagement with the French before Carical, whence the besieging army derived all its supplies, determined Lally to raise the siege; and, after a disastrous retreat, his shattered force arrived on the 28th at Carical. The hostile fleets again encountered on the 2d of August, and after an hour's fighting the French bore away, and were soon beyond the reach of shot. Lally, to relieve his pecuniary wants, which were only augmented by the unsuccessful siege of Tanjore, now prepared for an expedition against Arcot. This place capitulated on the 4th of October, and the French force proceeded forthwith to Chingleput, about forty-five miles south-west of Madras. But the English, aware of its importance, reinforced the garrison, and Lally did not attempt its reduction. His situation was beset with difficulties, from the total want of money and all necessary supplies; and in order to retrieve his affairs, he resolved on the bold enterprise of laying siege to Madras. His force consisted of 2700 European troops, and 4000 Indians. In this attempt he signally failed, with great loss, after continuing the siege from the 16th of December till the middle of February 1759; and this disaster greatly contributed to depress his spirits, and to abate his vain confidence in his own schemes. The French army retreated in the direction of Conjeveram, whither they were followed by the English. Here the two armies manœuvred for some time in sight of each other, when the English marched upon Wandewash, and afterwards on Conjeveram, which they took by assault. On the 28th of May 1759 both armies went into cantonments.

In the end of September the campaign was resumed with spirit by the English, who laid siege to Wandewash, but were repulsed in all their attempts to carry it by storm. But it was attacked and taken on the 29th of October, as was also Caranjoly on the 10th of December. Bussy had been recalled from the Carnatic, where he had exerted himself so advantageously for the French cause, and he joined the army the day after the repulse of the English. Lally had resolved to divide his force; with one part to collect the rents of the southern, with the other to protect what belonged to the French in the northern districts. He contrived by skilful manœuvring to amuse the English, and in the mean time he surprised and took Conjeveram, and thence proceeded to the attack of Wandewash. The English army under Colonel Coote now approached, consisting of 1900 Europeans, 2100 Sepoys, 1250 black horse, and twenty-six field-pieces; and the French general determined to try the issue of a general battle. The French, including 300 marines and sailors, consisted of 2250 Europeans, and 1500 Sepoys. The battle commenced on the 22d of January 1760, at eleven o'clock, and terminated in the total defeat of the French, who lost nearly all their cannon. Lally retreated to Chittapet, about twenty-eight miles from the field of battle, and afterwards to Gingee and Valdore. The victorious general resolved on the reduction of Arcot, and having previously taken Chittapet, he arrived before that fortress upon the 1st of February, and upon the 9th the garrison capitulated. The affairs of the French now rapidly declined. The English had acquired a decided superiority in the field, and fortress after fortress fell into their hands; Tinery on the 1st of February, Devicottah about the same time, and Trincomalee on the 29th. To complete this train of misfortunes, Admiral Cornish arrived at Madras with six men of war; and there being no longer a hostile fleet in the Indian Seas, he readily agreed to co-operate with the land forces. The consequence was, the reduction of Carical on the 5th of April, of Valdore on the 15th, of Chittambaram on the 20th, and about the same time of Cuddalore; and on the 1st of May the whole French force was shut up in Pondicherry, which was their last remaining hope in India, whilst the English forces encamped within four miles of the town. It was in the beginning of September that the English laid formal siege to this place. The batteries were opened about the beginning of December, and it capitulated on the 15th of January 1765; and thus terminated for ever the power of France in this quarter of the world.

Elevation of Meer Cossim to the throne.

Whilst the English were thus establishing their ascendency in the south of India, and also in Bengal, Meer Jaffier, the new nabob, was wholly unable to answer the exorbitant demands of the Company's servants, who, still deluded with the idea of eastern riches, refused to abate one iota of their demands. His situation thus became extremely difficult. His treasury was exhausted, his people impoverished, he had no funds for the expenses of government, and still less for the demands of his rapacious allies. He was compelled to extort money from his ruined subjects by cruelty and terror. He himself, and his son Meeraus, soon fell into universal odium and contempt, from their merciless exactions, and the weakness, negligence, and disorder of their administration. The troops mutinied for want of pay, the rajahs and nobles were discontented, and rebellions multiplied throughout his dominions. The nabobs of Oude and Allahabad entered into a dangerous confederacy with the eldest son of the Emperor Aulumgeer II. for supporting his claim to the imperial throne, and to the subordinate provinces of the Mogul empire; and their combined forces advanced to the invasion of Bengal. But European troops, though few in number, and European counsels, proved an overmatch for the ill-organized masses of Indian cavalry; they were accordingly defeated in every encounter, and Meer Jaffier secured in the undisputed possession of the throne. Lord Clive, who bore so conspicuous a part in these transactions, resigned the government in February 1760; and by his influence Mr Vansittart was raised to be president or governor of the council, consisting of from nine to twelve persons, by a majority of whom the affairs of the Company were now administered. The English, by their prompt and decisive measures, had defended the nabob against foreign aggression; and he had now to defend himself against their own domestic treason, which proved to be the more serious danger. In raising him to the sovereignty they were actuated by purely interested views; and being disappointed, they entered into schemes for dethroning him, and for again selling the throne to the highest bidder. Meer Cossim, married to his daughter, was the person now pitched upon to supply his place. The conditions were, that he should assign to the Company the revenues of the three districts of Burdwan, Midnapore, and Chittagong; that he should pay the balance due by Jaffier; and besides, make a present of five lacs of rupees for the war in the Carnatic. Mr Vansittart now proceeded, with a body of troops under Colonel Calliaud, to persuade, or rather to compel, the nabob to abdicate the sovereignty. At day-break his palace was surrounded with troops, and a letter was sent to him explaining the views of the English, which filled him with rage. He treated with disdain the assurances of safety for his person, and that a reform in his government under his son-in-law as his deputy was all that was proposed; and he finally preferred, rather than sway a barren sceptre, to retire to Calcutta under the protection of the English. Against the deposition of Meer Jaffier several members of the council protested, and this spirit of opposition for a considerable time distracted the English councils. The party who had elevated Meer Cossim highly commended his whole administration, which their opponents were equally solicitous to criticise and to condemn. Meer Cossim was a person of quite a different stamp from his weak and indolent predecessor. By the assistance of his new allies he cleared his dominions of all invaders, and strengthened his frontiers; he reduced the rajahs or independent Indian chiefs, who had rebelled against Jaffier, obliging them to pay the usual tribute, by which means he repaired his finances; he introduced order and economy into his whole administration, and by regular pay secured the discipline and fidelity of his troops. But his conduct was viewed in a sinister light by the members of the council who opposed his elevation; and four of them being dismissed by the directors at home for insubordination to their authority, this faction became the majority; and the most violent amongst them, Mr Ellis, was sent to superintend the factory at Patna, the residence of the nabob, where his whole conduct was one continued insult and defiance of his authority. He made no scruple of seizing and punishing the officers of the nabob, who acted under his express sanction; sometimes throwing them into prison, or sending them in chains to Calcutta, to be there punished at the discretion of the council. To these were added other and more extensive injuries; and at length the usurpations and tyranny of the English were carried to such a height, that the authority of the government either became a mere name, or an instrument of violence and extortion in the hands of the Company's servants. The causes of these disorders, which led to a new and important revolution in the political condition of India, we shall now briefly explain.

Disputes with Meer Cossim.

Cause of these disputes, and oppression of the country.

In India the transit of goods from one place to another was, under the native governments, subjected to a tax; and upon all the roads and navigable rivers toll-houses were erected, where this tax was paid. These toll-houses were multiplied, to the great inconvenience and oppression of the internal trade; and as the duties varied in different places, there was here a wide field for abuse, and the traders were frequently oppressed by the arbitrary extortions of the collectors. The East India Company had, at an early period, procured a firman, which exempted from all internal duties, both the goods which they imported from Europe, as they passed into the interior, and those which they purchased in the interior in their passage to the sea. They were, in fact, protected by a certificate signed by the president or chiefs of the factories, called a *dustuck*, and shown at the toll-houses or chokeys through which they passed. The servants frequently endeavoured to abuse the Company's privilege, by claiming an immunity from taxation for all their own goods, which they had neither imported nor were to export, but which, for the internal supply of the country, they were transporting from one place to another. The subahdars of Bengal, whilst they retained their power, restrained the Company's privilege within its appointed limits, and steadily refused to exempt the trade of its servants from duties to which all others were subject. But when, by the elevation of Meer Jaffier to the throne, the English acquired the undisputed ascendency, they broke through all the equitable restraints imposed upon them; in every district, in every market and village, they dealt in rice, the common food of the people, paddy, betel-nut, oil, fish, straw, bamboos, &c. and, without scruple, used the Company's passport to screen these articles from internal duties; and so dreaded was the English name, that the toll-house keepers no longer exacted the public dues on the transit of their goods through the country. In some cases where the demand was made and the goods stopped, the toll-keeper was arrested by a party of Sepoys, and carried prisoner to the nearest factories; and he was frequently exposed to even greater severities, being tied up and lashed. The confusion into which the country was thrown by the injustice, the violence, and the cruelty, of those rapacious intruders, can scarcely be imagined. The native merchant, still burdened with the heavy duties, which were rigorously levied on him, was undersold in every market; and the Company's servants in a short time engrossed the whole commerce of the country. The unhappy natives were subjected to various other oppressions. It was a common practice of the Company's servants to defraud them both in purchase and in sale; to force goods from them at a lower, and to compel them to buy their own at a higher rate than the market price. Nor did the ordinary tribunals afford any protection against their injustice; a band of foreign adventurers, to call them by no harsher name, had usurped the sovereign power, which they rendered wholly subservient to their own schemes of enriching themselves at the expense of the country.[1]

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Meer Cos-
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Meer Cossim, the ruler who had been set up by the Company, was extremely displeased with the conduct of their servants, and he represented in the strongest terms to the president and council the enormities to which the private trade had given rise. But the majority of the council were too deeply interested in these enormities to be moved by this just appeal of the sovereign in behalf of his oppressed people. They all participated more or less in the profits of the private trade, and they had no disposition to part with or to restrict this lucrative abuse. They even refused to pay nine per cent. of transit duties upon their goods, though this rate was far inferior to that paid by the native traders; and all that they would agree to was, out of their own liberality and free choice to pay a duty of two and a half per cent. on salt alone. The nabob, when he heard of the proceedings in council, and of the injurious treatment of his officers for duly executing his orders, was naturally filled with indignation; and he came to the resolution of abolishing all internal duties. There could not possibly have been a more moderate or equitable measure. It gave freedom and equality to all parties; it threw down at once all the restraints to fair and open competition, and gave to the Company's servants the unlimited freedom of trade. This just and liberal policy, however, was far from corresponding with their views, and it excited amongst them the most violent clamours. They were discontented at losing so fair an opportunity of amassing enormous wealth. Their conduct, as Mr Mill justly observes, furnishes one of "the most remarkable instances on record, of the power of interest to extinguish all sense of justice, and even of shame." They first insisted on an exemption for themselves from all internal duties, now they cried out in the rage of disappointed avarice against the extension of the same privileges to the inhabitants; and thus they reversed all the usual maxims of fair policy, in seeking immunities for foreigners which were refused to natives.

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The conduct of Meer Cossim, in claiming justice for his oppressed subjects, was highly displeasing to the majority of the council. The exaction of legal dues upon English goods was represented as a violation of the Company's rights, and as evidence of a design to expel them from the country; and, for this new species of treason against the offended majesty of usurped power, it was resolved to depose him, and to replace Meer Jaffier on the throne, as nominal ruler of Bengal, on the well-understood condition of subservience to their views. A treaty was concluded, confirming the immunity which they claimed from all internal duties, with the exception only of two and a half per cent. on the article of salt, whilst those duties were re-imposed on the goods of all other merchants. Large presents were bargained for, and other payments to a great amount, as compensation for losses alleged to have been sustained by the Company's servants, in the course of their illicit interference in the domestic trade. These sums, which at first were estimated at ten, but soon afterwards mounted up to fifty-three lacs of rupees, equal to about L.625,000, were rigidly exacted, whilst large payments to the Company were still undischarged, and the public finances were sinking under the burden of an expensive war, great sums having been borrowed by the Company from its servants, at an interest of eight per cent., and, with all these aids, supplies were wanting both for the war and for the investment, the Company's ships frequently returning, in consequence, half loaded to Europe. Meer Cossim, on his side, saw plainly that matters were fast approaching to the extremity of war, and he made preparations for the contest. He transferred his capital from Moorshedabad, as being too near Calcutta, and under the inspection of the English, to Mongheer, a place 200 miles farther up the Ganges, which he fortified in the best and most expeditious manner. He introduced European discipline among the troops, and he recruited his ranks with all the Armenian, Persian, Tartar, and other soldiers of fortune whom he could collect, and especially with such wandering Europeans or Sepoys as had borne arms in the English service. He substituted European muskets for matchlocks, and formed a train of artillery.

Hostilities with Meer Cossim.

Hostilities commenced sooner than was expected, with the surprise and capture of Patna by Mr Ellis; a violent and rash measure, disapproved by several members of the council. The nabob immediately gave orders to stop several boats laden with arms that had been seized, and released on the representation of the English. Resistance was made, and in the course of the struggle which ensued, Mr Amyatt, a member of the council, and several other Englishmen, were slain. The contending armies now hastened to take the field; and Meer Cossim was overwhelmed by one unbroken series of disasters, which terminated in his dethronement and flight. A division of his army, which had advanced for the protection of Moorshedabad, was totally defeated on the 19th of July, by the English army, which consisted of 650 Europeans, 1200 Sepoys, two troops of native cavalry, and was afterwards joined by a battalion of Sepoys and a hundred Europeans. In advancing to the capital, Major Adam found the enemy strongly posted, with intrenchments fifteen feet high, defended by a numerous artillery. These were stormed, and the city of Moorshedabad was entered by the conquerors. The English, pushing forward, encountered the Indian army on the 2d of August 1763, consisting of 20,000 horse and 8000 foot, in the plain of Gheriah, near Sootie. They resembled European troops in clothing and accoutrements, and in their division into brigades; and the battle that ensued was obstinately contested for four hours. But the discipline and steadiness of the European troops finally triumphed, and the enemy fled, leaving all their cannon behind them. From this time the English were no longer opposed on equal terms in the field. It was only in strong positions and intrenchments that the enemy made a stand. A strong intrenchment at Oodwa was carried on the 5th of September, after it had detained the English for nearly a month; and Mongheer, the last stronghold of Meer Cossim, capitulated, on which he fled into the dominions of the nabob of Oude, and afterwards into the Rohilla country. Irritated by his misfortunes, the nabob wreaked his vengeance on the unhappy English prisoners who were in his power. He had formerly put to death several Hindus of rank who were thrown into prison on account of their wealth; and he now gave an order for the execution of about two hundred English, who had been taken at Patna; amongst others, of Mr Ellis, who had formerly tyrannized over and insulted him, and Mr Lushington, also high in the Company's service. They were invited to an entertainment, and, according to the odious maxims of eastern treachery, were barbarously murdered. A German of the name of Sumroo was the chief agent in this scene of cruelty. Dr Fullarton, who had gained favour

Defeat and flight to Sujah Dowlah.

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[1] See Ninth Report of the House of Commons on India Affairs; also a Letter of Meer Cossim, dated Backergunge, May 25, 1762, which states that the inhabitants who refused to sell to the Company's servants were flogged or confined.

by his medical services, was the only Englishman who escaped.

Meer Cossim was received in the most friendly manner by Sujah Dowlah, the nabob of Oude, who was far from being well disposed to the English. He considered them as rapacious usurpers, the natural enemies, as they fatally proved to be, of Indian independence, and who, under pretence of commerce, aspired to the dominion of the country. In reply to a letter from the English, threatening, that if he assisted the nabob of Bengal, they would carry the war into his own country, he remonstrated with them on their ambitious views, and on account of the disturbances which they had created in the country; and he added, " to what can all these wrong proceedings be attributed, but to an absolute disregard of the court (of Delhi), and to a wicked design of seizing the country to yourselves. If these disturbances," he continues, " have arisen from your own improper devices, deviate from such behaviour in future; interfere not in the affairs of government; withdraw your people from every part, and send them to their own country; carry on the Company's trade as formerly, and confine yourself to your own commercial affairs." To these reasonable remonstrances, which were repeated in another letter to Major Carnac, the president and council were so far from listening, that they determined upon commencing an immediate and offensive war against him.

War with, defeat, and treaty with Sujah Dowlah.

Major, afterwards Sir Hector Munro, who had arrived from Bombay with a reinforcement, was appointed to the command. His first care was to repress the mutinous spirit which had of late prevailed among the troops, and this he effected by the severe measure of blowing away twenty-four of the ringleaders from the mouths of cannon. He then advanced, with a force of 6215 Sepoys and 856 Europeans, towards the Saone, where the enemy, to the number of 40,000, with a train of artillery, were intrenched in front of the village and fort of Buxar. On the 22d of October 1764, a battle took place, in which the Indian army was completely overthrown, with the loss of about 2000 men. On the side of the British eighty-seven Europeans and 712 Sepoys were either killed or wounded. Major Munro followed up his success, though in two attempts to storm the fortress of Chanda he was repulsed with loss, and it was only through the mutiny of the garrison that it was at length taken by Sir R. Fletcher, who had succeeded to the command. Lucknow, the capital of Oude, was also occupied by the battalions of Sepoys, the fortress of Chunar was attempted, though without success, and that of Allahabad surrendered. Sujah Dowlah was abandoned in his reverses by his ally the Mogul, who concluded a treaty with the English. But he did not yet despair of his fortunes; and having received the aid of a Mahratta force, the combined armies encountered the English on the 3d of May 1765, when they were defeated; and Major Carnac, again attacking them at a place called Calpi, they were overthrown, and driven with precipitation across the Jumna. The vizir, Sujah Dowlah, seeing no hope of retrieving his affairs, resolved to trust entirely to the generosity of the English; and on the 19th of May he surrendered to Major, now General Carnac. The final settlement of terms was reserved for Lord Clive, who had arrived in Bengal, with full powers from the directors, as governor, to regulate all their complicated concerns, whether of sovereignty or of trade. It was agreed that, with the exception of Allahabad and Corah, he should still retain his dominions, which he was judged more capable of defending than the Mogul emperor, to whom they had been promised. For this concession the vizir agreed to pay fifty lacs of rupees as the expenses of the war; but he remonstrated so earnestly against the establishment of factories in his dominions, or any permission to trade free of duties, as the certain cause of trouble, that all such propositions were abandoned. He agreed not to molest Bulwunt Sing, who held the zemindaries of Benares and Gauzeepore, and who had assisted the English in the late contest, and never to afford an asylum to Meer Cossim, or the German soldier Sumroo With regard to the Mogul emperor, he was told, that of the thirty lacs of annual tribute due to him from the subahdars of Bengal, not a rupee would ever be paid; that twenty-six lacs of rupees, which had been assigned him as the revenue of these provinces, would be continued; and that he should receive possession of Corah and Allahabad. In return, the Company received the imperial firman, dated the 12th of August 1765, granting the duannee, or the right of collecting the revenues of Bengal, Bahar, and Orissa, in which is implied, according to the laws and constitution of the Mogul empire, the right of sovereignty; and thus was this body of merchants constituted in form, as well as in substance, the rulers of a vast empire.

Company receives the sovereignty of Bengal.

Maladministration of the Company's servants.

To this issue affairs had been evidently tending for some time past. Meer Jaffier, worn out with anxiety and indulgence, died in the beginning of the year; and Jaffier, his son, was chosen his successor by the Company's servants. From each successive sovereign it was the custom of the electors to exact not only a large donation, but also an extension of power and privileges, so that the native ruler was at length left in possession of little more than a nominal authority. It was now resolved by the English that they should take upon themselves the whole charge of defending the country, and that they would only allow the nabob a few troops for the sake of parade, or for other necessary purposes; whilst, in regard to the civil government, he was to choose a deputy, with the advice of the governor and council, on whom the whole internal administration of the country should be devolved. So completely had the government fallen under the control of the English, that the accountants of the revenue could not be appointed without their approbation. In the mean time the directors were distracted by the contradictory reports of their affairs which they received from India; and it was because they were alarmed by the expensive wars so readily undertaken by their servants, by their rapacious proceedings in regard to the private trade, and by the general embarrassment of their affairs, that they had resolved to appoint Lord Clive to the supreme government of Bengal, conferring on him and a select committee of four, full authority to act and determine all matters, without any dependence on the council; of which authority they were not slow to avail themselves upon all occasions. They also sent along with him a strong representation against the rapacity and tyranny of their servants. In a letter to the governor and council they observe, " Your deliberations on the inland trade have laid open to us a scene of the most cruel oppression." " The poor of the country," they continue, " who used always to deal in salt, betel-nut, and tobacco, are now deprived of their daily bread by the trade of the Europeans, whereby no kind of advantage accrues to the Company, and the government's revenues are greatly injured." The directors accordingly issued the most peremptory instructions for the prohibition of the inland trade of salt, betel-nut, and tobacco, or rather of the monopoly held by the Company's servants, by which the country was so cruelly oppressed. The practice of receiving presents from the native rulers and princes, which had been carried to a great extent, was also prohibited. At a general meeting of proprietors, however, it was urged, in opposition to those wise and salutary restrictions, that the " servants of the Company in India ought not to be deprived of such precious advantages, which enabled them to revisit their native country with independent fortunes."

This reasoning convinced the majority of the proprietors, and a recommendation was moved in consequence to the directors, to re-consider their resolution in regard to the private trade. The governor and council were therefore instructed, after consulting with the nabob, to form a "proper and equitable plan for carrying on the inland trade." (Mill's *British India*, vol. ii. p. 217.) In other words, they were to contrive how they could oppress the country, and yet adhere to the rules of equity. This transaction places in a very strong light the corrupt nature of the local administration. It was admitted on all hands that it was by extortion and rapine, that is, by compelling the oppressed inhabitants both to purchase and sell at prices fixed by the Company's servants, that such profits were gained, and that they were enabled to return to Europe with enormous accumulations of ill-gotten wealth. It was, indeed, as we have just seen, acknowledged by the directors, that the poor of the country were deprived of their daily bread by the trade of their European servants, who monopolized every profitable channel of business; yet, with these facts before them, we find the sovereigns of India delivering over their oppressed subjects to the rapacity of their servants, for the avowed purpose of enriching them with the spoils of the country.

Lord Clive assumed the supreme power in India in May 1765. At this period the servants of the Company, in defiance of the peremptory orders of the directors, still persisted in all the ruinous practices connected with the inland trade; and instead of abolishing these, and thus remedying some of those abuses of which he so violently complained, Lord Clive entered into a partnership for the monopoly of salt, of which large quantities were accordingly purchased, and sold for a profit of forty-five per cent., which was divided amongst three of his own dependents, his secretary, surgeon, and another friend, for whom he wished, as he expresses it, to realize a fortune. The plan of a more extensive monopoly, including salt, betel-nut, and tobacco, the chief articles of consumption in the country, was afterwards devised to be carried on exclusively for the benefit of the superior servants of the Company, amongst whom the profit, after setting apart L.100,000 per annum to the Company, was to be divided according to their rank in the service. At the time this corrupt scheme of monopoly was established, the select committee were in possession of peremptory orders from the directors for its abolition; but these orders, under various pretences, they delayed to carry into execution till September 1768.

Although the ascendency of the English had for some years been thoroughly established in Bengal, and although they were formally invested in 1765 with the sovereignty of the country, its affairs were still administered in the name of the native prince, and according to the forms and policy of the ancient constitution. Justice was still dispensed by the native courts, and by the nabob's officers; the revenues still flowed through the same channels into the public exchequer; and all transactions with foreign powers were carried on under the same authority as formerly. But such was the increasing power of the English, that the government, as far as regarded the protection of the people, was dissolved. Neither the nabob nor his officers dared to offer any opposition to their sovereign will; and the tribunals of justice, far from being a protection to the oppressed, became subservient to the rapacity of the Gomastahs, or Indian agents, employed by the Company's servants, and were converted by them into most efficacious instruments for plundering the people, and for punishing the wretched victims of their oppression if they dared to complain, and if they did not patiently submit to be fleeced and trampled upon by their foreign masters. The native tribunals had no power to afford protection, whilst the English had no legal authority beyond the presidency, either over the natives or over their own subjects; and hence the inhabitants lay entirely at the mercy of the Company's servants. Nor need we wonder that, during this period of anarchy and disorder abroad, the embarrassments of the Company's affairs continued to increase, even during the peaceable administration of Mr Verelst, who succeeded Lord Clive as governor when he left Bengal in February 1767. The Indian revenues were indeed large, but they were plundered by their servants. Lord Clive and the first adventurers were enriched by the presents or bribes of the native rulers. These they were now prohibited from accepting. "It was expedient for them," says Clive, "to find out some other channel, the channel of the civil and military changes. Every man now who is permitted to make a bill makes a fortune." In lieu of the enormous gains which accrued from the monopoly of salt and of other articles, the trade which the directors, early in 1768, sent peremptory orders to lay open, and also of one eighth per cent. of the revenues given to the governor, as a compensation for his share of the salt monopoly, the Company granted a commission of two and a half per cent. on the revenues. This sum was to be divided into a hundred shares, and to be distributed amongst the civil functionaries of the Company, and the military officers, according to their rank.

Embarrassments of the Company at home.

Whilst the local rulers of India were thus enriching themselves, their masters were reduced to great pecuniary distress. But, in the midst of all their embarrassments, the most flattering accounts of their affairs were circulated in Europe; and the directors and proprietors lent a willing ear to these golden promises, of which their servants were always liberal. The splendid acquisition which the Company had made of the territorial revenues of Bengal, the political events in which they had been involved, and the immense fortunes with which a few individuals had returned to Europe, confirmed the general delusion, and inflamed the impatience of the proprietors of East India stock to participate in the inexhaustible treasures of their new dominions. In pursuance of these views, the dividend on their stock was raised from six to ten per cent.; and India stock rose to 263 per cent. A higher dividend was called for, and it was in vain that the directors represented the heavy debts of the Company, and the general embarrassment of their affairs. The proprietors refused to listen to such disagreeable representations, and at a general court they voted a dividend of twelve and a half per cent. for the year 1767. The attention of government being now directed to the Company's affairs, this vote was rescinded by act of parliament, and the dividend limited to ten per cent.

In the mean time, every day's experience was refuting the fallacious expectations of annual treasures from India. So far from possessing any surplus revenue, the servants were involved in debt for the current expenses of their government; they drew largely on the directors, but they remitted little; and the whole of this complicated scheme of trade and sovereignty laboured in consequence under such pecuniary difficulties, that the directors, to avert a public bankruptcy, were compelled to apply to the bank for a loan of L.400,000, and afterwards of L.300,000. In consequence of this state of things, so different from the pleasing fancies of unbounded wealth, with which the proprietors of the Company and the country at large had been amused, great discontent and a violent clamour was raised against the Company's servants in India, who by their profusion or corruption had failed to realize those golden dreams. The situation of the Company was at length brought under the consideration of parliament by the minister, who introduced two acts for the regulation of their affairs. The first of these was intended to relieve the pecuniary embarrassments of the Company, and provided that the sum of L.1,400,000 per annum, at four per cent. should be lent to them, and that the stipulated annual payment of L.400,000 from the territorial revenue should not be required till the discharge of this debt; the dividend not to exceed six per cent. till the discharge should be accomplished, and not to exceed seven per cent. till the bond debt should be reduced to L.1,500,000. Other clauses related to the appropriation of the surplus revenue, which was always fondly hoped for, but never received. The other act, which was heavily complained of as an infringement of the Company's rights of sovereignty, as the first was said to be an invasion of their rights of property, raised the qualification to vote in the court of proprietors from L.500 to L.1000; gave two votes to every proprietor possessed of L.3000; three votes to those possessed of L.6000; and four votes to those possessed of L.10,000; and only six directors, instead of twenty-four, the whole number, were to be annually elected; and the administration of the provinces of Bengal, Bahar, and Orissa was to be vested in a governor-general with an annual salary of L.25,000, and four councillors with a salary of L.10,000 each. The other presidencies were rendered subordinate to that of Bengal; and a supreme court of judicature was established at Calcutta, consisting of a chief-justice with L.8000 a year, and three other judges with L.6000 a year, appointed by the crown. The first governor-general and councillors were to be appointed by the king; and all the political correspondence of the Company with India was to be laid before the ministry. These acts received the royal assent on the 21st of June and 1st of July 1773. Under this act Mr Hastings was appointed governor-general, with General Clavering, Colonel Monson, Mr Barwel, and Mr Francis, members of council.

Affairs of the Carnatic.

It will now be proper to revert to the affairs of the Carnatic. After the departure of Bussy from that province, and the decline of the French influence, Nizam Ali resumed his power, which he employed in dethroning and imprisoning, and afterwards murdering, his feeble brother Salabut Jung, the subahdar of the Deccan. The English having received from Shah Aulum, the Mogul emperor, a grant of the Northern Circars, a tract extending 470 miles along the coast of the Bay of Bengal, and uniting the English possessions in the Carnatic with their province of Orissa, proceeded to occupy it with a military force. On this Nizam Ali, or the Nizam as he is called by the English, made an irruption into the Carnatic, and greatly alarmed the presidency of Madras. After some operations of little moment, a treaty was concluded, by which the English agreed to pay a rent for the disputed territory, and to give him such military aid as he should require in the affairs of his government. The first operation in which this force was to be engaged was the reduction of the fortress of Bangalore, belonging to Hyder Ali, the sovereign of Mysore; and thus were the English brought into collision with that powerful chief. He was one of those bold spirits who rise to eminence in times of civil confusion. From a common foot soldier, or peon, employed in the collection of taxes, he rose to high command, to wealth and dominion, and finally to the rank of sovereign prince. The nizam, who had joined with the English against Hyder, soon became his ally, and their united forces made incursions into the Carnatic. Several battles were fought to the disadvantage of Hyder, but these were of little advantage to the English, owing to his superiority in cavalry, with which he laid waste the country to the very gates of Madras, and struck terror into the president and council. The nizam, however, wearied of the war, quitted the alliance of Hyder, which so elevated the confidence of the Madras presidency that they resolved on the invasion of Mysore. But Hyder anticipated their designs, and having by his masterly tactics artfully drawn the English army to a distance from Madras, he suddenly appeared at the head of 6000 cavalry before that city, having marched 120 miles in three days, and so alarmed the presidency, that a treaty, offensive and defensive, was concluded in April 1769, by which it was also agreed that all conquests should be mutually restored.

Destruction of the Rohillas.

At this time the Mahrattas, humbled for a time by the defeat of Paniput, now began to renew their incursions into the northern provinces, and greatly to the alarm of the subahdar of Oude, who dreaded any confederacy between them and the Rohilla chiefs or Afghans, a hardy race from the north, who having frequently aided the imperial armies, were rewarded with lands in the fertile district between the Ganges and the mountains, and to the west of the Oude territories. One of their chiefs, Nujeeb ad Dowlah, had been chosen by Abdallee Shah, on his departure from Delhi, after the battle of Paniput, as the imperial deputy. He had ruled the country with singular prudence and success, and had transmitted the government to his son, Zabita Khan, against whom a coalition was now formed by the Mahrattas and the fallen emperor Shah Aulum, anxious to regain his former power. By their assistance the emperor, in the year 1771, entered his capital of Delhi, with all the pomp of imperial dignity. Zabita Khan, unable to withstand their united attack, fled across the Ganges, leaving his fertile and flourishing territories to the devastations of the Mahrattas, to whom they afforded a rich booty. The Rohillas, alarmed by this aggression, proposed to form an alliance with the subahdar of Oude, who on his side was equally dismayed; and through the intervention of the English a treaty was accordingly concluded, offensive and defensive, by which the Rohillas engaged to pay annually to the subahdar forty lacs of rupees if he would expel the Mahrattas from their territories. He made no effort, however, to perform this service; and the Mahrattas, after retiring across the Ganges during the rains, soon returned to ravage the country, and actually extorted a sum of money from Hafiz Rhamet, chief of the Rohillas, as the price of their retreat. In 1772 they besieged the emperor, who had become weary of their alliance, in Delhi; and having entered the city, they extorted from him a grant of the two provinces of Corah and Allahabad, which he held by virtue of a treaty with the English. The subahdar was now really alarmed, and wrote the most pressing letters to the English for aid. A detachment was accordingly sent under Sir R. Barker, to assist in the defence of his territories, when the Mahrattas were recalled to their own country about the end of May 1773. The subahdar, freed from danger, now became ambitious in his turn, and was intent, either by force or fraud, upon gaining possession of the Rohilla country. With this view, in a meeting with Mr Hastings in October 1773, it was agreed that the English troops should assist in the conquest and extermination of the Rohillas, and that forty lacs of rupees should be paid for this service. In fulfilment of this iniquitous compact, the united forces, the British under Colonel Champion, entered the Rohilla territories in 1774, and on the 23d of April a battle was fought, in which the unfortunate Rohillas, after an obstinate defence, were defeated, and their gallant chief Hafiz Rhamet, slain while rallying his troops; the subahdar and his army, in the mean time, behaving with shameful pusillanimity. The whole country now lay at his mercy, and he proceeded to execute his diabolical purpose, which, as he had expressly informed the English, was the *extermination* of the Rohillas. Never, probably, says Mr Mill, were the rights of conquest more savagely abused; man, woman, and child were given up to the destroying sword, and the country was reduced to a desert.[1] At length it was agreed that Fyzoolla Khan, the remaining chief of the Rohillas, should surrender one half of all his effects to the subahdar or the vizir, and should receive in Rohilcund a jaghire of fourteen lacs and 75,000 rupees. With regard to the Mogul emperor, the twenty-six lacs of rupees hitherto paid to him as his share of the revenues of Bengal, Bahar, and Orissa, were withdrawn, because he had accepted the aid of the Mahrattas in his late attempt to regain the throne of his ancestors. He was also deprived of the provinces of Corah and Allahabad, granted to him in terms of a former treaty with the Company.

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[1] *History of British India*, vol. iii. p. 509.

Sketch of the Mahratta powers.

On the west coast of India, the presidency of Bombay was at this period involved in disputes, which ended in a war with the Mahratta states; and, with a view to the subsequent history of India, it may be necessary here to give a brief account of these disputes, and of the different Mahratta powers who had now risen to political importance in India. In the Mahratta government, as originally constituted, the sovereign or rajah was assisted by a council of eight Brahmins, the chief of whom bore the title of peshwa; and in course of time this principal minister of state, on whom devolved the duties of government, usurped all the real power, and the sovereign became a mere pageant in his hands. In the reign of the rajah Sahoo, the third in succession from the brave and politic Sevajee, the founder of the Mahratta power, this revolution had been insensibly brought about. He was a weak prince, devoted, as most princes are, to ease and pleasure, and leaving to Kishwanath Balagee the chief powers of the state. He assumed the name of Row Pundit, or chief of the Pundits, or learned Brahmins, and was invested by the rajah with a *sirpah* or robe of office, with which ceremony the peshwas have ever since been installed into their sovereign dignity. Custom or policy had so completely sanctioned the usurpation of supreme power by the peshwa, that Kishwanath had quietly transmitted his dignity and influence to his son Bajerow, who confined the rajah as a sort of state prisoner to Satarah, whilst he himself resided at Poonah, the future capital of the Mahratta states. Bow, the son of Bajerow, being slain at the battle of Paniput, the office of peshwa descended to his nephew, who had two sons, Madhoo Row and Narrain Row, the eldest of whom, Madhoo Row, a minor, succeeded to his father's dignity at his death, and the guardianship of the peshwa now devolved on Ragonaut Row, more commonly known under the name of Ragoba. The council of state, consisting of the Brahmins, now made an effort to regain their lost influence; and intriguing with the mother of the peshwa, they succeeded in sowing division between the nephew and the uncle, and finally in stripping him of his power. Madhoo died at an early age in 1772, and appointed Ragoba to be the guardian of his brother Narrain Row. But he was by the same influence again stripped of his power; and dissensions having arisen amongst the council of Brahmins, or Mutseddies as they are also called, a conspiracy was formed, which ended in the murder of the young prince, when Ragoba was again acknowledged peshwa. But he was still thwarted by the ministerial factions of the Brahmins, and the consequence was a civil war, which was carried on with various fortune, but terminated at length in the flight of Ragoba from his dominions. The presidency of Bombay had been extremely anxious to procure the cession of the island and peninsula of Salsette and Bassein, as adding much to the security and value of Bombay. But all their efforts were in vain. Ragoba uniformly refused to give them up on any terms. He had now retreated to Surat; and in the low state of his fortunes the negotiation was renewed. In the mean time the presidency were informed by their resident at Goa that the Portuguese were making preparations for the recapture of their former possessions, especially of Salsette and Bassein. No longer hesitating, they sent a force from Bombay, which carried by assault the principal fort in Salsette on the 28th of September 1774, and afterwards took possession of the island; in March 1775 they concluded a treaty with Ragoba for the surrender of these places, with other advantages; and in return they sent a body of troops under Colonel Keating, which joined his army in April, about fifty coss from Cambay; and this combined force, amounting to 25,000 men, now advanced for the purpose of penetrating to Poonah before the commencement of the rains. The enterprise failed for the present, but the armies were quartered in convenient positions; and having concluded a favourable treaty with the rajah of Gujerat, who had agreed, amongst other conditions, to advance the sum of twenty-six lacs of rupees, they prepared, with a friendly country in their rear, and greatly increased resources, to advance to Poonah the next campaign. But all these promising schemes were now frustrated by the interference of the Bengal council, which had been invested with supreme authority over the other settlements in India; and the alliance formed by the presidency of Bombay with Ragoba, the peshwa, and indeed all the other proceedings, were severely condemned by the governor-general and his council. The council at Bombay were ordered peremptorily to retrace their steps, to withdraw their troops from those of Ragoba, and to give him no further aid; and they themselves proceeded to treat, by means of their own agent, Colonel Upton, with the opposite faction of the Brahmin ministers. A long and perplexed negotiation now ensued, which had nearly ended in war, when a treaty, that of Poorunder, was signed on the 3d of June 1776, by which the Mahratta ministers agreed to surrender Salsette, and the English Bassein; and the unfortunate Ragoba finally retired to Surat with only two hundred attendants.

War with the Mahrattas.

The Mahratta power, which was spread far and wide in India, was now weakened by the same divisions which had occasioned the downfall of the Mogul empire. All indeed acknowledged their allegiance to the peshwa, the representative of Sevajee, their founder, and the nominal head of the whole confederacy. But there was no unity in the component parts of their wide-extended empire. They no longer obeyed one common impulse. The military chiefs to whom were confided the more distant provinces threw off the yoke of sovereign authority, as it was gradually relaxed; and thus, from the extension of the Mahratta power, arose various independent potentates, who, though united by a common tie, yet waged war with each other, or with the peshwa, their head, on any provocation or prospect of advantage. The most important of these independent states was, 1*st*, that of the Bhonslas, which included the extensive province of Berar, together with Cuttack, a part of Orissa; 2*d*, the province of Gujerat, broken off from the Mogul empire by Pillagee Guicowar, or the herdsman; 3*d*, the independent chiefs, Holkar and Scindia, whose names figure in the future annals of India, and who ruled over extensive territories in Malwah and in the regions bordering on the territories of Berar and Oude. Other inferior chiefs, offsets from the main stock, possessed smaller portions of territory in different parts; and the internal relations of Hindustan were thus more than usually complicated, and presented a wide field for politics and intrigue.

Oppression of the native princes.

The presidency of Madras, as well as the other two presidencies of Bengal and Bombay, were now deeply involved in the disputes of the native powers. The nabob of the Carnatic, Mahommed Ali, was incapable of ruling or of defending his country against the Mahrattas or Hyder Ali, and he relied entirely upon the English for protection and for the collection of his revenues. The disorder of his finances, already great, was much increased by the extortions of his allies, who were insatiable in their thirst of gold; and funds failing, as in Bengal, to supply their exorbitant demands, they anxiously sought elsewhere the means of relief. The kingdom of Tanjore, by the prudence of its sovereign, had enjoyed peace amidst the wars and desolations of surrounding countries; his powerful neighbours, supposing that he had amassed great wealth, mustered up against him a world of complaints, of which he readily showed the futility; and when he saw that his ruin was resolved on, that he was to be stripped of his dominions, and that he and his family were to be put to death or imprisoned for life, he pleaded for mercy with the most affecting earnestness; but avarice had extinguished every softer feeling in the breasts of his oppressors. The troops were ordered to advance; the rajah agreed to terms which he could not fulfil; and failing to pay within the exact time which the contribution imposed upon him, though he made the fairest offers, Tanjore, his capital, was taken by assault, and he and his family were delivered into the power of the nabob. This act of oppression, encouraged at first by the directors, was afterwards disapproved by a court of proprietors; and Lord Pigot was sent out as governor of the presidency, to restore the rajah, and to enforce economy and reform. The corrupt and dishonourable practices of the Company's servants were nowhere carried to a greater length than at Madras. They were in the habit of lending, or pretending to lend, money, to the nabob, at an exorbitant interest, and to receive in security assignments on the land. Paul Benfield, with a salary of some hundred pounds a year, had assignments on the lands of Tanjore to the amount of L.234,000; and Sir Thomas Rumbold, with a salary of L.20,000 a year, remitted to Europe the first year he was in office L.45,000, and in the two subsequent years a further sum of L.119,000, alleging that he had property to this amount in India before he left Europe. The lands belonging to the Company were let at an under rate to the renters, and large bribes received in return; and it was by such unworthy means that the servants of the Company so quickly acquired their enormous fortunes. Lord Pigot, in carrying into effect the views of the directors, by restoring the rajah of Tanjore, and opposing the existing abuses, was resisted by a faction. He was at last put under arrest by the members of his own council, and died after a confinement of about eight months. The authors of this violence were afterwards tried in England, and condemned to pay a paltry fine of L.1000, which was no adequate punishment for such an offence, and, to men of their fortunes, no punishment at all.

Invasion of the Carnatic by Hyder Ali.

The growing ascendency of the English naturally excited the hostility of the native powers; and Hyder Ali, irritated by their increasing influence, and by their breach of the treaty of 1769, in refusing the aid which he demanded, was now preparing to assail them with the whole weight of his power. He accordingly made peace with the Mahrattas, who formed, with the Nizam Ali and Hyder, a coalition for the expulsion of the English from India. In the year 1778, war having commenced in Europe between France and England, the presidency of Madras besieged and took Pondicherry, and Mahé, a small fort, the only remaining possession of the French on the coast of Malabar, and ranked by Hyder amongst his dependencies. Irritated by this new offence, he assembled his army, and having seized and guarded the passes of the Eastern Ghauts, through which alone the Carnatic would be invaded from Mysore, he suddenly poured down on the country below with a mighty host of 100,000 cavalry and 20,000 infantry, besides the European troops of Colonel Lally, of undoubted bravery and experience in war. Every thing gave way before this overwhelming flood of invasion; and the cavalry inundating the open plains, the inhabitants fled from their homes to the woods or the mountains, whilst the unresisted invader laid waste the country with fire and sword for many miles round Madras, and even threatened the city itself. The council were confounded by the intelligence of this sudden calamity. They were apprized on the 21st of July that Hyder had come through the pass, that he had next day plundered Porto Novo on the coast, and Conjeveram, not fifty miles from the capital. Each succeeding day brought its tale of calamity, and on the 10th of August Madras was alarmed by the approach of the enemy's horse, and the inhabitants of the open town began to take flight. The governor and council were very indifferently provided for the fearful struggle in which they were engaged. They were destitute both of money and provisions; their small force was scattered throughout the country; and, lastly, their councils were distracted by the dissensions of the civil and military authorities. Immediate action, however, was necessary, in order to avert impending ruin. The scattered troops were therefore directed to assemble at St. Thomas' Mount, for the defence of the capital. Colonel Brathwaite's detachment from Pondicherry having joined the main body on the 18th of August, an express was sent to Colonel Baillie at Gumeroponda, about twenty-eight miles from Madras, directing him to repair to Conjeveram, whither the main army now advanced under Sir Hector Munro, consisting of 1500 Europeans and 4200 Sepoys, with a train of artillery, and arrived after a distressing march of four days, during which two hundred men belonging to the seventy-third regiment were left lying on the road. They found the town of Conjeveram in flames, large bodies of the enemy's cavalry advancing on both flanks, and no appearance of Colonel Baillie's detachment, which had been impeded in its march for a day by a small torrent swollen with the rains. Hyder Ali having learned from his spies the movements of the English army, abandoned the siege of Arcot, in which he was engaged, and, upon the 3d of September, the day on which Baillie's detachment crossed the river in its advance to the main body, he encamped at five miles distance in front of the English army, near Conjeveram; thus interposing between Colonel Baillie's detachment and the English forces; and he sent his son Tippoo with 30,000 cavalry, the flower of his army, and 8000 foot, with twelve pieces of cannon, to cut off the troops under Colonel Baillie, who had now arrived at a small village about fifteen miles distant from Sir Hector Munro's army, the movements of which he himself watched in the neighbourhood of Conjeveram. The troops under Colonel Baillie gallantly repulsed the repeated charges of Tippoo's numerous cavalry; and being now joined by a detachment under Sir R. Fletcher, sent to their aid by General Munro, they resisted long and bravely all the attacks of the overwhelming force by which they were surrounded; they even at times became the assailants; and an attack by five companies of Sepoys on the enemy's guns, which had begun to do great execution, spread amongst them such terror and confusion, that a seasonable and bold assault of their camp would, it is thought, have completed their route. The English commander maintained the same position till next morning, for which he has been much blamed; and when, at five o'clock, he began the day's march, he was assailed by the whole army of Hyder, who had left his ground without shifting his tents, to conceal his design. Colonel Baillie, with his handful of men, still maintained his ground in spite of the enemy's superior fire and the fury of his closer attacks, when, by an accident, the blowing up of two tumbrils, the English line was not only disordered, but the ammunition was destroyed, and the guns disabled. But though their fire was now silenced, they maintained a gallant resistance till three o'clock in the morning, when the commander, Baillie, despairing of relief, sent a flag of truce to the enemy; and the men having laid down their arms on receiving a promise of quarter, Hyder's troops rushed on them with savage fury; and, but for the humane inter-

Colonel Baillie's detachment cut off.

position of the French officers, would have massacred all who survived. After this disaster, Sir Hector Munro retreated to Madras, whilst Hyder returned to the siege of Arcot, which was taken by storm on the 31st of October, with an immense quantity of ammunition and military stores.

Progress of the war with Hyder Ali.

On the intelligence of Colonel Baillie's disaster, the supreme council of Bengal requested Sir Eyre Coote to take the command of the army in the Carnatic; and on the 17th of June 1781, the English force, consisting of 7000 men and 1700 Europeans, marched from the encampment at Mount St Thomas. Hyder now changed his plan of operations, and detached different divisions of his force against the strong places of the Carnatic. But he was so overawed by the arrival of a new commander with reinforcements, that he abandoned the siege of Wandewash, and of every place which he had invested, and retired without even disputing the passage of the Palaar. The English took the opportunity of this short respite to secure possession of Pondicherry, and to disarm the inhabitants, who had revolted. Hyder having received large reinforcements, resumed the offensive; and as the plan of the English was to march southward to protect the district of Tanjore and Trichinopoly, he resolved to oppose their advance to Cuddalore. A battle was fought on the 1st of July 1781, in which Hyder was driven from his strong position with great slaughter. On the 27th of August, another battle was fought on the ground where Colonel Baillie's disaster had occurred, when he was again defeated, after an obstinate action, in which the English suffered severely; and, some weeks afterwards, he experienced a third defeat, with greater loss than before. Far from being discouraged, this warlike prince proceeded to lay siege to Vellore, eighty-eight miles south-west from Madras. Sir Eyre Coote, though he had placed his army in cantonments, advanced to its relief, and forced his way through a strong pass guarded by the enemy's force. Returning by the same pass, he was again attacked at a disadvantage with the utmost vigour; but Hyder's cavalry suffered so severely from the English artillery that he retired with loss, while Sir Eyre Coote returned to his cantonments near Madras. Whilst the war was thus carried on with doubtful success in the eastern districts of the Carnatic, hostilities now commenced on the opposite coast of Malabar. The English detachment, by which the French settlement of Mahé was captured in 1779, had since that period occupied the fortress of Tellicherry, when it was besieged by a superior force of Hyder's tributaries. Major Abingdon, the commander, having received a reinforcement from Bombay on the night of the 7th January 1782, assaulted the enemy's lines, and threw their whole army into confusion; and he soon afterwards gained possession of Calicut. Here he was joined by Colonel Humberston Mackenzie with a thousand Europeans, and offensive operations were undertaken with vigour and success, when the army returned in May, as the rainy season approached, to its cantonments at Patacalah, in Calicut. Operations were resumed in September with the reduction of a strong fort, and the army had arrived at Palacatcherry, when, being surprised in a narrow defile, the whole baggage and ammunition was captured. A retreat to the coast was the only alternative now left to the English, in the course of which they were attacked from every thicket, both on their flank and rear, and harassed in their march, by 20,000 horse under Tippoo. Arrived at the town of Paniany, on the Malabar shore, their lines were assaulted by the enemy's force in four columns, including Lally's corps, when the forty-second regiment advancing to the charge, repelled the enemy. Tippoo now hearing of his father's death, immediately departed to take the necessary measures for securing his succession to the throne.

In the south of the Carnatic a French fleet landed 2000 men at Porto Novo early in 1782; and Tippoo having arrived with a large detachment from Hyder's army, by a brilliant and successful movement surrounded Colonel Brathwaite's force, consisting of a hundred Europeans, five hundred Sepoys, and three hundred horse, encamped upon the Coleroon, before there was the smallest suspicion of his march. Forming a hollow square, this little band held out for twenty-six hours, and repulsed every attack, until, exhausted with incessant conflict, they were at last broken by a charge of the French under Lally, and would have been all massacred as formerly, but for his vigorous and humane interference. Hyder was now enabled, by the succours he had received from France, to invest Cuddalore, which quickly surrendered, when he determined to undertake the siege of Wandewash. Its importance brought the army of Sir Eyre Coote to its relief, when Hyder still declined the hazards of a battle. The English general then proceeded to the attack of Arnee, the great depository of the enemy's warlike stores and necessaries. But Hyder outstripping the slow movements of the English force, hung upon their march; and, whilst they were galled by the attacks of his cavalry, he dexterously detached a division of his army, which carried off all his treasure from Arnee, and reinforced the garrison. In the retreat to Madras, after these operations, a regiment of European cavalry, drawn into an ambuscade by the skilful tactics of the enemy, was either killed or made prisoners. Whilst the English army was cantoned in Madras, Hyder, ever active and enterprising, was concerting with the French admiral an attack on Negapatnam, a settlement of the Dutch, which had been conquered by the English at the commencement of the Dutch war in 1780. But the French fleet having been brought to an action by the English, was prevented from co-operating in this well-planned enterprise. On the return of the army to Madras, Lord Macartney, who had arrived as governor in December 1781, now concerted a plan for the recovery of Cuddalore. But the admiral steadily refused co-operation in this, or apparently in any other operations of the land forces. On the 15th of October, one of the most dreadful tempests ever known occurred at Madras; the shore was in a short time strewed with the wreck of a hundred trading vessels, and famine raged in the city, multitudes daily perishing for want. The enemy had fortunately no information of the helpless and starving condition of the place, and considerable supplies of provisions were received from Bengal and the Circars. Hyder Ali died in December 1782, at the age of eighty years; and this event produced a great and favourable change of affairs. The Mahratta war, undertaken in favour of the claims of Ragoba to the dignity of the peshwa, which had continued since 1778, was now also concluded by a peace. The capitulation by which a British force that had invaded the Mahratta country surrendered, having been violated, the Mahrattas joined the confederacy against the English. But by the great successes of General Goddard, who, in the course of three months, from January 1780, had reduced the province of Gujerat, and completely defeated Scindia, the Mahratta general, they were now detached from the alliance of Hyder, the great enemy of the English.

Tippoo, after he joined his army in the Carnatic, undertook no operation of consequence, and he was recalled to the defence of his own territories, which were assaulted by the enterprising movements of the English armies, both from the west and from the south. About the beginning of January 1783, a force concentrated at Merjee, on the western coast of India, about 300 miles north of Paniany, under General Mathews, after storming the forts of Onore, Aranpore, and Mangalore, on the sea coast, with the slaughter of every man taken in arms, laid siege to Bednore, a rich capital of one of the Mysore provinces, which soon surrendered. A vast treasure, amounting to L.800,000 in pagodas, besides jewels, was found in this place, which immediately occasioned disputes, in consequence of the general refusing to divide the booty among the captors. He was on this account superseded by the presidency, and the command given to Colonel Macleod. But the hope of spoil appears to have corrupted the virtue of the army, which was dispersed in plundering detachments over the country, when Tippoo suddenly took possession of Bednore, making prisoners of the English garrison, which capitulated, with General Mathews, and sending all of them in irons to the strong fortresses of Mysore. Mangalore was next besieged, and taken after a gallant resistance, on the 23d of January 1784. In the mean time Colonel Fullarton, who commanded a force in the Southern Carnatic, having reduced to order the districts of Madura and Tinnevelly, and taken, in April, May, and June, the forts of Caroor, Dindigul, and Daraporam, advanced to the strong fortress of Palacatcherry, which surrendered after a short siege. Coimbetore was taken possession of in November, and every preparation was made for advancing to Seringapatam, and terminating the war by the capture of the enemy's capital, when a treaty was signed on the 11th of March 1784, upon the general basis of a mutual restitution of all conquests.

The state of affairs in Bengal under the administration of Mr Hastings now claims our attention, and we shall endeavour briefly to describe the leading transactions of that memorable period. The new council, to whose care was committed the administration of India, and of which Mr Hastings was president, commenced its deliberations in October 1774, with an inauspicious appearance of mutual coldness and jealousy, which quickly broke out into open dissension. The Rohilla war was the first subject of deliberation, and it unhappily afforded too good grounds for doubt and for inquiry. Other subjects succeeded, equally difficult to handle without offence, as they involved the governor in a suspicion of corruption in the business of the revenue. The rannee of Burdwan, a widow who enjoyed an extensive district, accused her agent the duan of corruption, and the English resident of being bribed to support or to connive at his iniquities. In the accounts that were presented to the council, a sum of 15,000 rupees was charged to Mr Hastings, and 4500 to his native secretary. Another accusation of the same nature was preferred by one of the natives, namely, that the phouzdar of Hooghly, out of the salary of 72,000 rupees which he received from the Company, returned 36,000 to Mr Hastings, and 4000 to the native secretary; and Mr Grant, accountant of the provincial council of Moorshedabad, produced a set of accounts, from which it appeared that Munny Begum, a concubine of the late Meer Jaffier, who had been appointed to the guardianship of the nabob by Mr Hastings, had received 967,693 rupees[1] more than she had accounted for; and when pressed on this subject, she told that she had given 150,000 rupees to Mr Hastings for entertainment money, which was at the rate of L.73,000 per annum, and the like sum to Mr Middleton, the agent of Mr Hastings. A still more serious charge was brought forward by the rajah Nundcomar, who had been the agent of Mr Hastings in the prosecution of Mahommed Reza Khan, duan or manager of the revenues of Bengal, whose embezzlements, as well as those of Shitabray, he now accused the governor-general of overlooking; and further exhibited the particulars of a sum of 354,105 rupees, which he affirmed that he had accepted for the appointment of Munny and Goordass to their respective dignities and powers. In answer to these accusations, Mr Hastings chiefly pleaded his dignity as governor-general. He resented them as personal insults; and when it was proposed to inquire into them by the other members of the board, he lost all calmness, and accused them of a design to supersede him in his office. "I declare," he said, "that I will not suffer Nundcomar to appear before the board as my accuser. I know what belongs to the dignity and character of the first member of this administration. I will not sit at this board as a criminal." After this he dissolved the council, in virtue of a power which he assumed as president. The majority declared the dissolution void, and continued the inquiry, when Nundcomar declared the particular sums which he himself had paid to the governor-general, gave in the names of several persons who were privy to those transactions, and presented a letter from Munny Begum, which, on examination of the seal, was found to be authentic, mentioning a gift of two lacs (L.20,000) given to the governor by herself. The governor being called upon to refund, refused to acknowledge the authority of the council, and returned no answer. At this critical stage of the proceedings, a prosecution was instituted against Nundcomar, at the instance of the governor-general and his supporters in the council, which, after some ineffectual proceedings, was dropt. But a few days afterwards, Nundcomar, at the suit of a native, was arrested on a charge of forgery; tried before the supreme court by Sir Elijah Impey and a jury of Englishmen, though it was far from clear that the court had any jurisdiction over him, being a native of Hindustan; convicted on doubtful and contradictory evidence; and finally executed, amidst the tears and loud lamentations, and even shrieks of horror, of a vast assemblage of his countrymen. This transaction, viewed in all its bearings, leaves a stain on the character of Hastings, from which it has never been relieved by the zealous testimonials of his friends. In reviewing the whole evidence and circumstances of the case, we cannot well doubt, that if Nundcomar had not accused Mr Hastings, he would never have been arrested; that his real crime, therefore, was the charge which he had brought against Mr Hastings, and not the alleged forgery; and hence that he was tried and executed because he was a witness whose testimony it was more easy to put out of the way than to confute. If this be a just inference, Mr Hastings must be considered as guilty of murder, committed under the forms of law. This is the character which must be fixed upon him by the impartial verdict of history; and his political merits, however magnified by his admirers, cannot be accepted for a moment as any palliation of his moral guilt.

In adverting, as we shall now do, to the transactions of the governor-general with the independent or tributary states of India, it may be observed, that when he assumed the government of Bengal, the Company still laboured under great pecuniary difficulties. Disorder and waste pervaded every department of the administration; the Company's servants were intent, as we have seen, on enriching themselves rather than their masters; and the consequence was a constant want of funds for the public service. The arduous duty of providing these now devolved upon the governor-general; and the necessities of the state, if they do not justify, afford at least a key to some of those dark, and, we must add, atrocious transactions, which distinguished his administration. Bengal had been exposed to such heavy exactions that the country was exhausted; and Mr Hastings, instead of adopting economy, and improving the revenue at home, sought relief in the plunder of foreign princes, who were now laid under contribution to the necessities of the state. The rajah Cheyt Sing, who ruled at Benares, was the son of Bulwunt Sing, who had sided with the English in the war with Sujah Dowlah, subahdar of Oude, and who had been confirmed in his inheritance by the British for a fixed tribute, which was paid with an exactness not very usual in India. Mr Hastings proposed in 1778 to increase this contribution; and because the rajah pleaded poverty, and required time, he became offended, replied to him in harsh and imperious terms, refused to allow time for raising the money, and threatened military execution in case of delay. These exactions were renewed from year to year, and increased, the rajah remonstrating in the most humble terms, and being treated on account of his remonstrances as a delinquent whom it was necessary to punish. "I was resolved," says Mr Hastings, "*to draw from his guilt the means of relieving the Company's distresses.*" This was truly his object, and he accordingly found out guilt in the whole conduct of the rajah, though it was meek and humble, such as the weak naturally assume when they are in the power of the strong. At last Mr Hastings proceeded to Benares, and, notwithstanding the supplications of the rajah, craving forgiveness if he had offended, on the ground of his youth and inexperience, he ordered him under arrest; a tumult arose between the Sepoys and the inhabitants, in which the former were all put to the sword; the rajah fled; war commenced, which ended in his discomfiture, and he was dethroned. His mother, the wife of Bulwunt Sing, the faithful ally of the British, took refuge in the fort of Bidgegur; she surrendered her treasure on condition of being allowed protection for herself and female attendants. But the articles were shamefully violated; and she and her followers were plundered of their effects, and their persons subjected to the rude examination of the licentious soldiery and the followers of the camp. In a letter, Mr Hastings says, "I think that every demand she has made to you, except that of safety and respect for her person, is unreasonable." He afterwards adds, "I apprehend she will contrive to defraud the captors of a considerable part of the booty, by being suffered to retire without examination. But this is your consideration, not mine. I should be sorry that your officers and soldiers lost any part of the reward to which they are so well entitled." The ideas implied in this hint not to suffer these illustrious females to pass without examination cannot be mistaken; it is sufficient to sanction the grossest outrages; and it appears, indeed, that those to whom it was addressed were not slow to profit by the instructions given them.

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[1] Nine lacs sixty-seven thousand six hundred and ninety-three rupees. A lac of rupees is 100,000, and a crore is 100 lacs, or ten millions. We have adopted the English mode of notation, as more familiar to the reader.

The treasures of Cheyt Sing and his widowed mother fell so far short of the expectations of Mr Hastings, that they did not even pay the expense of quelling the revolt which he had occasioned; and hence this transaction, impolitic as well as unjust, increased the embarrassments of the Company. The governor-general was therefore compelled to look elsewhere for treasures that might be profitable to the state, and he fixed his eye on the two princesses of Oude, known by the name of the Begums, the one the mother of Sujah Dowlah, the late nabob, eighty years of age, and the other his widow, and mother of the reigning nabob, who were possessed of treasures to a great amount, and of jaghires or estates, from which they maintained their own state and dignity, and the numerous families of the preceding nabobs, with a suitable train of attendants. The nabob of Oude, Sujah Dowlah, had long been unable to pay the contributions imposed on him by the English; he was in arrear to the amount of L.1,400,000, and Mr Hastings now entered into a negotiation with him for the seizure, or resumption, to use the official phrase, of the jaghires or estates which belonged to the Begums, for the purpose of enabling him to pay up this arrear. It is unnecessary to dwell on the proceedings by which a son was persuaded or compelled to aid in the spoliation of his mother and grandmother. Suffice it to observe, that Mr Middleton, the agent of Mr Hastings, in order to extort the surrender of the treasure from the princesses, ordered the zenana, the dwelling of the princesses at Fyzabad, with their numerous families, to be blockaded by troops; and these measures failing to obtain the treasures, the eunuchs Jewar Ali Khan and Behar Ali Khan, the confidential servants of the princesses, were imprisoned and put in irons, and were kept from all food, and exposed to secret tortures. These dreadful measures so wrought upon the feelings of the princesses, that the elder Begum surrendered the treasure to the amount of the nabob's bond given to the Company in 1779–1780. But another balance still remained, and new severities were applied to the ministers of the princesses, which drew from them an engagement to complete the demanded sum; but they were still tortured; and though the princesses now delivered their whole effects, even to their table utensils, and had paid upwards of L.500,000 before the 23d of February 1782, and the resident himself reported "that no proof had been obtained of their having more," yet the prisoners were not released, as they earnestly entreated. On the contrary, they were threatened with greater severities to enforce a payment of L.25,000, according to their account, and of L.50,000, according to the resident, still due on the extorted bond; and though they had now lain two months in irons, were sickly, and the officer who guarded them wrote to the resident Middleton, craving that their irons might be taken off, and that they might be allowed to walk in the garden, the nature of his orders allowed no mitigation of their sufferings; they were even threatened a few days after, on the 1st of June, with being removed, and were actually removed to Lucknow, where they were tortured in secret, of which the letter addressed by the assistant resident to the commanding officer of the English guard affords the odious evidence.[1] The cruelties to which the women and children of the zenana, composing the household of the late rajahs, were exposed, are truly shocking to humanity. They were distressed for want of food to that degree that they uttered the most piteous cries, and were even driven to the extremity of appearing publicly before the Sepoys, an exposure dreaded more than death by Hindu females of rank; and these barbarities were executed under the orders of Englishmen, a disgrace to the name, and by English officers, unwilling agents, we may well believe, in such cruelties, and whose letters describe the extreme sufferings of these helpless females. In the letter of the commanding officer, it is said, "they are in a starving condition, having sold all their clothes and necessaries, and now have not wherewithal to support nature." "Last night the women of the zenana assembled on the tops of the buildings, crying in the most lamentable manner for want of food; that for the last four days they had got a very scanty allowance, and that yesterday they had got none. The melancholy cries of famine are more easily imagined than described."[1] These cruelties were continued for nearly a year, and persevered in after all the treasures were surrendered, in the vain hope that some secret hoard might still be retained, which torture would compel them to bring forth. Amongst other particulars, it may be added, that Mr Hastings received from the nabob a present of L.100,000, and craved permission to accept it from the directors, whose orders were positive against the receipt of presents. These princesses were accused of aiding in the rebellion of Cheyt Sing. But of this charge no proof beyond mere rumour was ever adduced; and, in considering all the circumstances of the case, it appears to have been invented as a pretext for despoiling them of their wealth. Mr Hastings resolved to draw from the guilt of Cheyt Sing, to use his own words, the means of relieving the Company's distresses; and the same patriotic motive seems to have dictated the accusation against the Begums. In other countries it is the poor, those who are discontented and in debt, that are turbulent; but here it is the rich, aged women of fourscore and upwards, living in affluence and splendour under the protection of the English, that are accused of rebelling against their benefactors, and of raising disturbances which could bring no advantage, but, on the contrary, were fraught with danger, to them. The directors in Europe disapproved of these proceedings against the princesses; they saw no evidence of their rebellion; and they ordered their estates to be restored, and an asylum to be offered them within the Company's territories. But the authority of the directors was little respected in India, the governor-general never wanting a pretext for disobeying their express commands. It appears, however, that some provision was afterwards made for these princesses, and for the restoration of a portion of their estates. The remaining transactions of Mr Hastings before he quitted Bengal relate to Fyzoolla Khan, who survived the ruin of the Rohilla nation in 1774; and he now entered into a scheme with the nabob of Oude for dispossessing him of his dominions. In a journey which he afterwards undertook to the upper provinces, in order to regulate the affairs of Oude, he was a witness to the desolation of the country from the exactions of his own deputies, a country which was flourishing and happy under the milder sway of Cheyt Sing.

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[1] We subjoin the two letters. The first, dated January 1782, is addressed by the resident to the officer guarding the eunuchs: "Sir,—When this note is delivered to you, I have to desire that you order the two prisoners to be put in irons, keeping them from all food, &c. agreeable to my instructions of yesterday. (Signed) Nath. Middleton." Letter of the assistant resident to the commanding officer of the English guard: "Sir,—The nabob having determined to inflict corporal punishment upon the prisoners under your guard, this is to desire that his officers, when they shall come, may have free access to the prisoners, and be permitted to do with them as they shall see proper."

On the 8th of February he resigned his office and embarked for England. For a more full detail of the conduct and character of Mr Hastings, the reader is referred to the work of Mr Mill, which contains a clear and well-digested view of all the dark and complicated transactions of his stormy administration. The calm and philosophical tone maintained by Mr Mill; his impartiality and love of truth and justice; and the interest which he uniformly manifests in the cause of suffering humanity, give a peculiar value to his work as a history. In his estimate of Mr Hastings' character, he seems to consider it due to truth to state the difficulties and temptations under which he acted, as to a certain extent palliating his guilt. We may remark, however, that crimes, especially those of a deep dye, are never committed except under strong temptation; and when we consider that those of which Hastings is accused are tyranny, extortion, and corruption in his high office; cruelty, the secret torture by his agents of innocent individuals, by means of famine, stripes, and imprisonment; violence threatened to females by the same agents as the means of extortion, he chiding them all the while for delay; his bargain for the extermination of the Rohillas by fire and sword; and the provinces of Oude and Benares reduced, under his unhappy rule, from contentment and prosperity to desolation; we can scarcely admit the palliations suggested by the candour of the historian. Mr Hastings was impeached, on his return to Europe, before the House of Peers, of high crimes and misdemeanours, of which he was declared innocent by a great majority of his judges. But there were various circumstances which detracted from the value and authority of this acquittal. The House of Lords, from its constitution and character, is unfit to act as a judicial tribunal. It is a political assembly, consisting of the two opposite parties, the one against, and the other in favour of the ruling power; it is thus exposed to the corrupting influence of politics, and is generally ruled, even in its judicial capacity, by the minister of the day, of which, in our more recent history, we have had ample proofs. It wants impartiality, therefore, that essential attribute of a court of justice; and there were, besides, in the present case other sources of delusion. The hope of sharing in the wealth of India had now shed its baneful influence over the land; that hope swayed all the higher classes, including the peers, who lent an unwilling ear to the charges; and this, joined to the reputed favour of King George III. for the accused, rendered the prosecution unpopular. The value of the acquittal was also lessened by the mode of conducting the defence. Mr Hastings was far from courting inquiry; on the contrary, he availed himself of all the legal subtilties of a technical defence. He constantly objected to evidence, and to the production of papers. He acted wisely, if he was guilty, in screening his conduct under legal pleas; but not so if he was innocent, because by resisting inquiry he hindered his innocence from being made clear, to the confusion of his enemies.

The mal-administration of India had now become a standing topic of declamation at home, in which all parties in parliament eagerly joined; and as the privileges of the Company were to expire after the 25th of March 1780, some new arrangement became necessary for the future government of India. Negotiations for this purpose had been begun between the ministers and the directors; and an act was at length passed in 1781, which, besides regulating the dividend, and other financial matters, more fully detailed in the account given at the conclusion of this article, of the commercial transactions of the Company, ordained that the directors should communicate to the ministers all despatches sent to India with respect to revenues, and to civil and military affairs. In 1783 Mr Fox brought forward his celebrated measure for regulating the commercial concerns of the Company at home, and for the better government of their territories abroad. He proposed to supersede the two existing courts of proprietors and directors, by vesting the whole administration of the territories, revenues, and commerce of India, in seven commissioners, to be chosen by parliament; these to have the power of appointing and of dismissing all persons in the service of the Company; nine assistant directors, being proprietors of India stock to the amount of L.2000, to be named by the legislature, and to assist in the details of commerce, and to be under the authority of the superior board. This was the substance of Mr Fox's bill, by which the government of India was transferred from the directors and proprietors to these seven parliamentary commissioners. There were, however, numerous other provisions for securing the punishment of Indian delinquents, for ensuring publicity; and all the serious abuses which had been committed by the servants of the Company were specially enumerated and forbidden. Monopolies were abolished, the land-tax was to be fixed, and it was provided that the zemindars should be reinstated in their dignities and lands.

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[1] See *Hastings' Trial.* Letters of Captain Leonard Jaques, of 6th and 7th March 1782; also letter of Major Gilpin, dated 30th October 1782. At last the unhappy females became desperate from want, and resolved to break into the market-place; and with this view "they arranged themselves in the following order; the children in the front, behind them the ladies of the seraglio, and behind them again their attendants." They were, however, opposed in their intentions by the Sepoys. On the following day their clamours were more violent than usual. It was resolved to drive them back by force. "The Sepoys," it is added, "consequently assembled, and each one being provided with a bludgeon, they drove them by dint of beating into the zenana." (*Letter to the Resident at Lucknow.*)

In 1784 Mr Pitt introduced a new bill for the better administration of Indian affairs, the chief distinction of which from the other was the institution of a board of control, or of six commissioners, to be chosen, not by parliament, but by the king, who were not to supersede the court of directors, but only to "check, superintend, and control" all the acts and concerns which in anywise relate to the civil or military government or revenues of the Company's dominions; and with this view all letters and orders were to be submitted, before being sent out to India, to the inspection of the board, who might alter and amend these as they should deem expedient; and all communications from India were in like manner to be submitted to its inspection, and this board might even transmit orders to India without being submitted to the directors. The power of the court of proprietors was greatly diminished; a secret committee of directors was appointed; a provision was made for enforcing the disclosure by individuals of the fortunes brought home by them from India; and a new tribunal was erected for the trial of offences committed in that country. The nomination of the commander-in-chief was vested exclusively in the king; that of governor-general, presidents, and members of all the councils, in the directors, subject to the approbation of the king; which clause, rendering the approbation of the king necessary, was afterwards modified, but he was still allowed the power of recall. The servants in India were forbidden to engage in war, to receive presents, or to disobey orders transmitted by the board; and provision was made for the restoration to the zemindars of the lands from which they had been ejected. In the year 1786 no less than three acts were passed for the amendment of this act, by one of which power was given to the governor-general to act without and even against the consent of this council; by another the military was subjected to the civil power; and by a third act, the most efficient clause of Mr Pitt's bill was repealed, which ordained every public functionary of the Company, on his return to Europe, to make a full disclosure on oath of the property he possessed. This was considered as too severe a test for the Company's servants, though it could not have affected those who acted honestly. It is the guilty only who suffer by inquiries of this nature.

Mr Pitt's bill defined rather loosely the respective powers of the board of control and the directors; and the consequence was, that they speedily came into collision. The first question which came under their joint consideration, was the settlement of the nabob of Arcot's debts. These debts were owing to the Company's servants, and it was not very clear that any equivalent had been given for them. Paul Benfield, a principal creditor, who, as we have already mentioned, acted as a junior clerk of the Company, with a salary of some hundreds a year, advanced a claim, which, with interest, amounted to L.592,000. Such transactions, therefore, were of so very doubtful a character, that they presented a *prima facie* case for inquiry; and Mr Pitt's bill accordingly provided that the court of directors "should take into consideration the origin and justice of such demands." But how great was their surprise when the board of control ordered that these debts, some of them contracted in 1767, should be all paid without inquiry, and with the addition of interest at the rate of twelve per cent. The directors remonstrated against this proceeding, but in vain. The board ordered the debts to be paid immediately, though, in a similar case in 1805, the commissioners appointed to inquire into the more modern debts of the nabob of Arcot, out of claims to the amount of L.20,390,570, allowed only L.1,346,796. These facts too clearly point to the parliamentary influence of the East India interest as the true spring of this corrupt transaction; and the same interest also prevailed in subverting the plan which Lord Macartney had adopted for the management of the Carnatic revenues, and in restoring the administration of the nabob, which was a system of misrule that impoverished the country exactly as it tended to enrich the Company's servants. This, and other differences which arose, induced the directors to question the powers of the board of control; and a declaratory act was in consequence brought forward by Mr Pitt explaining these powers, according to the interpretation, not of the directors, but of the ministers. This act vests the real power in the board of control, though in practice a large share both of power and patronage has been still left to the directors.

War with Tippoo.

Lord Cornwallis assumed the government of India in September 1786. He had ample instructions both from the court of directors and the board of control; and he carried into effect several very important reforms, both in the management of the revenue and in the administration of justice, whilst in his arduous contests with Tippoo he fully maintained the honour of the British arms. To the native and dependent powers his conduct was moderate and just; and one of his first cares was to relieve the nabob of Oude from the extortions of the former government, by which the country was impoverished, and in many places deserted and desolate. The wretched condition of the people is described in strong terms by Lord Cornwallis; and he now reduced the annual payment of the nabob from eighty-four lacs, equal to L.940,000, to fifty lacs, and left in his hands the internal government of his country. But the mind of the governor-general was soon engrossed by other and more momentous concerns. Tippoo, who naturally viewed with jealousy the growing ascendency of the British, began to take hostile measures. He descended from the Ghauts with a large military force, and spread alarm along the whole western coast. At length, throwing off all disguise, he commenced an attack on the rajah of Travancore, an ally of the British, and invaded his dominions. Lord Cornwallis now prepared for war. He formed a league with the Mahrattas and the nizam, who agreed to aid with a military force in the approaching contest. The plan of the campaign was, that a division of the British under General Meadows should penetrate through the province of Coimbetore into the heart of the Mysore country, whilst General Abercromby should reduce the territory of Tippoo on the coast of Malabar, and Colonel Kelly remain to protect the Carnatic from the ravages of the enemy. The division of General Meadows marched from the plain of Trichinopoly on the 15th of June 1790, and all the fortresses in the line of its march, namely, Caroor, Daraporam, Erroad, Coimbetore, Sattimungul, Dindigul, and Palacatcherry, were necessarily occupied, by which the army was divided into three bodies, one at Coimbetore, another at Sattimungul, sixty miles distant, and a third at Palacatcherry, about thirty miles in the rear. In this situation, Colonel Floyd at Sattimungul, was attacked and forced to retreat with loss, and with great difficulty effected a junction with General Meadows. The sultan now resolved to attack, and, if possible, surprise the English chain of posts. He retook Erroad; approached Coimbetore, which had been previously reinforced; and afterwards turned to Daraporam, which capitulated. Colonel Maxwell with his corps being ordered to invade Barramahal, the sultan, leaving part of his army to watch General Meadows, hastened to attack, and, if possible, to cut off this detachment. The British, and a regiment of cavalry, inveigled in a defile, were driven back with great loss. But the able dispositions of Colonel Maxwell frustrated any further attempts on the part of Tippoo; and he soon afterwards effected his junction with General Meadows. The sultan having thus succeeded in defeating the original plan for the invasion of Mysore by a rapid march into the Carnatic, arrived before the English depôt of Trichinopoly, whither he was followed by General Meadows, and afterwards to Trincomalee; and thus ended this indecisive campaign. The Malabar country was in the course of three weeks completely reduced under the British power by the force under General Abercromby.

Lord Cornwallis now resolved to assume the command of the army, and, advancing to the Ghaut Mountains in the direction of Velore, to lay siege to Bangalore, and thence to proceed against Seringapatam, the capital of Mysore. Early in February 1791 he was on his march to Velore; and on the 5th of March the English army sat down before Bangalore, which on the 21st was carried by assault; an event which, fixing the seat of war in the enemy's territory, proved decisive of its success. On the 28th Lord Cornwallis began his march from Bangalore, in the course of which he was joined by the nizam's force, amounting to 10,000 cavalry, which were found to be of little service. On the 13th of May the British army reached Anika, about nine miles from Seringapatam, destitute both of provisions and of draught cattle. It was the intention of Lord Cornwallis that General Abercromby, ascending through the passes of the Ghauts from Malabar with the Bombay army, and the Mahratta force under Purseram Bhow, should penetrate into the centre of the sultan's dominions, and co-operate with the main army in the attack of the capital. Of the movements of this force Lord Cornwallis had received no intelligence; and having defeated Tippoo's army in the vicinity of Seringapatam, he now resolved, as the Cavery was too large to be crossed in safety, to ascend to a ford at Cansambaddy, eight miles above Seringapatam. In this march the troops were exposed to unexampled hardships; to disease, from scarcity of food, and of the means of conveyance owing to the complete failure of the draught cattle; and all their calamities were aggravated by the small-pox, which raged in the camp. It was now apparent that the army could only be saved by a timely retreat, and by the sacrifice of the battering train and all the heavy equipments. On the 21st of May, accordingly, the retreat was begun; and immediate orders were sent to General Abercromby to follow the same course, which occasioned a similar destruction of the battering train and other heavy equipments. So great was the destruction, that the ground on which the army of Lord Cornwallis had encamped at Cansambaddy was covered to an extent of several miles with the carcasses of the cattle and horses; and the last sight of the gun-carriages, carts, and stores of the battering train, left in flames, was the melancholy spectacle which the troops beheld, as they passed along, on quitting this deadly camp.

Fortunately for the British army, it was met, before the end of the first day's march, by the allied force of the Mahrattas, under Purseram Bhow and Hurry Punt. Every despatch sent to these chiefs had been intercepted by the vigilance of the enemy, and they were astonished when they learned the disasters which had been occasioned by their delay. Their arrival, which evinced their sincerity in the cause, produced general satisfaction in the British camp, and a conviction, that the ruin of the sultan, though delayed, was now certain and inevitable. Tippoo, overawed by this formidable confederacy, made overtures to Lord Cornwallis for the conclusion of a peace; but that nobleman would listen to no terms of accommodation in which his allies were not included, and which were not preceded by the release of all the prisoners that had been detained during the present and former wars. The arrival of the Mahratta troops, amounting to 32,000 cavalry, however fortunate it might be deemed at the critical moment in which it happened, brought little additional effective strength to the allied army. Their battalions were unwieldy, irregular, and ill disciplined; their force had declined as much as Tippoo's had advanced in improvement; and they were at present far inferior to those troops who, under Madha Row, had defeated Hyder Ali in 1772.

Treaty with Tippoo.

The combined armies amounted to about 80,000 men; and if to these be added four times the number of camp followers, brinjarries or grain carriers, and the carriage department, the number of strangers to be subsisted in the Mysore alone could not be much less than half a million. That no distrust, jealousy, or counteraction, should have disturbed the combined operations of such an immense multitude, must be ascribed to the unexampled moderation and the vigilant conduct of the commander-in-chief. Such a vast army had never taken the field in India in the British cause; yet no murmurs, nor even the slightest appearance of distrust, were ever manifested by the allies towards the British commander. They submitted with implicit confidence, not only to his arrangements in carrying on the war, but, which was little to be expected among allies so much alive to their particular interests, they acquiesced in his distribution of the conquered territories, with a deference which evinced the most perfect confidence in his liberality and justice. With these coadjutors, Lord Cornwallis set out in the month of June towards Bangalore. He determined on a new and circuitous route northward by Naggemungulum; and in order to facilitate the communication between the Mysore and the Carnatic, from which the supplies were chiefly to be drawn, the various hill forts which command the different passes were to be reduced. Amongst these forts, remarkable for natural strength, Oossoor, Rayacottahud, and Nundydroog, were assaulted and taken. There remained Kistnaghery, Savendroog, and Ootradroog, on the first of which an unsuccessful attack was made. Savendroog consists of a vast mountainous rock, which rises above half a mile in perpendicular height above its own base, which covers a space of eight or ten miles in circumference. This rock is surrounded by walls on every side, and defended by cross barriers wherever it was deemed accessible. Towards the upper part, the immense pile is almost precipitous, and has the further advantage of being divided on the top into two hills, which have each their defences, and are capable of being maintained independently of the garrison in the lower works. To the siege of this tremendous fortress, Lieutenant-Colonel Stewart, commanding the right wing of the main army, was appointed. The attempt commenced on the 10th of December. In three days a practicable breach was effected, and both hills were stormed, with only one private soldier wounded. Colonel Stewart's detachment marched in two days against Ootradroog, another fortress strengthened by five different walls, and so steep as to prove tenable by a handful of men against the largest army. After the refusal of a summons to surrender, the lower fort was escaladed with such rapidity, that the killadar requested a parley. But on some appearance of treachery in the upper fort, the assault was ordered; some of the gates were instantly broken, others were escaladed, till five or six different walls on the face of the steep rock were passed, when the troops gained the summit, and put the garrison to the sword. The assault of these fortresses, which had hitherto been deemed impregnable, made so serious an impression on the enemy, that in none of the hill forts, however inaccessible, did they afterwards make any attempt to resist the British troops. Hence the strong mountainous country between Bangalore and Seringapatam, which, studded with forts, had so much checked all communication, now afforded security to the convoys. These henceforth reached the army without opposition; and the supplies of warlike stores of every description were as completely re-established as they had been at the beginning of the last campaign.

To prevent any future scarcity of the great article of grain, the commander-in-chief encouraged the native brinjarries, a class of men of whom we have already given some account. They form a peculiar caste, who are traders in grain, and whose utility is so universally acknowledged that they are regarded as neutral in war, and are not hindered by either of the belligerents from carrying supplies of grain to the other. By constantly affording regular payment and a good price to these native merchants, they supplied the camp to an extent far exceeding what could ever be furnished by the most extensive carriage establishment. With such ample supplies, preparations were made for the commencement of the campaign. The Bombay troops, destined again to act from the same quarter as last season, marched from Cananore, and arrived at the foot of Poodicherrim Ghaut in the month of December. Several weeks of hard labour were necessary to drag the artillery through woods extending nearly sixty miles, and over mountains of immense height, when this force, consisting of 8400, with all their baggage and artillery, and a supply of rice for forty days, penetrated with safety into the Mysore frontier, which they reached on the 22d of January 1792. To facilitate the return of the army, batteries were constructed to defend the pass; a precaution which, if the sultan had not overlooked, he would have suffered no invasion on this quarter of his dominions.

The Mahratta forces, after taking the important post of Simoga, which, however, was soon retaken by one of Tippoo's generals, and defeating Reza Saib and nearly 10,000 of the sultan's cavalry, effected their junction with the Bombay army, though somewhat later than the appointed season. The main army under Lord Cornwallis, being joined at Ootradroog by the battering train under Colonel Duff, and the last convoys under Colonel Floyd, and also by the army of the nizam, was at last fully prepared to resume its enterprises against the sultan, who, in imitation of his father when formerly attacked in 1767, had encamped with the whole of his force in a strong position under the walls of his capital. On the 1st of February the allied armies marched from Hooleadroog, the last hill fort of which they had taken possession, lying at the distance of only forty miles from Seringapatam. The last march, of the 5th of February, stretched across a range of barren hills lying six miles north-east of Seringapatam. From these heights a view of the whole city was presented to the army, and the encampment of the sultan under its walls. Every circumstance was eagerly viewed by our troops; and, from the sultan's position, it was evident that he meant to defend the place in person, and to make it the grand concluding scene of the war. The camp of the allies was pitched on the north side of the island. The British formed the front line, and extended along both sides of the Lockany, a small river which at this place flows into the Cavery. The reserve was placed a mile in the rear, to afford space for the baggage and stores; and the nizam and Mahrattas were stationed still farther in the rear, to prevent interference with the British camp.

Opposite to Seringapatam, on both sides of the river, a large space was enclosed by a bound hedge, which marks the limits of the capital, and afforded a refuge to the peasants during the incursions of cavalry. Tippoo's front line, or fortified camp, lay immediately behind this hedge, where it was defended by heavy cannon in the redoubts, and by a large field train advantageously placed. In this line there were a hundred pieces of artillery, and in the fort and island which formed his second line there were above thrice that number. The redoubts on his left were intrusted to two of his best officers, and a corps of Europeans commanded by Monsieur Vigie; Sheik Ansar, a general of established reputation, was stationed on the right, and the Carighaut Hill; whilst Tippoo himself commanded the centre, having his tent pitched in the sultan's redoubt. The fort and island, where there was the greatest number of guns, were intrusted to Syed Saib and other commanders. The whole army of the sultan thus stationed consisted of about 50,000 men.

The whole attention of Tippoo, on finding that he could not keep the field, was directed to the fortifying of this camp, and the strengthening of his defences in the fort and island, under the idea that the want of supplies, or the approach of the monsoon, would again force his enemies to abandon their enterprise, as they had been compelled to do on former occasions. In these circumstances, Lord Cornwallis resolved on the bold enterprise of a night attack on the enemy's fortified camp. Accordingly, on the evening of the 6th of February 1792, just after the troops had left the parade, orders were issued for an attack at seven o'clock, of the enemy's camp and lines, in three divisions. The British camp was left to be defended by the artillery and cavalry; whilst the assailants, who were instantly furnished with guides and scaling ladders, marched in perfect confidence that muskets alone, for they were unprovided with artillery, would prove the fittest instruments for opening their way into the enemy's camp. The allies of the British, to whom this design was not communicated till after the columns had marched, were struck with surprise and consternation on learning that Lord Cornwallis, like a common soldier, was personally to lead the attack on the enemy's fortified camp. They not only deemed his success impossible, but they dreaded that the ruin of the allied army would be involved in the attempt.

The three columns into which the assailants had been divided marched with equal intrepidity to execute the different objects which had been allotted them. Many obstacles intervened; various conflicts ensued in different quarters of the enemy's camp; each party was uncertain of the fate of the rest, and each individual of his associates. The return of day at last removed their fears and uncertainty, by disclosing the complete success which had crowned their exertions throughout the whole line of attack. The enemy having lost all their positions on the north side of the river, where the siege was to commence, and almost the whole of the island, every material object of the assault was secured. On the side of the British, the loss, though considerable, amounting to 536 men, was small in proportion to the importance of the victory and the disasters of the enemy, of whom it afterwards appeared that 4000 had been slain in the various conflicts during this night of enterprise, danger, and death, besides a much greater loss which was suffered by desertion.

The British army, now in possession of the island and town of Seringapatam, and flushed with the pride of victory, immediately began to make the necessary preparations for the siege of the fortress or citadel. The mosques and religious buildings on this enchanting island, watered by the Cavery, and the seat of perpetual verdure, were converted into hospitals for the wounded and sick; and the trees, now for the first time assailed by the axe, furnished materials for fascines and gabions for the approaching siege. The sultan was now seriously alarmed; and after vain efforts to retard the siege by a distant cannonade, which occasioned little injury, he at last began to meditate seriously on the necessity of a peace. In order to smooth the way for his overtures, he previously liberated two British officers, who had been detained contrary to capitulation in Coimbetore. These officers, who had not been treated with his usual rigour, he loaded with presents, and made the bearers of a letter to Lord Cornwallis, suing for peace. He at the same time had recourse to another daring expedient, which might have been attended with fatal consequences. He despatched a small party of horsemen in the night to surprise the tent of Lord Cornwallis, and to put him to death. The party were detected by their eager inquiries after the commander's tent; and being fired upon, effected their retreat. The Bombay army, which was at this time approaching, effected its junction with the main army on the 16th; and on the second night after this event the trenches were opened, and a parallel formed within eight hundred yards of the north face of the fort. General Abercromby, stationed on the southern quarter with a strong detachment, was ordered to cannonade it from the heights. This attack being directed against the weakest part of the fort, occasioned the greatest alarm. Tippoo himself, therefore, at the head of his troops, marched to dislodge the general. Being supported by the guns of the fort, he maintained the action for the whole day; but towards evening he was forced to retreat. This desperate effort was the last that Tippoo made for his defence. His affairs hastened to a crisis; cabals were formed by the chiefs, and his troops deserted in multitudes during the night. He saw his capital blockaded on every side by a powerful army, plentifully supplied with provisions, which must infallibly reduce his troops by famine, should they even prove successful in repelling its assaults; even his last hopes of relief from the monsoon, and the swelling of the river, were thus finally cut off.

On the 23d of February, therefore, the preliminaries of peace were signed by Tippoo, amidst the conflicting emotions of pride, resentment, and fear; and orders were issued to the troops on both sides to cease from further hostilities; a stipulation of which the dread of an immediate assault alone enforced the observance.

By the terms of this treaty, Tippoo was compelled to pay, as an indemnification for the expenses of the war, three crores and thirty lacs of rupees, at two instalments, the first to be advanced immediately, and the second at the end of four months. Other articles of this instrument provided further, that all the prisoners taken from the allied powers, from the time of Hyder Ali, should be unconditionally restored; that no less than one half of his territories should be ceded to the allies, and that two of Tippoo Sultan's three eldest sons should be given as hostages for the due performance of the treaty.

About noonday on the 26th, the young princes, the one eight, and the other ten years of age, mounted on their elephants richly caparisoned, and attended with a splendid retinue, left the fort, the walls and ramparts of which were crowded with spectators. Amidst the vast multitudes whom curiosity or affection had drawn out to witness this scene, Tippoo himself was beheld standing above a high gateway, through which, as they passed, the princes were saluted by the guns of the fort; a compliment which they again received as they approached the British camp. They were seated in silver howdahs, attended by their father's minister and a numerous retinue. The procession which they thus formed was equally grand and interesting. It was led by several camel harcarras and standard-bearers, carrying green flags suspended from rockets, followed by one hundred pikemen, with spears inlaid with silver Their guard of two hundred Sepoys, and a party of horse, brought up the rear.[1]

Lord Cornwallis, attended by his staff, and the principal officers of his army, and a battalion of Sepoys, received them at the door of his tent, and embraced them with a cordiality and tenderness that resembled parental affection. The manners, dress, and appearance of the young princes themselves, formed an interesting spectacle to their European hosts. They were clothed in red turbans and long white muslin gowns, everywhere sparkling with emeralds, rubies, and pearls. Thus attired, the young princes, immediately after their reception, were seated on each side of Lord Cornwallis, when Gulam Ali, the head vakeel of Tippoo, thus addressed the British general:— "These children were this morning the sons of the sultan my master; their situation is now changed; they must look up to your lordship as their father." The scene now became most interesting; the faces of the children brightened up; and not only their attendants, but all the spectators, were delighted to observe, that any fears they might have harboured were removed, and that they would soon be reconciled to their change of situation. After being regaled, in the eastern manner, with ottar of roses and betel-nut, the princes were presented each with a gold watch from Lord Cornwallis, a gift from which they seemed to receive great delight. Lord Cornwallis next day visited them in their tents; and each of them made him a present of a Persian sword, and he made them a present of some elegant fire-arms in return.

Some difficulty occurred in adjusting the terms of a definitive treaty. When the territory of the Coorga rajah, in particular, was required, the demand seemed unexpected both by the sultan and his ministers, and was at first received with astonishment and disdain. This rajah was considered as a chief cause of the war, and Tippoo, therefore, wished to crush him. Lord Cornwallis seemed equally resolute in his defence; for he again manned the works, and threatened to recommence the attack. Happily, his stock of provisions was ample; and although upwards of 400,000 strangers and half a million of cattle were daily to be fed, the supply was sufficient for the whole; whilst one million sterling of the fine imposed on Tippoo had already been paid. The firm determination of the commander-in-chief, aided by these circumstances, which were not unknown to the sultan, damped his resolution. His resentment cooled, and he finally acceded to the terms agreed upon, and copies of the treaty were delivered to the confederated powers.

Nabob of Oude.

From the conclusion of this treaty, dictated to Tippoo by an English army at the gates of his capital, no great event occurs in the history of India till the renewal of the war in 1798, during the administration of Lord Mornington. The affairs of the nabob of Oude, and his dominions, were both hastening to ruin under his own mismanagement and that of the English; and, with a full knowledge of this, his sway was now extended over the district of Rampore in the Rohilla country, granted to Fyzoolah Khan, the Rohilla chief, who survived the ruin of his nation, and who died at an advanced age in 1794, leaving the territory of which he was ruler in a high state of cultivation. On the pretence of the usurpation of the reigning prince, who had made his way to the throne by the murder of his brother, the British troops made war on the Rohillas, and defeated them. The treasures of the late chief, amounting to 332,000 gold mohurs (L.607,000), were given to the vizir or ruler of Oude, who returned twelve lacs of rupees (L.127,000) to the British army; ten lacs of revenue were assigned for the support of the lawful prince, now dethroned; and the unhappy country was handed over to be pillaged and destroyed by the vizir and his English allies. He soon afterwards died, and was succeeded by Mirza Ali or Vizir Ali, who was set aside by the English on the reputed spuriousness of his birth, and Saadut Ali, the eldest surviving son of Sujah Dowlah, was placed on the throne. The annual subsidy to the English was at the same time raised to seventy-six lacs of rupees.

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[1] For the substance of this account, see Major-general Dirom's narrative of this campaign.

Transactions at Madras.

The Nabob Mahommed Ali, the first ally of the English, died in 1795, at the age of seventy-eight, and was succeeded by Omdut-ul-Omrah, his eldest son. Lord Hobart, governor of Madras, now determined to interfere with a strong hand in the affairs of the Carnatic, and, if possible, to rescue the country from the merciless exactions to which it had been exposed. These evils he describes to arise from the numerous loans of the English to the nabob. "Some of the principal houses of business in Madras," he observes, "or even some of the Company's servants, enter into an agreement with the nabob for the payment of sums which may have become due to the Company's treasury. They receive a mortgage upon a portion of the territory. To render this availing, they stipulate for the appointment of the manager of the territory. It is also requisite to establish an understanding with the military commanding officer of the district. And then the chain of power is complete. Then the unhappy ryots (husbandmen) are delivered over to the uncontrolled operations of men who have an interest in nothing but exacting the greatest sums in the shortest time; of men hardened by practice, and with consciences lulled to rest by the delusive opiate of interest upon interest." Lord Hobart prepared to remove these evils by assuming the management of the nabob's revenues, and, in short, the internal government of the country. But these arrangements being opposed by the supreme government, were not at this time carried into effect.

Invasion of the nizam's territories by Scindia.

The British had now acquired an undisputed ascendency in India. The other ruling powers were the Mahrattas, under the peshwa and Scindia; the nizam of the Deccan, an ally and dependent of the British; and Tippoo, so greatly humbled and weakened by the late war as to be no longer formidable. Each of these powers was jealous of the others, though the balance of power was chiefly endangered by the ascendency of the British. The nizam, after the conclusion of the war with Tippoo, was extremely desirous of forming an alliance with the English as a defence against the encroachments of the Mahrattas, who, he was well informed, were planning an inroad into his dominions, for the purpose of levying the contribution of the chout, amounting to one fourth of the land revenues, to which they laid claim, on condition of guaranteeing the remainder. The English, though bound to the nizam by a treaty offensive and defensive, refused to join in any alliance against the Mahrattas, who, under the command of Dowlut Row Scindia, Mahadjee Scindia being lately dead, now invaded the nizam's territories, and having defeated his army and shut him in one of his fortresses, dictated a treaty of peace to him, by which he ceded a country yielding thirty-five lacs of revenue, paid them a large sum, and gave up his minister as an hostage for the performance of these conditions. Tippoo, since the conclusion of the peace negotiated by Lord Cornwallis, had laboured assiduously to regain his lost power and influence, and had employed all the means which suggested themselves for inducing the French to lend their assistance in expelling the English from India.

Lord Mornington arrived in Calcutta as governor-general in May 1798, and he had scarcely been a month in India when printed copies of a proclamation announcing the hostile designs of Tippoo, and inviting French subjects to join his standard, were circulated at Calcutta. The inquiries instituted by the governor-general not only substantiated the authenticity of this document, but developed a variety of facts illustrative of the irreconcileable enmity of Tippoo against the British. No course now remained but to establish a permanent restraint upon Tippoo's future means of offence; and Lord Mornington at once resolved upon a series of extended operations against Mysore. Tippoo, as the event too fatally for himself proved, was unprepared for war. Stripped of half his dominions and revenues by the last treaty, he had not the means of maintaining war; whilst the power of his rivals was formidably increased, and their numerous and well-appointed armies, and extended dominions, justly excited the dread and the jealousy of the native powers, and probably of Tippoo amongst others. But the humbled king of Mysore was no longer himself an object of jealousy and dread: the last treaty was dictated by a victorious army at the gates of his capital; its terms, from his unprovoked aggression of the British allies, were necessarily severe; and circumstances had since occurred which fully justified the British in exacting additional securities from the fallen prince. It was known that he had been in communication with Zemaun Shah, the ruler of Caubul, and that his intercourse with that prince had for its object the invasion of the N. of India in order to facilitate the projected hostile measures on the part of Tippoo in the S. It was ascertained that an embassy consisting of two natives, accompanied by a French officer, had been despatched by him to the executive directory of France. At Poona and at Hyderabad his efforts had been directed to counteract British influence, and to engage both Mahratta and Mohammedan chiefs in his views. The objects of the governor-general, as explained by himself, were, by obtaining the whole maritime territory remaining in the possession of Tippoo on the coast of Malabar, to preclude him from all future communication by sea with his French allies—to compel him to defray the entire expenses of the war, thus securing reimbursement of the outlay rendered necessary by his hostility, and, by crippling his resources, increasing the probability of future security—to prevail on him to admit permanent residents at his court from the English and their allies; and to procure the expulsion of all the natives of France in his service, together with an engagement for the perpetual exclusion of all Frenchmen both from his army and dominions. Before hostilities commenced, however, the sultan was allowed time to avert them by timely concession. Intelligence of Lord Nelson's recent victory over the French fleet was communicated to him with suitable remarks; and a letter addressed to him by the governor-general adverted to the transactions between that prince and the French government of the Mauritius, and contained a proposal to send an English officer to Tippoo, for the purpose of communicating the views of the Company and their allies. Tippoo's answer contained a ridiculous attempt to explain away the embassy to the Mauritius and its consequences, and his communication in other respects was so extremely vague, that the governor-general determined to suspend all negotiation with the sultan until the united force of the arms of the Company and of their allies should have made such an impression on his territories as might give full effect to the just representations of the allied powers. Three armies were now assembled for the invasion of Mysore—namely, the army of General Harris at Velore, which was to advance from the east; the army of General Stuart at Cananore, on the western coast; and a force under Colonels Read and Brown in the southern districts of the Carnatic. On the 9th of March the army made its first united movement, and in the course of its advance experienced no serious resistance. The greatest obstacle to its progress arose from the want of provisions, and an adequate supply of carriages. All these difficulties were, however, overcome: and on the 5th of April the united army took up its position for the siege of the capital, exactly one month after it had crossed the frontier. Tippoo made a last and vain appeal to his enemies. But the governor-general was now resolved on the conquest of the country. His views expanded with the success of his arms; and towards the end of April he declared his opinion, that "it would be prudent and justifiable entirely to overthrow the power of Tippoo;" and "that the power and resources of Tippoo Sultan should be reduced to the lowest possible state, and even utterly destroyed, if the events of the war should furnish the opportunity." On the 3d of May a practicable breach was made, and next day the assault took place, which, notwithstanding an obstinate defence, was successful at every point. The assailants, carrying everything before them by the impetuosity of their attack, met over the eastern gateway; and the palace, in which were the family of the sultan and a body of his most faithful adherents, was the only place within the fort that still held out. From motives of humanity, the English were extremely averse to expose its inmates to the horror of an assault, and they at length succeeded in effecting its peaceable surrender. Major Allan, who was admitted to the apartments of the young princes, endeavoured, by every expression of tenderness, to soothe the agitation of their minds. They were conducted to the presence of General Baird, who assured them, in the kindest manner, of protection from violence and insult, and gave them in charge to two officers, to be conducted to the head-quarters of the general. The sultan lost his life in the defence of his capital, and his body was found amidst heaps of slain. He had been repeatedly wounded in the course of the conflict; and his attendants having placed him in his palanquin, he was observed by the English soldiers who first entered. One of them in attempting to pull off his sword-belt, which was very rich, received a wound from the sultan, who still held his sabre in his hand; on which, putting his musket to his shoulder, he fired, and the sultan, receiving the ball in his temple, expired.

Defeat and death of Tippoo.

The kingdom of Mysore, which was now in possession of the English, was partitioned amongst the allied powers. The English and the nizam received equal portions of the conquered territory, and a smaller portion was reserved for the Mahrattas. The possessions of the sultan on the Malabar coast, the district of Coimbetore and Daramporam, the whole country which lay between the Company's territory on the eastern and western coasts, the passes of the Ghauts, the district of Weynaad, and the city and island of Seringapatam, were surrendered to the British, who now occupied the country from sea to sea. A territory of equal revenue was ceded to Nizam Ali, in the districts of Gooty, Gurrumcondah, and the tract of country which lies along the line of the great forts of Chittledroog, Sera, Nundydroog, and Colar, with the exception of the forts. The territory ceded to the Mahrattas, from one-half to two-thirds of the other portions, was to include Harpoonelly, Soonda above the Ghauts, Annagoody, and some other districts; also the territory, though not the fortresses, of Chittledroog and Bednore. The remaining portion of the sultan's territories was erected into a separate state, over which was placed a descendant of the ancient rajahs, who had been retained in confinement by Tippoo and his father; with such conditions, however, as provided for the transfer of the entire administration to the British in the event of misgovernment. The treasures of Tippoo, amounting to sixteen lacs of pagodas (L.640,000), and his jewels, valued at L.360,000, were divided amongst the troops. The fortress of Velore was commodiously fitted up for the future residence of the royal family, to whom, and to all Tippoo's confidential servants, such pensions were assigned, that they were no less surprised than gratified by the liberality of the conquerors.

The influence of British authority is not confined to the dominions immediately subjected to it; it is exerted over nearly the whole of India, by virtue of protective treaties with the native princes. In the states thus situated the prince exercises the functions of sovereignty, under the control of the British power, which is represented by a resident agent. The presumed advantages of this arrangement are mutual. The prince and his successors are guaranteed in the possession of their dominions; and in return, the ruling prince renounces all external connections, except with the British, through whom alone negotiations are conducted, and by whose decision he is bound in all matters of dispute with other states. In some cases the prince consents to receive a subsidiary force; in others this provision is dispensed with. But the great principles which pervade them all are the supremacy of the British, and the dependency of the native government. In 1798 a treaty was concluded with the nizam, by which he agreed to dismiss a force under French officers, which he had hitherto maintained, and to receive and to pay a British force in its stead, whose aid, it is certain, was absolutely necessary for the defence of his dominions. This was therefore the commencement of British ascendancy in that country. In Oude the military power had long been vested in the Company. Upon the death of Shujah-ud-Dowlah in 1775, and the succession to the throne of his eldest son, it was stipulated that a brigade of British troops, consisting of two battalions of Europeans, one company of artillery, and six battalions of sepoys, should be stationed in Oude whenever required by the vizier, for the support of which he engaged to pay an annual sum of about L.300,000. Additions were made to this force in 1781, and again in 1787, when the Nawaub vizier agreed to fix his subsidy at L.500,000, in which sum were included the expenses of the British Residency. In 1797 the vizier consented to defray the expense of two regiments of cavalry, one European and one native, making the total subsidy L.555,000 per annum. Shortly afterwards the Company bound themselves to defend the territories of Oude against all enemies. In order to enable them to fulfil this engagement, and at the same time to provide for the protection of their own dominions, they had largely increased their military establishment by the addition of new levied regiments, both of infantry and cavalry; and in consequence thereof Saadut Ali agreed, in 1798, to increase the subsidy to L.760,000 per annum. The Nawaub vizier also ceded the fortress of Allahabad, and gave L.80,000 to the Company for its repairs, and L.30,000 for those of Futtehghur. The British troops in Oude were not to consist of less than 10,000 men, including Europeans and natives, cavalry, infantry, and artillery; and should it become necessary to augment the Company's troops beyond the number of 13,000 men, the vizier agreed to pay the actual difference occasioned by the excess above that number. The threatened invasion of Zemaun Shah attracted the attention of the Marquis Wellesley (then Earl of Mornington) to the state of Oude. It was desirable to substitute efficient troops for the unskilful and undisciplined force maintained by the vizier, and to place the defence of the Oude frontier against foreign invasion upon a more substantial basis. To accomplish these objects the pecuniary subsidy was commuted for a territorial cession; and by treaty, 10th November 1801, the Nawaub vizier ceded the Southern Doab and the districts of Allahabad, Azimgurh, Western Goruckpore, and some others. estimated to yield in the aggregate an annual revenue of L.1,352,347. About the same time the nabob of Surat, the nabob of Arcot, against whom a lucky discovery was made of a criminal correspondence with Tippoo, and the rajah of Tanjore, were all dethroned, and pensions assigned them for their support. The benefits anticipated from these measures have been fully realised. Most of the protected states have been wretchedly misgoverned; and there cannot be the slightest doubt that the people have been far happier as British subjects. Yet some suspicion must attach to the motives of those who, after the death of Fyzoolah Khan, could transfer the flourishing country of the Rohillas from the mild sway of its lawful rulers to the misrule and oppression of the nabob of Oude. A bad was here substituted for a good government. If good government had been the sole object, how greatly would it have been promoted by the transfer of the territory from native to British rule. The British provinces have been steadily advancing in prosperity; the progress of the protected states has been from bad to worse.

The Mahratta powers.

The Mahratta powers, namely, the peshwa, the nominal head of the confederacy, whose capital was Poonah, the rajah of Berar, Holkar, and Scindia, now remained the only rivals of the English for the dominion of India; and it was the policy of the Marquis Wellesley, as he himself explains at large in his correspondence with the residents in India and the directors at home, to form subsidiary alliances with them, on the same terms as with the other states of India; namely, that a British force should be permanently stationed within their dominions, and that they should assign a sufficient quantity of land for its maintenance and pay. The effect of this alliance, as indeed its object, as stated by the marquis, was to secure the dependence of the different states of India on the British power. "The measure of subsidizing a British force, even under the limitations which the Peshwa has annexed to that proposal (namely, its being stationed without the limits of his dominions), must immediately place him in some degree in a state of dependence on the British power." This effect was very plainly seen by the Mahratta princes, as well as by the governor-general; and accordingly, though the arrangement was very zealously pressed upon the peshwa, as well as on Scindia, it was steadily rejected by both, until the former was reduced by necessity to accept the alliance of the British on their own terms. This necessity was brought about by contentions amongst the Mahratta chiefs, Holkar and Scindia, for political ascendency in the court of Poonah. Mahadjee Scindia, who was the founder of the family, was the son of Ramojee Scindia, whose humble employment at the court of Poonah was to carry the peshwa's slippers, but who afterwards rose to eminent rank, and was known as an enterprising soldier. Mahadjee was also a soldier, and was present in the fatal battle of Paniput, from which he narrowly escaped with a severe wound in his knee by a battle-axe. He afterwards acquired land and troops, and rose, as the power of the peshwa declined, to the rank of an independent chief. He died at Poonah in 1794, leaving to his grand-nephew, Dowlut Row Scindia, only thirteen years of age, vast possessions and a well-disciplined army.[1] Mulhar Row, the founder of the Holkar family, was born about the year 1693. He was at first a keeper of sheep, afterwards a commander of horse in the service of the peshwa, and at last one of the great military leaders of the Mahratta confederacy. He died in 1766, at the age of seventy-six years, with the character of a plain and generous soldier. Mulhar Row Holkar had only one son, Kundee Row, who was slain, some years before the battle of Paniput, at the siege of Kumbhere. This prince had married the renowned Ahalya Baee, by whom he had one son and one daughter, both of whom died, the daughter on the funeral pile of her deceased husband. Ahalya Baee succeeded to the sovereignty, and assumed as the commander of her army, and her minister for those duties which a female could not perform, Tukajee Holkar, the chief of the tribe, though not related to Mulhar Row. The administration of Ahalya Baee, who is celebrated by Sir John Malcolm as a shining example of great qualities and amiable virtues, was fraught with blessings to her subjects, the country enjoying under her rule more than thirty years of prosperity and peace. Tukajee Holkar, who reigned till the year 1797, left four sons, Cashee Rao, Mulhar Rao, Eithojee Holkar, and Jeswunt Rao Holkar. The succession was disputed by the two elder brothers, who repaired to Poonah for the decision of the peshwa. The influence of Scindia was at this time paramount at Poonah; and having made his terms with Cashee Rao, he surprised and murdered Mulhar Rao, with all his attendants, at Poonah, in September 1797. The wife of Mulhar Rao left a posthumous child, Khundeh Rao, of whose person Scindia got possession, and retaining Cashee Rao in a state of dependence, proposed to govern the dominions of Holkar in his name. The two brothers, Eithojee and Jeswunt Rao, who were at Poonah at the time of the murder, made their escape, the first to Kolapoor, where he was taken, sent to Poonah, and executed; the latter to Nagpoor, where he was arrested and thrown into confinement. Having made his escape, he fled to Mehysser on the Nerbuddah. Here he collected a band of adventurers, and in October 1801 was enabled to fight a battle with Scindia, in which he was defeated with the loss of his baggage and artillery. Before the middle of 1802 Holkar had assembled a new and well-disciplined army. He insisted on the release of the posthumous child Khundeh Rao, the head, as he proclaimed him, of the house of Holkar; and to enforce his demand, he advanced with his troops from Malwah towards Poonah. Scindia collected his army, and on the 25th of October a battle was fought, in which Holkar obtained a decisive victory.

Foreign policy of Lord Wellesley.

It was during these transactions that the governor-general deemed the occasion favourable for drawing the Mahratta chiefs into a subsidiary alliance with the British; and it was proposed to Scindia that he should receive a British force into his dominions, that he should cede to the Company a territory sufficient to maintain this force, and that he should admit the arbitration of the British in all disputes with the nizam and with the other states of Hindustan; and the governor-general explains, that if he consent to receive a British force within his dominions, "the arbitration of the British government will necessarily be admitted to an extent proportioned to the ascendency which that government will obtain over Scindia under the proposed engagements, and to the power which it will possess of controlling his designs." Was this system, we may ask, of general alliance and subjection to the British, now proposed by the governor-general, a scheme of benevolence for establishing universal peace throughout India, or one of ambition? War is no doubt the great scourge of humanity; and if it could be superseded by the peaceable arbitration of neutral powers, a great blessing would be conferred on mankind. But it is vain to suppose that the potentates of the earth will voluntarily submit to the curb of reason; and vain was it therefore for the governor-general to endeavour, by persuasion or address, to draw the powers of India into an alliance which would reduce them from the rank of independent princes to mere dependents on the British. That the entire ascendency of the Company's government in India would, in preventing intestine war, have been, as it has since proved, highly beneficial to India, no one could doubt; but it was obvious that the supremacy of the British was to be established not by pacific measures but by the sword. The policy, however, of the British government in India was at this time opposed to conquest, and to the influence of this principle must be ascribed the conduct of the governor-general. His motives are entitled to respect, but it is to be regretted that he was not actuated by a less scrupulous spirit. In point of fact, it is by war that all India, happily we sincerely believe for the people, has been at length brought under the control of one ruling power, and that universal peace now reigns over that vast continent. It was not yet time, however, for this desirable consummation; and the Mahratta chiefs, as might have been supposed, received with decided aversion the propositions of the governor-general, which amounted to nothing less than a renunciation of independent power. In the defeat of Scindia, however, by Holkar, and the advance of this latter chief to Poonah, the peshwa saw the overthrow of his power; and he quitted his capital, leaving in the hands of the British resident a preliminary engagement, by which he agreed to receive into his territories six battalions of troops, with their proportion of artillery, and to cede a territory for their support either in Gujerat or the Carnatic, yielding twenty-five lacs of rupees.

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[1] *Memoir of Central India*, by Sir John Malcolm, vol. i. chap. v.

Treaty of Bassein, and war with the Mahratta chiefs.

This treaty, in which it was further agreed that the peshwa should, by the aid of the British, be restored to his dominions and to his sovereign authority, was formally signed at Bassein on the 31st of December 1802; and immediately Sir Arthur Wellesley, on a report that Poonah was in danger of being burned, advanced on that city by a rapid and unexpected march, with a body of cavalry. At the approach of the British, Holkar's disorderly bands fled with precipitation, and soon abandoned the territory of Poonah; and the deposed prince returned in triumph to his capital, amid the acclamations of the people. The treaty of Bassein, and the entire ascendency of the British at the court of Poonah, excited the jealousy of the other powers; and Scindia and the rajah of Berar now entered into a confederacy for repressing this desire of encroachment on the native states. But their motions were narrowly watched by the British; and their armies having taken hostile positions, from which they refused to withdraw, the British were induced to take the field. A vast force was collected. An army under General Lake assembled on the north-western frontier of Oude, which on the 7th of August marched from Cawnpore, and crossing Scindia's frontier on the 28th, took by assault the fort of Allyghur, and on the 9th of September totally defeated, about six miles from Delhi, the Mahratta force, formerly under Perron, a French officer, and still commanded by one of his countrymen, with the loss of all the artillery and baggage. General Lake entered Delhi, evacuated by the enemy on the 14th, and paid his respects to the Great Mogul Shah Aulum, afflicted with age, infirmities, and poverty, in all respects a touching spectacle of fallen dignity. On the 4th he reached Agra, which was taken by assault after a severe contest; and on the 31st defeated, in the well-fought battle of Laswaree, the remaining force of Scindia; and thus in the course of three months overran all his territories in the region of the Jumna. Nor was General Wellesley, who now gave an early promise of that genius for war which was afterwards more fully displayed in the arduous conflicts of Europe, less successful in the south. His first operation was the assault and capture of the strong fortress of Ahmednuggur on the 12th of August; after which, being apprised that the combined armies of Scindia and the rajah of Berar meditated a march on Hydrabad, he concerted with Colonel Stephenson, who commanded a separate corps, a joint attack on the 24th. In the mean time, apprehensive that the enemy meditated a retreat, he attacked with his own division alone the combined Mahratta armies, encamped on the Kaitra river, near the village of Assye, and obtained the victory after a sanguinary conflict, in which, out of 4500 men, the British lost 428 killed and 1138 wounded, and were entirely disabled from pursuing the enemy. Colonel Stephenson, who joined on the 24th, was sent on this duty, and was also instructed to attack Boorhanpore and Asseerghur, of which, and of all Scindia's territories in the Deccan, he took possession. The British arms were now turned against the rajah of Berar; his army was entirely defeated on the plains of Argaum on the 29th of November. Colonel Stephenson, advancing to Ellichpoor on the 5th of December, laid siege to the strong mountain fortress of Gawilghur, near the source of the Taptee, which was carried by assault. The British were equally successful in every other quarter. The country of Bundelcund was speedily reduced; a force from Bombay attacked Scindia's possessions in Gujerat; and a division of the Madras army the maritime province of Cuttack. The Mahratta chiefs now bethought of peace as their only refuge from impending ruin. A treaty was accordingly concluded with the rajah of Berar, by which he ceded to the Company the province of Cuttack, with the port of Balasore, to their ally the nizam, the country lying between his own frontier and the river Wurda to the eastward, and between his own frontier and the hills, in which are situated the forts of Gawilghur and Nernulla to the northward. By the treaty concluded with Scindia, he ceded in full sovereignty the country between the Jumna and the Ganges, to the northward of the territories belonging to the rajahs of Jeepoor, Joudpoor, and Gohud, the fort and territories of Barooch, of Ahmednuggur, and all the possessions which he held on the south side of the Ajuntee Hills to the Godavery river. Provision was made for the independence of all those minor states in the region of the Jumna which had joined the English in the late war. Of these cessions, it was agreed that the territory situated to the westward of the Wurdah, and to the southward of the hills on which were the forts of Gawilghur and Nernulla, together with the territory between the Ajuntee Hills, should be given to the nizam; that the fortress of Ahmednuggur and its territory should belong to the peshwa, and that the English should have the remaining portion. The minor princes near the Jumna, namely, the rajahs of Bhurtpore, Joudpoor, Jeepoor, Machery, and Boondi, the ranah of Gohud, and Ambajee Rao Englah, now became dependents on the British, by whom they were guaranteed in the possession of their dominions, they defraying any charge which might be incurred. Scindia, now weakened by the loss of territory, was really anxious to secure a subsidiary alliance with the English for the security of his remaining dominions against the designs of Holkar. It was agreed that six thousand infantry, with the usual complement of artillery, should be allotted for his defence; that they should be maintained by the English from the revenues of the ceded territories; and that they should be stationed near the frontier, but not within his dominions. It was further agreed, as formerly in the treaty of Bassein, that the British should not in any case interfere between him and his subjects, but that the subsidiary force, if required, should aid in suppressing rebellion and internal disturbances; a condition of doubtful policy, since it evidently implies that the British were to stand still, the quiet spectators of any cruelties the Mahratta chief might inflict upon his subjects; but, the moment they took up arms in their defence, they were to aid in crushing them, as disturbers of the public peace.

Successes of General Lake and Sir Arthur Wellesley.

Treaty with the Rajah of Berar and with Scindia.

perations gainst Iolkar.

The short period of tranquillity that succeeded the peace with Scindia was speedily interrupted by Holkar, who, though he kept aloof from the confederacy of his countrymen, with an indifference which seemed to argue at once a deficiency of patriotism and a want of sound policy, was, nevertheless, alarmed by the success of the British arms, and his whole conduct evinced his determination to try the fortune of war. His power and resources had gradually been increased, like that of the other chiefs, by the introduction of European officers into his army, and by an improved system of discipline, which he had established. He was, besides, protected by the nature of his country, which is very mountainous, and, during the rains, impassable from jungles and morasses. His skill in maintaining the predatory warfare, so congenial to a Mahratta army, was far superior to that of the other chiefs, whose ruin had so fully taught him the danger of any regular engagement with European troops. Thus, although his territories were invaded on all sides by detachments of the Company's forces, he constantly eluded their attacks; and, by the singular rapidity of his movements, he was enabled suddenly to assemble almost his whole force, and overpower whatever detachments he might find at a distance from support. In this situation, the troops under Colonel Monson were surprised. This officer, in concert with Colonel Murray, who invaded Holkar's dominions from Gujerat, and captured Indore, the capital, without much opposition, had advanced fifty miles beyond the Mokundra Pass, towards the Chumbul, when, alarmed by the fear of his supplies running short, he resolved to retreat. Being betrayed by his guides, and deserted by part of his troops, he was attacked by a superior force under Holkar himself, before which he was forced to retreat towards Agra, through a country impassable from the rains, and destitute of provisions. After several disastrous conflicts, during a retreat of seven weeks, which degenerated into a flight, the greater part of his guns, and the whole of the baggage and military stores, were lost. A few only of the troops reached Agra at midnight, in a state of extreme distress; the greater part had been overtaken in their flight, and were either massacred, or cruelly mutilated, by their ferocious pursuers.

Colonel Willot of the Bengal artillery was almost equally unsuccessful in an attack which he had planned against a strong post in the interior: he failed in the attempt, and soon after died of the wounds he had received. It was in Bundelcund, and the country of the Rohillas, that Holkar received the most considerable checks, which produced a reverse in his fortunes. From both those territories he was completely driven by Lieutenant-colonel Fawcet and General Smith. On the escape of Colonel Monson to Agra, Holkar advanced with his whole army to Muttra, whither he was followed by General Lake, who arrived at Muttra on the 1st of October 1804, Holkar retiring as he advanced. Here he put in practice a stratagem, which had nearly gained for him great advantages. Leaving his cavalry to engage the attention of the British general, he proceeded with his infantry in secret and by forced marches, and on the 8th he appeared before Delhi, on which he opened a heavy cannonade. Next day he erected breaching batteries, and made a determined assault. But this and a subsequent attack was repelled with such determined gallantry by the small garrison under Colonels Ochterlony and Burn, that he desisted from all further attempts, and departed during the night with his whole force.

Parties of his cavalry had been repeatedly defeated by Lord Lake; but the rapidity of their movements as often saved them from destruction, and it was not till the decisive battle of Deeg, on the 13th of November, that the main strength of this enterprising chief was completely broken. At this place his army, trusting to the great strength of its position, behind successive ranges of batteries, was induced to hazard a general action. From these different batteries, which extended to the depth of two miles, they were successively driven by the gallant General Frazer, who had the credit of forcing a post which had been deemed impregnable, and which at this period was defended by twenty-four battalions of infantry and 150 pieces of cannon. In this brilliant achievement the general received a wound in the leg, of which he afterwards died, and was carried off the field. The completion of the victory thus fell to Colonel Monson, who now saw complete vengeance inflicted for his past disasters, and for the unexampled cruelty of his enemy, 2000 of whom were killed, either in the battle or during the retreat. An immense number was wounded, and amongst these many considerable chiefs; whilst eighty-seven pieces of cannon fell into his hands, which partly consisted of the same guns which he had himself lost during his disastrous retreat to Agra. The important fortress of Deeg was besieged and taken at night, by assault, on the 23d of December.

Had Holkar confided merely to his effective force in the field, his cause might have now been regarded as desperate. His boldness, however, and his unexampled success, had gained him the support of several of the native princes. Among these he had seduced the rajah of Bhurtpore, an ally of the British, and the chief of the celebrated caste of the Jauts, the most warlike tribe in upper India. General Lake was therefore obliged to concentrate his army, and to employ it in the reduction of Bhurtpore, a fortress which experience has proved to have been the strongest and most impregnable in the whole peninsula. Whilst thus employed, the dispersed troops of Holkar had time to rendezvous in distant quarters, and were successful in cutting off his supplies of provisions, and in plundering the surrounding districts, by that predatory mode of warfare for which the Mahrattas have always been celebrated. Scindia, also, who had been engaged in continual disputes with the British respecting the treaty which had been concluded, now openly showed his hostile dispositions by invading the territories of the British allies, by attacking and plundering the camp of the British resident, and by his ill-concealed correspondence with Holkar, whom he now openly joined.

Siege of Bhurtpore.

The reduction of Bhurtpore, defended by the indefatigable efforts of Holkar, by its intrepid garrison, and its own natural strength, proved the most arduous enterprise which the British troops had ever undertaken in Asia. The success of the besieged in repelling four different assaults animated them with fresh courage and intrepidity. The rajah and his whole tribe were united by the ties of blood, as well as of civil authority. They laid claim to a high caste among the natives, which they knew must be forfeited for ever by unconditional submission. Unfortunately these were the only terms which General Lake, in the peremptory instructions which were given for its reduction, was permitted to accept. The rajah, therefore, having collected in the fort his women, his children, and his treasures, resolved to bury them all with himself under its ruins, rather than submit to terms which were deemed as disgraceful to his religion and his rank, as they were mortifying to his feelings as a soldier. Compelled by the orders of his superior, and undaunted by all the past disasters which the troops had already suffered, General Lake resolved to hazard another attempt, which was equally unsuccessful with all the others. In the official account given of this last attack, it is said, "the bastion, which was the point of attack, was extremely steep, the resistance opposed to them was vigorous, and as our men could only mount by small parties at a time, the advantages were very great on the side of the enemy. Discharges of grape, logs of wood, and pots filled with combustible materials, immediately knocked down those who were ascending; and the whole party, after having engaged in an obstinate contest for two hours, and suffering very severe loss, was obliged to relinquish the attempt, and to retire to our trenches." The loss of the British army in this last assault, and that of the 20th, amounted to 300 killed, and 1564 wounded; its whole loss, during the different attacks, amounted to upwards of 3000 of the bravest of our troops, whilst the unconditional surrender of the place, though the ultimate object of all these perilous attempts, was never attained. The rajah, however, again proposed the terms he had formerly offered, and consented to pay three lacs of rupees to the army, and the expenses of the war. Hostages were given for the regular discharge of these sums, at different instalments. Thus the last prince in India who resisted the British arms was found to have made the most glorious defence of his independence, and to have secured for himself the most honourable terms. Holkar, unable any longer to face the British troops, was reduced to the condition of a fugitive; and flying from place to place, often beaten, and at last deserted by almost the whole of his troops, was obliged to escape with a retinue so scanty as was hardly sufficient for the protection of his person.

Arrival of Lord Cornwallis. Pacific policy.

The directors of the Company in Europe, though they were dazzled for a time by the splendid successes of the British arms, were at length startled by the warlike policy and prodigal expenditure of the Wellesley administration; and, with a view to retrieve their embarrassed affairs, the Marquis Cornwallis was sent out as governor-general to Calcutta, where he arrived on the 30th of July 1805. He entirely disapproved of the system of subsidiary alliances adopted by his predecessor, by which the British were entangled in the labyrinth of Indian politics. He censured in strong terms the treaty of Bassein, which reduced the British, as he states, to "the alternative of mixing in all the disorders and contentions incident to the loose and inefficient constitution of the peshwa's administration, or of suffering the government and dominion of his highness to be completely overthrown by the unrestrained effects of general anarchy and rebellion. Under such circumstances," he adds, "the alliance with the peshwa, far from being productive of any advantage to the Company, must involve us in inextricable difficulty, and become an intolerable burden to us." In pursuance of these views, he resolved, as soon as Scindia should release the British residency, to conclude a treaty with him, and to restore to him Gualior and Gohud, the points in dispute. At this critical period Lord Cornwallis, languishing under age and infirmities, expired. But his successor, Sir George Barlow, entered entirely into his views. A treaty was concluded with Scindia on the terms proposed; the British agreed to renounce all interference, by treaties or otherwise, with the rajahs of Odeypoor, Joudpoor, Kotah, and other chiefs, the tributaries of Scindia, in Malwah and Mewar. A treaty was concluded with Holkar, on the 24th of December 1805, by which all his former territories were restored to him, both on the north and on the south of the Chumbul. According to his system, Lord Cornwallis dissolved all the alliances which had been formed with the petty princes of India, several of whom had aided the British in the late contest. Lord Lake earnestly remonstrated in vain against this abandonment of the British allies, several of whom were now left, contrary to the faith of protecting treaties, to the vengeance of the Mahratta chiefs, Holkar and Scindia.

General peace.

Nepaulese war.

From the year 1805, when a general peace was established by Lord Cornwallis, to the year 1813, when Marquis Hastings assumed the government, the political relations of the Company with the native powers had undergone little alteration. The tranquillity which prevailed was, however, more apparent than real; and it was naturally to be supposed, indeed, that the widely extending domination of a foreign power would excite the jealousy of the native princes of India. Such of them, accordingly, as retained any sense of national honour were naturally hostile to the British, and were well disposed to unite against them as the common enemies of Indian independence. In 1814 the war with the Nepaulese commenced, and in the outset the reverses sustained by the British in their attempts to penetrate into the hill country strongly excited the hopes of the native princes. In the following year, the valour and military talents of Sir D. Ochterlony brought that war to a brilliant close; and the bravery and discipline displayed by the troops in the course of the campaign renewed among the Indian princes the former impression of their invincible superiority. Whatever might be their ulterior views, therefore, they were compelled for the present to temporize, and to soothe their conquerors by an outward show of humility and peace.

Incursions of the Pindarees.

A more favourable opportunity, as they conceived, soon occurred for successful resistance to the British power. From the constant wars and commotions in which India had from time immemorial been involved, it happened that a great proportion of the native population were trained to habits of disorder and military license. At the general settlement concluded in 1805, it was naturally supposed that those bands of adventurers, having no longer any scope for their predatory enterprises, would betake themselves to pacific pursuits, and would thus be gradually dissolved among the mass of the people. It happened otherwise. Those hordes of freebooters, known under the general denomination of Pindarees, improved both in strength and union, and Scindia and Holkar, in whose neighbourhood they were settled, if they did not openly abet them, made no active efforts for their suppression. The nature of their force may be shortly described. It consists of a species of light cavalry, which was formerly attached to the native armies, in the same manner and for the same purpose as the Cossacks are to the armies of Russia. Their horses were trained to long marches and hard fare, it being their object to plunder the country, and to elude pursuit by the celerity of their movements. They were generally armed with a bamboo spear, from twelve to eighteen feet long; every fifteenth man carried a matchlock; about four hundred out of every thousand were well mounted; of the remaining six hundred, four hundred were indifferently mounted, and the rest were slaves, attendants, and camp-followers, mounted on wild ponies, and keeping up with the corps as they best could. About the year 1814, these predatory bands comprised about 40,000 horse, who followed plunder as their mode of subsistence, and were indeed a most formidable species of gang-robbers; but, like other robbers and murderers on a great scale, they assumed all the form and pomp of military array. The strength and numbers of this disorderly mass were daily increasing by deserters from Holkar's irregular bands, and from the loose cavalry establishments of Scindia and others, where they were retained by no tie but that of present advantage, and where their pay was always in arrear. The central situation of the Pindarees, at an equal distance from the three presidencies, rendered their hostility still more formidable, and enforced on the British the necessity of maintaining an extensive line of defence, which was always penetrated by those flying hordes, and the territories of our allies exposed, in consequence, to annual devastations. In 1808–1809, and in 1812, they carried their incursions into the British territories, and returned loaded with spoil. The fame of these successful exploits recruited their bands, and enabled them to extend their ravages. In October 1815, a force of 8000 Pindarees crossed the Nerbuddah in a north-west direction, and dividing into two parties, they penetrated to the Kistnah, though they were watched, and one party was surprised by a body of infantry and cavalry, which did them, however, little damage. They were only deterred from crossing into the Madras presidency by the swollen state of the river, along the fertile and populous banks of which they took their course, plundering as they went along, and committing every kind of enormity. In their return along the line of the Godavery and the Wurda, they passed the British positions, making good their retreat with an immense booty, and with utter impunity. A second expedition was soon planned, which, crossing the Nerbuddah, appeared on the western frontier of the district of Masulipatam, under the Madras presidency, on the 10th of March 1816. Next day they made a march of thirty-eight miles southward, plundering ninety-two villages, with every circumstance of unheard-of cruelty; and on the 12th they marched thirty-eight miles, plundering fifty-four villages. By the 17th May they had nearly all recrossed the Nerbuddah, loaded with spoil, and with scarcely any loss. During the twelve days that they had remained within the Company's territories, it was ascertained that 182 persons had been put to a cruel death, 505 were found severely wounded, and 3603 had been put to different kinds of torture.[1]

War with the Pindarees.

It now became necessary to adopt efficient means for protecting the country against these destructive visitations. For this purpose a defensive line of posts was extended along the Nerbuddah, and across the country for about 150 miles. This was, as usual, soon penetrated by the activity of the enemy, and various expeditions advanced southward for the purpose of plunder. By the singular activity of the different corps, and by a train also of fortunate accidents, almost all of these expeditions were intercepted, broken, and discomfited, so that very few of the plunderers made good their retreat. It was resolved, however, in the year 1817, to commence offensive operations; to attack the enemy in their native haunts, and either to exterminate them, or to drive them from the advantageous position which they occupied, in the very centre of India. The season of inaction was accordingly spent in making preparations for a great military effort; and, by the end of the rainy season of 1817, a numerous and well-appointed army was ready for the field. The plan of the campaign was, that the armies of the different presidencies should advance northward, and gradually converging to a common centre, hem in on every side, the devoted territory of the freebooters.

War with the Peshwa.

But whilst this plan was in progress, it was interrupted, and part of the troops engaged in executing it were suddenly recalled, by the unexpected hostility of the native powers. Bajee Rao, the peshwa or prince of Poonah, who had long been impatient of the British yoke, availed himself of this opportunity to make a fresh attempt to recover his independence. With a view of more vigorously prosecuting the war against the Pindarees, all the troops had moved northward, with the exception of a brigade which had been left at Poonah; and it was to overpower this small body of troops that the peshwa's first efforts were directed. They were completely unsuccessful; he was repulsed at all points by the steadiness of the Company's troops. This action took place on the 5th of November. On the 13th, the British were joined by General Smith's division, which had advanced on the Godavery, on an understanding, that if he did not hear daily from the resident at Poonah, he should countermarch to that place. It was resolved to attack the enemy's camp next day; but it was found deserted. General Smith immediately commenced an unremitting pursuit of the peshwa, who was hunted from place to place by the different corps of the British army, until he at length deemed it prudent to surrender. He was deposed from his throne; a residence in a particular city was fixed upon for him; and a pension of about L.100,000 per annum assigned him for his support. His dominions were of course taken under the administration of the British.

War with the Rajah of Nagpoor.

The rajah of Nagpoor, Appa Saheb, who was held in the same thraldom by the British, pursued a similar course, and with the same results. On the 26th of November, at sunset, he attacked, with a great superiority of force, the brigade left at the residency, which was in consequence in great peril. A doubtful contest was maintained through the night, and next day the attack on the British was renewed with fresh vigour. Under every disadvantage those attacks were finally repulsed, and the weak prince, Appa Saheb, taking fright, sent to ask forgiveness from his enemies. The conditions offered him were, that his territories should be placed at the mercy of the British government; that he should give up all his artillery, disband his troops, and come in person as a hostage into the British camp; on an understanding that if he acceded to these terms, the former relations between him and the British would be restored; it being at the same time understood that he should cede part of his territory, and that due provision should be made for a greater degree of internal control over his future movements. Being threatened with an immediate attack, he came to the British camp with a few attendants. His troops, as if to shame their pusillanimous prince, fought an unsuccessful battle for his rights and independence; after which the city of Nagpoor, with its fort, was surrendered to the conquerors, and this second war was brought to a triumphant close. Appa Saheb, afterwards repenting of his spiritless conduct, began to plot new schemes, when he was arrested by the British resident, and detained in close confinement. He found means to escape in the summer of the following year, and making good his retreat to the hills, where he was joined by a band of irregular followers, he distracted the country for a time by desultory hostilities. Having thus fled from his dominions, the conquerors determined to invest Bajee Rao, a grandson of Raghojee Bhoonsla, with the sovereignty, and to take the internal administration wholly under their own control. It had been the professed intention of the Anglo-Indian government, which had now become the conservator of the general peace, to force the two independent chiefs, Scindia and Holkar, into an acquiescence with its views in regard to the Pindarees, and also the Patans, a species of infantry, better appointed, and more regularly disciplined, than the Pindarees, but associated together on the same unlawful principle of indiscriminate plunder. Scindia had been compelled to temporize, and finally to accede to the British propositions. The court and administration of Holkar were distracted by contending factions. The late prince, after the unfortunate issue of his war with the British, became deranged, and soon afterwards died. His heir, Mulhar Rao, was at the time under age; and Toolsye Bhye, the widow of Holkar, and now appointed regent, contended for supremacy with the Patan chiefs. Their views were entirely discordant, the queen-regent soliciting an alliance with the English, on condition of receiving a subsidiary force; a measure so strongly opposed by the military chiefs and the troops, that they conspired against Toolsye Bhye, and having seized her person, carried her to the banks of the river, where she was put to death. After this outrage, they prepared for war, and troops were concentrated in such hostile positions, that Sir John Malcolm judged it expedient to fall back. Having effected a junction with the corps under Sir J. Hislop, they attacked, on the 21st of December 1817, the army of Holkar, encamped at

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[1] *Narrative of the Political and Military Transactions of British India under the Administration of the Marquis of Hastings.* By Henry T. Prinsep, chap. i. and v.

Mehedpoor, and advancing to close action under a severe fire of artillery, the enemy's troops gave way at all points, and the camp, artillery, and baggage, fell into the hands of the victors. Peace was sought and obtained by the Patan chiefs, who ruled in the councils of Holkar; they accepted the protection and alliance of the British; and thus they enrolled themselves amongst the dependents and tributaries of the new sovereigns of India.

The main object of the war, which was the destruction of the Pindarees, was not, in any material degree, impeded by these incidental contests. According to the plan proposed, the different divisions of the grand army proceeded northward, converging as they advanced for the purpose of surrounding the haunts of these freebooters, and preventing their escape. They were driven out of the province of Malwah, retiring as the British advanced; but were at length so effectually hemmed in, that in attempting to retreat they were intercepted at all points, and the greater part of them destroyed. The remainder were so humbled by fatigue and misery, that they were glad to submit upon any terms; and at length the three principal leaders surrendered on condition that their lives should be spared.

Settlement of the country.

All open resistance being thus successfully put down, the more important task still remained of quieting and conciliating the country, overrun by lawless hordes of troops or banditti. The history of Hindustan is, from its earliest period, one unvarying scene of intestine violence, of war, rapine, rebellion, and bloodshed. For twenty years prior to the Pindaree war, these disorders had been increasing; and to still this intestine storm, to overawe the turbulent, and to settle on a permanent and equitable basis the conflicting claims to dignity, power, and property, which had arisen in a long period of trouble, when might was the test of right, was a task that required unusual prudence, firmness, and patience. This difficult and all-important duty now devolved on Sir John Malcolm, who to his glory as a warrior now added the still greater glory of a legislator and a statesman. Whilst he distributed his troops in such positions throughout the disturbed districts, as entirely to overawe the fiercer mercenaries and turbulent Arab soldiers, he conciliated the peaceable inhabitants by mildness, moderation, and justice. To all ranks, to the head of a village as well as to the sovereign of a kingdom, to the leader of a gang of robbers as well as to the commander of an army, he explained that his sole object was to establish the peace of the country. By kindness and conciliation he succeeded in reclaiming the Grassia, Rajpoot, and Bheel freebooters, and the discharged Patan mercenaries, accustomed to prey on the country. Persecuted and oppressed as outcasts and robbers, they were won by the generous confidence of Sir John Malcolm, who offered them pay in the British service, and employed the most notorious of the Bheels to guard his person and treasure, in which they proved invariably faithful. Thus the disorderly bands amongst the Pindarees and Patan soldiery, for many years the disturbers of India, were gradually converted into its industrious cultivators; and a great and happy change was effected in the habits of the people and in the aspect of the country. The several princes and rajahs of Central India were enriched by increased revenues and diminished expense. The troops maintained by Scindia were reduced from 39,000 to 22,000; and those maintained by the rebellious chiefs and tributaries, always ruinous to the country, were disbanded. His revenues were increased twenty-five per cent., and the expenses of collection reduced fifteen per cent. The revenues of Holkar were increased from four lacs in 1817, to sixteen lacs in 1819–1820. The condition of all the other inferior rulers and feudatories was improved in the same degree. "In 1817," says Sir John Malcolm, in his admirable work on Central India, "there was not one district belonging to Scindia that was not more or less disturbed; in 1821 there existed not one enemy to the public peace."

Petty states of India.

After the contest was brought to a close, the country was still overspread with disorderly bands of Arabs, Mekranies (from Meckran in Persia), Mewassies, and Patans; and the general result of the arrangements now adopted was the expulsion of these disturbers of the country, and the restoration of the just rights and dignities of Scindia and Holkar, as well as of a crowd of petty feudatories and renters, who were before the prey of freebooters. The same system was extended to the Rajpoot states to the N. W. of Malwah and the Chumbul River. The petty rajahs who occupied this country were continually at war; and the country was besides laid waste by the predatory bands of Ameer Khan, Holkar, and Scindia, who, on pretence of espousing the quarrels, invaded and plundered the territories of the different chiefs. These evils had risen to such a height, that they were all desirous of being admitted into a federal union with the British government, offering in some cases half their dominions for protection. In 1818 they were admitted into this union, of which the British are at the head. They agreed, in the event of any future differences amongst them, instead of appealing to arms, to submit their differences to the arbitration of the British government. In this manner their country, freed from the scourge of internal war, has progressively improved. The military adventurers who fled before the victorious armies of Britain, were reduced to submission by the wise and conciliatory measures of Sir D. Ochterlony, combined with skilful military movements. The Patan battalions, with about 3000 horse, were taken into the British service, the officers being dismissed with pensions. These measures have been followed by the happiest effects. The wretched peasantry have emerged from their hills and fastnesses, the usual refuges of the oppressed, and have occupied their deserted villages; the ploughshare is again at work on a soil undisturbed for years, except by the hoofs of predatory horse; and although the fierce habits of war may occasionally recur, yet the foundation of improvement is laid. The daring robber, moulded by time and the force of circumstances, will gradually exchange his wild and disorderly habits for those of the peaceful cultivator, and commerce and industry succeed to scenes of desolation and war.

The tranquillity which succeeded these events was but of brief duration. The rajah of Bhurtpore, confiding in the strength of his fortress, committed several enormities in his government, such as the seizure of the infant rajah, and the murder of his uncle and followers; and he even treated the remonstrances of Lord Amherst with indifference and contempt. In these circumstances, the reduction of this formidable stronghold was essential to the glory of the British arms, on which former failures had left a stain. The siege was accordingly commenced with 25,000 efficient troops; and as no impression could be made by cannon on walls of clay sixty feet in thickness, they were thrown down by the explosion of a mine. The assault took place next day, the 17th January 1826, which was completely successful, with the loss of 163 killed, and 466 wounded. The principal works of the fortress have since been demolished.

Burmese war.

The British rulers of India and the Burmese monarch had long been involved in mutual disputes, and these were brought to an issue in 1822, by a claim set up by the sovereign of the Burmese to the petty isle of Shapuree, in the province of Bengal, on the Chittagong frontier, and by aggressions on the British territory, which were repelled by a force stationed at Chittagong, whilst a large armament was sent to Rangoon, the naval arsenal of the Burmese empire, which was captured; and, after a series of hard-fought actions by the British, who endured much privation and distress, the monarch of Ava was compelled, in 1826, to sue for peace, by the near approach of the army to his capital.[1] Thus terminated the first Burmese war. After the lapse of several years it was followed by a second, rendered necessary by the wrongs, public and private, inflicted by the Burmese government. It was neither long in duration nor brilliant in events, and concluded with the annexation in December 1852 of the extensive province of Pegu, in satisfaction to some degree of the injuries sustained, and in aid of the means of defending British territory and property from further aggression.

The Affghan war, commenced in 1839, with a view to raising a barrier against the aggressive power of Russia, brought to the British no accession of territory, of power, or, taken on the whole, of glory. It was ostensibly undertaken to restore to the throne a former Affghan ruler, Shah Shoojah, supposed at least to be actuated by friendly feelings towards the British, though doubts on that point may well be entertained. The advance of the forces destined for the conquest of Affghanistan was attended by much difficulty and dreadful suffering; but at length a part of the invading army reached the chief city Cabool. Here it was thought the object of the expedition was gained; but the commencement of a new and frightful series of calamities was at hand. Insurrection broke out; the British envoy was treacherously murdered; a large part of the British force was destroyed, and the remainder compelled to retire under the most disastrous circumstances—incessant annoyance and fearful slaughter marking its progress. Many deeds of heroism, never surpassed, tended indeed to add fresh lustre to the British name, and among others the noble defence of Jelalabad by Sir Robert Sale can never be forgotten so long as Affghanistan is remembered. But the war and its consequences contribute to furnish an awful page in the history of British enterprise in India. Ultimately the country was avenged, and its reputation vindicated through the vigorous counsels and the vigorous acts of Generals Pollock and Nott. The former arrived first at Cabool, and replanted the British colours there; the latter arrived shortly afterwards. The British could now withdraw without discredit from a country where, for the first time, the *prestige* of their national character seemed endangered. That at least was vindicated and upheld, though, looking at the expenditure of blood and treasure, at the mass of suffering, and the imminent danger of irreparable disgrace which must have followed a premature retirement, every Englishman must wish that the war had never been undertaken.

The country of Lahore, or the Punjab, as far as the Suliman Mountains, was occupied by the rajah Runjeet Singh, who in the year 1805, when Lord Lake had an interview with him, seemed to be one among many petty chiefs. Between this and the year 1812 he subdued the whole country, but while proceeding in 1808 to extend his power over all the petty chiefs as far as the Jumna, he was opposed by a strong military detachment of British troops stationed at Loodiana. A treaty was concluded in 1809, by which it was mutually agreed that the rajah should not encroach on the territory to the S. of the Sutledge, nor the British on the territory to the N. of that river. The death of Runjeet Singh gave rise to a series of excesses terminating in a state of things in which the army was triumphant over the government, and was an object of its dread rather than of its dependence. At length a portion of it crossed the Sutledge, and invaded the British territories. This, of course, was repelled; and, first at Moodkee, subsequently at Ferozeshah, in December 1845, the Sikhs were defeated. At Aliwal and at Sobraon fresh triumphs attended the British forces, who finally crossed the river and dictated the terms of submission at Lahore, the Sikh capital. Here a treaty was concluded under which the British obtained a cession of all the territory between the Beas and the Sutledge; the native government of Lahore being retained with some requisite modifications. But this arrangement proved of short duration. The atrocious conduct of a chief holding the fortress of Mooltan, where two British officers were murdered; the generally distracted state of the country; the open violation by the government and people of the treaty so recently concluded; and the actual levying of war against their peaceful neighbour, demanded further intervention of a hostile character. One step only remained to be taken, and the success which again attended the British enabled the governor-general to take it. The Punjab was annexed, and was thenceforward a part of the vast empire of India.

Various attempts had at different times been made to establish friendly relations with the ameers or rulers of Sinde, but they had been met reluctantly and unfavourably. Two or three treaties had been entered into; but they were brief, dry, and to neither party satisfactory. The ameers of Sinde hated the alliance which the British were anxious to establish, at first for commercial, latterly for political purposes. When the British commenced the march to Affghanistan, a treaty was forced upon the rulers of Sinde, which was more distasteful than any former one. Under this treaty, a British military force was to be permanently stationed in Sinde; and after some considerable time, Sir Charles Napier, whose career in Sinde has given rise to such a mass of controversy, was appointed to the chief command there. He commenced his course certainly with vigour, but as certainly with little consideration of the existing rulers. Treaties were proposed which, though rejection must have been looked for, were accepted, whether with sincerity or not;—probably there was little of that quality on either side. But, notwithstanding the acceptance of the treaties, Sir Charles Napier continued to advance. During his progress the British residency was attacked. It was gallantly defended, but weakness of numbers, and deficiency of ammunition, soon rendered retreat necessary. This was effected in good order, but at the sacrifice of the greater part of the property within the residency. The battle of Meeanee followed, in which the British gained a brilliant victory. Another battle, fought near Hyderabad, the capital, may be said to have terminated the contest; and Sinde in 1843 became a British possession.

The conclusion of the contest in Sinde found the British government involved in difficulties in Gwalior, or the dominions of Scindia. The death of the representative of that house without heirs rendered an arrangement for the appointment of a successor necessary. A child said to be the nearest relative of the deceased prince was selected, and the British government approved. But every Indian court is a focus of intrigue, and that of Gwalior formed no exception. A rabble army of 30,000 men was a source of weakness, not of strength; and through the influence of a profligate and reckless court, combined by that of a disorganized army, the state appeared rapidly tending to dissolution. Internal war had in fact commenced, when the British government, somewhat tardily, though at the last rather hastily, put in motion a military force towards the disturbed country. It soon came into hostile collision with the enemy; and two victories in one day, gained by two separate portions of the British force, decided the questions at issue. A new treaty followed, dated January 1844, in which a variety of arrangements for the safety of Scindia's territories, and the security of those adjacent, were embodied.

Political system of India.

The wars and commotions of India have thus at length come to a close, and Great Britain remains the sole ruler of that vast empire. The native princes, rajahs, and petty feudatories of the country, hold their several dignities and stations in the great political system of which they form a part, under the guarantee of her sovereign authority. The nature of the subsidiary alliances of the British with the Indian states has been already described—namely, the furnishing a force, which is stationed in the dependent state for its protection, and the latter a territory equivalent to its maintenance, and further submitting, in its foreign relations and differences with other states, to the arbitration of the British government, though free from all control in its internal concerns. The powers with whom subsidiary alliances have been formed are the nizam or ruler of Hyderabad; the king of Oude; the Guicowar, whose dominions are in the province of Gujerat; Holkar, who has been deprived of all his dominions S. of the Nerbuddah; Scindia of Gwalior, reduced since 1844 to insignificance; the rajahs of Cutch, of Mysore, of Travancore, and of Cochin. The protected states are so far reduced to dependence that they agree to maintain no correspondence with foreign powers of a political tendency without the privilege or consent of the British government; and not to go to war, but to submit all their differences with other states to the arbitration of the British. They are independent in their internal concerns, and have not, like the others, a British force stationed within their territories. They are bound to furnish a contingent of troops when required, which in the field act in subordination to the British commanders. These states are,—1*st*, in the N.W., Cashmere and the Sikh and Hill states, on the left bank of the Sutledge. 2*d*, Rajpoot states; Bicanere, Jesselmere, Jeepoor, Joudpoor, Odeypoor, Kotah, Boondi, Serowey, Kishengurh, Dowleah and Pertaubgurh, Doongapore, Jhallawar, Banswarra. 3*d*, Jaut states on the right bank of the Jumna; Bhurtpore, Ulwar or Macherry, Kerowlee. 4*th*, Boondelah states; Sumpthur, Jhansi, Oorcha or Tehree, Dutteah, Rewah, &c. 5*th*, States in Malwah; Bopaul, Dhar, Dewas, Rutlaum, Silana, Nursinghur, Amjherra, &c. 6*th*, States in Gujerat; Pahlunpore, Rahdunpore, Rajpeepla, Loonawara, Soonth, the states in the Myhee Caunta, the Kattywar states. 7*th*, States on the Malabar coast (chiefly Mahratta); Sawunt Warree and Colapore. 8*th*, North-eastern frontier; Siccim, Coosh Behar, Cossya Hills, &c. &c. Yet even in some of these protected states, as for instance, in Colapore and Sawunt Warree, the British government has been compelled to assume the administration, and to carry on the government in the names of the native rulers, who are placed in the position of stipendiaries. With respect to Colapore the retransfer of the government to the chief is made dependent upon the opinion which may be entertained by the British government of his character, disposition, and capacity to govern. In Sawunt Warree the heir-apparent having forfeited his rights by participating in the rebellion of 1844, the country, upon the death of the present chief, will be at the disposal of the paramount authority. In some other states, as those in Kattywar, the Myhee, and Rewa Cauntas, and others which are tributary to the guicowar, arrangements have been made under which the guicowar abstains from all interference, and the British government undertakes the management of the country, guaranteeing the guicowar's tribute. In carrying out such arrangements, the British government has conferred important benefits upon the country, by abolishing infanticide, suttee, and slave-dealing. It will thus be seen that, with the exception of the king of Burmah, and the rajah of Nepaul, there now remain no independent princes in India. The rajah of Nepaul, moreover, though not otherwise dependent, is bound by treaty to abide by the decision of the British government in the event of any dispute arising between himself and his neighbour the rajah of Siccim, and he is also restrained from employing in his service any European or American subject. The rajah of Dholpore, in Central India, holds his possessions in absolute sovereignty, free from any right of interference on the part of the British government, as does also the rajah of Tipperah, a wild jungly tract lying on the eastern frontier of Bengal towards Burmah, with the ruler of which the British government has never established any diplomatic relations; but the resources of these petty potentates are too unimportant to entitle them to be regarded as forming exceptions to the general rule of dependency. Over all the other native states in India the paramount authority of the British power has been established, and the relation of ally has in all cases merged into that of superior and dependent.

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[1] For a full account of the operations of this war, see the article Ava.

Causes of the British success.

The rise of the British power, from small beginnings into so vast an empire, is one of those surprising revolutions in human affairs which gives to history the air of a romance. The managers of a trading company in London are now the lords of a kingdom ten times the size of England, and containing upwards of 150 millions of inhabitants; they engage in war and make peace; they rule over kings and princes, dethroning some and setting up others in their stead; and in their counting-house in Leadenhall Street they regulate, not the chances of profit and loss, but the concerns of a vast empire. Yet the causes of this great revolution are simple and obvious. The extensive dominion acquired by the British in India is the consequence of long-continued military success; it is the fruit of victory in many a well-fought field, the triumph of European discipline and science over the rude valour of the hasty levies and imperfectly trained militia of the East. In the course of this long contest the British had frequently to contend with few against many, and their empire sometimes tottered on the verge of ruin, as in the invasion of the Carnatic by Hyder Ali. But the steadiness of the European infantry still repelled the irregular charges of the Mahratta horse, and triumphed in the end; and to this powerful instrument, namely, a well-disciplined military force, wielded by skilful hands, the British are indebted for the conquest of Hindustan. The extension of their empire in India was always discountenanced by the Directors at home, who issued their repeated and peremptory commands on the subject. Yet it might have been easily foreseen, that, the foundation once laid, the superstructure would naturally arise; that having made the first step, the British would not readily stop short in their course. The frailty of man has never been able to resist the allurements of ambition; the dazzling prize of extensive dominion has in all ages been pursued through the paths of blood; and it was scarcely to be imagined that the Company's servants in India would resist its temptations, more especially as there were many circumstances which gave a plausible colour to their ambitious views. The native powers, alarmed by the territorial acquisitions of the British, naturally combined against them as the common enemies of Indian independence. The British, on the other hand, convinced of their strength, and of the hatred and jealousy which they had excited throughout India, and easily yielding to the least surmise of hostile coalitions, often took up arms to avert distant and doubtful dangers; and victory being still the result of each new struggle, they assured their safety by the ruin of their enemies, and by the extension of their power. Thus the hostile designs of Tippoo failed to attain maturity, and he was overthrown before he could become formidable.

Internal policy of the British.

t will now be proper to give a brief account of the domestic policy of the Company as sovereigns of India, especially in those important departments in the civil administration of every country, namely, the revenue, the judicial establishments, and the police.

Land-tax under the Mogul empire.

Under the Mogul government, the public revenue was chiefly derived from a general land-tax, and the regular payment of this tax was the tenure by which property was held throughout the empire. The lands were possessed by different descriptions of owners or occupiers, under the titles chiefly of zemindars or polygars, the military chieftains of the Carnatic, talookdars, ryots, maliks, mecrassadars, nair mulguenies, bhoomias, &c.[1] When Hindustan was brought under the sway of the British, they were necessarily ignorant of the manners and usages of the people, and of the peculiar structure of a Hindu community; and hence the nature of the tenures under which land was held, and of the different descriptions of land owners and occupiers, has been a standing subject of controversy amongst the Company's servants, some insisting that under the Mogul despotism, as over all the East, the sovereign is the sole proprietor of the lands within his dominions; that no private right of property has ever been recognised in any of the great monarchies of Asia; and that all grants of land are resumable at the pleasure of the prince. According to this theory, the zemindar is considered merely as a species of steward or factor, appointed by the government, to collect and superintend the land revenues; and after reserving a suitable portion for his own maintenance, to remit the surplus to the imperial treasury. The rights of the talookdars, an inferior description of holders, and the ryots, and other occupiers of land, were still more imperfectly understood by the English when they acquired the dominion of Bengal; but, under the idea of the sovereign's indefeasible right in the soil, they naturally considered them as tenants at will, to be dealt with like other tenants in the same situation, at the pleasure of the proprietor. This hypothesis of the sovereign's proprietary right was eagerly adopted by the English, and has been boldly followed up in practice. It has, as might have been expected, led to extensive confiscations of land, to great changes in the state of property, and to much distress and confusion, as will be afterwards narrated; and it will be proper, therefore, briefly to inquire how far this claim accords with any legal right, and still more with any principle of enlightened policy.

Sovereign's proprietary right considered.

In a government purely arbitrary, where every man holds life and liberty at the mercy of the sovereign, it is extremely difficult to distinguish between the exercise of legal rights and the outrages of abused power. That the despotic rulers of the East might take possession of the land, or of any other description of property belonging to their subjects, and that this was their practice, can hardly be questioned. But might does not constitute right; nor by such acts of tyranny can they become lords of the soil in any legal sense, any more than of the lives and liberties of their subjects, because they often massacre and torture them at their pleasure. The law of conquest, which is the law of the strongest, gave to the Mahommedans possession of India, which they desolated with fire and sword, and took possession of the lands and properties of the inhabitants, who, according to their approved practice, might have been all put to the sword, as the redemption price of their blood. This was the only title which the Mogul emperor could have had to the lands within his dominions, namely, that he had seized upon them by force; and in countries long subject to Mahommedan rule, or to the Mahrattas and other domestic tyrants, all the ancient rights of the proprietors have accordingly been obliterated. But these acts of tyranny and spoliation can never be construed into legal precedents, nor can they ever confer any title; and it seems a gross abuse of words to call that a right which is merely a deed of violence.

The monarch or the emperor was no doubt styled, in the true strain of oriental flattery, the sole proprietor of the soil, and the lord of the universe; and this he may have been originally, in the same manner as the monarchs of Europe were under the feudal system. According to the feudal law, they were the supreme lords of all the conquered territories, which they granted as fiefs to their vassals, on condition of military service; and from the monarch a subordinate chain of vassalage extended downward to the lowest tenant. These lands were at first granted for a year, but afterwards for life; at length they became hereditary, and descended to the son, or to more distant relations; and thus they finally became a permanent property. But the form of the original tenure is still maintained. They still hold of the sovereign, to whom, at the death of each heir, a formal surrender is made of the property, and a new charter is granted as a matter of course. But this right of the crown, by which in former times the property was actually resumed at the death of the proprietor, has now become a mere legal fiction, an evidence only of the original tenure by which the property was held; and we may easily imagine the disorder and injustice that would be introduced into any European country by a conqueror, who, guided by feudal forms, in opposition to immemorial usage and fixed law, was to resume all property holding of the crown, or of any other superior. In like manner, in Hindustan, though the sovereign was styled the proprietor of all the lands within his dominions, and in legal theory might be so, it would be rash to infer from this the actual extinction of all proprietary rights. Under the Mogul government a heavy tax was, no doubt, laid on the land, which was the main source of the public revenue. But individual rights of property might nevertheless exist; and their non-existence has certainly never been satisfactorily proved; so far from it, that the advocates of the sovereign proprietary right seem to have nothing to oppose to immemorial usage, and to the principles of justice, but legal forms and the acts of despotic power.[2]

But the abstract question of right here merges into the higher question of policy. It would be the interest of a sovereign, even if he were proprietor of the soil, to commute his rights for a moderate assessment, which in the end would ensure the general prosperity of the community. A land-tax which leaves a bare maintenance to the cultivator discourages agriculture, population, and the growth of capital; it is indeed an interdict on all improvement. Its produce cannot be increased except by the most ruinous extortions, though it will necessarily decrease with the desolation of the land, which it tends to promote. No country can be improved and cultivated where the rights of property are loaded by a public tax. Would the wastes of America, we may ask, be so quickly converted into fruitful fields, if the government were to come in for the largest share of the produce, if the owner were placed under the strict surveillance of the excise, and obliged to account for every particle of his crop. In Europe the church tithes have been justly complained of as a great obstruction to improvement. But a tax such as we have described, which, however it varied in its amount from a fourth, a third, or half the gross produce of the soil, generally left only a bare maintenance to the cultivators, is far more pernicious in its operation; and it is indeed owing to its pressure that so large a portion of Hindustan still remains a primitive wilderness. Mr L. Place, to whom was committed, in 1790, the settlement of the Jaghire, a tract of country in the Carnatic that had been ruined by the invasion of Hyder Ali, after mentioning the desolation of the country, and that the inhabitants would not cultivate any fields except under a secure tenure, adds, that "by granting them lands to them and their heirs for ever, so long as they continued in obedience to the circar (government), and paid all just dues, he was enabled to convert the most stubborn soil and thickest jungle into fertile villages."

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[1] See Colonel Todd *On the Feudal System in Rajast'han*, vol. i. chap. i. p. 167. See also *Fifth Report*, p. 822–23, Extracts from Mr Thackeray's Report, dated 4th August 1807.

[2] The masterly reports of the Company's collectors in Southern India all concur in stating the hereditary rights of individuals in the land to be clear and unquestioned from the most remote ages. "In tracing their (the Hindus') past situation," says one of the collectors, "it is not to be discovered, that during the revolutions of many ages, from the reign of their first princes, until the final downfall of the Hindu authority, any questions ever existed, in any stage of the Hindu history, as to the right of the people to the lands of the country, excepting villages or lands totally waste, and that had escheated to government. On the contrary, they appear to have been transmitted to them, from the most remote era, down to the present time, without interruption; these rights are supported by usages, which could never have prevailed, but for their universal acknowledgment; and, in the repositories of their history and their laws, we find the right of the people to property in lands repeatedly acknowledged and preserved." (Extract from Report of Collector of Southern Polygar Peshcush, 29th December 1800, *Fifth Report*, Appendix, p. 828.)

Land titles among the Hindus.

It was extremely natural for those who had succeeded to the rights of the sovereign to exaggerate the extent of those rights, and to believe in the convenient doctrine of his proprietary title to the land. But although many ancient rights were unquestionably trampled down and for ever lost in the violence of the Mahommedan conquest, yet recent investigations have discovered, amidst the ruins of Hindu institutions, many relics of ancient manners, and the clearest titles of individual proprietors to the possession of the soil. In carrying into effect the permanent settlement by Lord Cornwallis of the land revenues in Bengal, the collectors were embarrassed by the claims of the petty talookdars, who insisted on a hereditary right of property in the soil; and the maliks, who with vehemence urged the same claims, and affirmed that the zemindars and talookdars had no deeds to show that could deprive them of their just rights. They claimed the land as their paternal inheritance, and refused to settle for the public revenue on any other terms than as proprietors. The collector was deeply impressed with the justice of their claims; and Mr Rickards, in his masterly work on Indian finance, affirms that the maliks were really proprietors, stripped of their rights by the usurpations and exactions of the zemindars and their aumils or collectors.[1] In the district of Dacca, the private rights of property were found to exist in their full force; even the unproductive jungle and waste around the town was claimed by individuals, "who," says the collector, "though they receive no profit from it, and are too indolent themselves to make it productive of any, will not suffer others to bring it into a state of cultivation without some recompense; and so very tenacious are they of it, that even in the suburbs of the city, which for three or four miles is almost an impenetrable jungle, infested by wild ferocious animals, a man cutting down a single tree will be sued by the proprietor for damages."[2] A clearer idea cannot possibly be conveyed of the rights of property, and of the solid foundation on which they rest in Bengal, as in all other countries. The accurate researches of Colonel Todd, who drew his information not merely from written records and deeds, but from the more durable tablets of stone found amidst the ruins of the fallen pile, have laid open the ancient tenures and institutions of Northern India; and in his lively delineation of those ancient manners we recognise all the peculiar features of the feudal system. There were in Rajast'han or Rajpootana two classes of landholders, the one the Grasya-t'ha-cour or lord, the other the bhoomia;[3] the first holding land by a grant from the prince on the condition of military service, "renewable," says Colonel Todd, "at every lapse, when all the ceremonies of resumption, the fine of relief, and the investiture, take place;"[4] the other an allodial proprietor, who holds prescriptive possession, who succeeds to his inheritance without any fine, though he pays a small annual quit-rent, and may be called upon for military service in the district where he resides, which is chiefly composed of the rocks and wilds that afford a refuge from oppression, and where the bhoomias, being numerous, form a species of local militia.

Landed property in the South of India.

In the southern countries of India, in Tanjore, Tinnevelly, Canara, Malabar, &c. where the Mahommedan rule had only been temporary or partial, the rights of property were not extinguished; they were indeed encroached upon, and were, as Mr Rickards observes, "in progress of actual extinction, and approached nearer and nearer to this term in proportion to the duration of Mussulman tyranny." The tyranny and exactions of Hyder Ali and his son Tippoo had nearly extinguished all proprietary rights in Mysore and in Malabar; and most of the Hindu landholders were compelled to seek refuge in Travancore. "I was," says Mr Rickards, "personally acquainted with some who, from the same causes, deserted their estates, and retired for safety into Coimbetoor."[5] But those rights were not obliterated, and the investigations of the British functionaries, skilled in the native languages and manners, brought to light in these countries the ancient condition of property, and the clearest titles of individual proprietors.[6] The notion of the sovereign's proprietary right to the whole produce of the land was interwoven with the Mogul system of finance, and the East India Company had always acted on the same maxims. Accordingly, Mr Place and others, when they entered on the management of the Jaghire, Canara, Malabar, &c. were prepossessed with the same ideas, and gave the most liberal interpretation to the Company's proprietary rights, considering the occupants and cultivators of the land as mere tenants at will. But they were soon undeceived by glaring facts. They found that the possessors of the land had the right of selling, bestowing, devising, or bequeathing their lands, in whatever manner they might deem expedient; that the lands, whether they belonged to villages, and were cultivated in shares by their common labour, or to individuals, were their absolute property, of which they could only be deprived by an act of violence. This proprietary right was termed *meerass*, a Persian or Arabic term for land;[1] and the proprietor a *meerassadar*. "Whatever may have been the origin of these rights," says the Fifth Report (p. 105), "they are regarded by the people as hereditary rights," and were, according to the Hindus, far more ancient than the Moorish conquest. Estates were found to consist of from 4000 to one acre of land; and where they were large, or were divided amongst a numerous proprietary, they were tilled by *parakudis* or *pyacaris*, who were paid for their labour, and who possessed hereditary rights of occupancy as cultivators. Common labourers were also occasionally hired; and slaves are numerous all over the country, attached to the soil, and in a state of villenage, as were formerly the cultivators in Europe. In Canara, the same rights of property exist in the land; and the proprietors are known under the appellation of *nair mul guenies*, who, like the meerassadars, have tenants in perpetuity, or *shud mul guenies;* and tenants at will, or *chalie guenies*. Of these tillers it is observed in the Fifth Report of the Select Committee on the affairs of the East India Company, that "the lands in general appear to have constituted a clear private property, more ancient, and probably more perfect, than that of England. The tenure, as well as the transfer, of this property, by descent, sale, gift, and mortgage, is fortified by a series of regular deeds, equally varied and curious, and which bear a very strong resemblance in both parts of the country. The proprietary right is either vested in individuals, or in copartnerships of persons, each of whom possesses an unalienable interest in the estate, proportioned to the share of the property of which he has become possessed."

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[1] See *Fifth Report*, p. 493, Copy of a Letter from the Collector of Shahabad to the Board of Revenue, dated 29th September 1789. Rickards, vol. i. chap. i. sect. iv. p. 368. *Mal*, says Rickards, is an Arabic word, denoting wealth, property, revenue, rent, particularly that arising from land; and *Malik* means master, lord, proprietor, owner of such rent.

[2] *Fifth Report*, Appendix, p. 495, Letter from the Chief of Dacca to the Board of Revenue, dated 23d July 1786. It was proposed that the government should clear away this jungle, and cultivate the land. But this "laudable plan," says Mr Day, chief of Dacca, cannot therefore be carried into effect, "without creating great dissatisfaction," as every seizure of private property necessarily does; yet he observes, that the "prejudice (*i. e.* the robbery) of a few individuals, should be no impediment to the adoption of a plan which has for its object the benefit of the community at large."

[3] The term *bhoomia* is, according to Colonel Todd, a most expressive and comprehensive name, importing absolute identity with the soil; *bhoom* meaning land. (Todd, vol. i. p. 168.)

[4] *Annals and Antiquities of Rajast'han*, by Lieutenant-Colonel James Todd, vol. i. p. 164.

[5] Vol. i. p. 283.

[6] See *Fifth Report of Select Committee*, p. 714, Report of Mr Place respecting the land tenures in the Jaghire; Report of Mr Hodgson on the revenues of Tinnevelly, *Fifth Report*, p. 832; Report on Revenues of Dindigul, p. 978. Mr Place at first agreed to the favourite theory that the sovereign was lord of the soil, and that the occupants of land in India were mere tenants at will. But on further inquiry, he was convinced that the *meerussadars* were hereditary proprietors. Report of Collector of Tanjore and Trichinopoly, 8th September 1805: "Immemorial usage," he observes, "has established, both in Tanjore and Trichinopoly, that the occupants, whether distinguished by the names of *meerassadars* or *mahajanums*, have the right of selling, bestowing, devising, or bequeathing their lands in the manner which to them is most agreeable." "It is fortunate that, at the moment when we are consulting on the means of establishing the property and welfare of the numerous people of these provinces, we find the lands of the country in the hands of men who feel and understand the full rights and advantages of possession; who have enjoyed them, in a degree more or less secure, before the British name was known in India; and who, in consequence of them, have rendered populous and fertile the extensive provinces of Tanjore and Trichinopoly. The class of proprietors to whom I allude are not to be considered as the actual cultivators of the soil; the far greater mass of them till their lands by means of hired labourers, or by a class of people termed *pullers*, who are of the lowest, and who may be considered as the slaves of the soil. The landed property of these provinces is divided and subdivided in every possible degree. There are proprietors of 4000 acres, of 400 acres, of forty acres, and of one acre."

There is another class of landholders in Malabar, denominated *jelmkars*, or *jenmkars*, who possess allodial rights, acknowledging no superior, and who were exempt from the government-tax.[2] When Hyder conquered the country, his first act was to declare half the produce of the soil to belong to the sovereign; and it was in this manner that in Hindustan all private rights were trampled upon and gradually obliterated. But these exactions of tyranny are not to be confounded with the legal claims of the state. Mr Hodgson, in his report on the revenues of Coimbetoor, justly observes, that whatever abuses took place under the Hindu or Mahommedan princes, "what was fair assessment, and what was exaction, was well known to the party governing and those governed."[3] From all this concurring evidence, it is clear that the sovereign's proprietary right in the soil was in Hindustan, as in Europe, more nominal than real; that prior to the Mahommedan conquest the land was divided amongst individual proprietors, and that the bhoomia of Rajpootana, the malik of Bengal, the meerassadar of Southern India, the nair mul guenies of Canara, and the jelmkars of Malabar, were all hereditary landholders, with legal rights, of which they could only be dispossessed by the violence of despotic power.

Zemindars.

The Mahommedan conquest subverted most of the ancient rights and titles of the Hindu landholders, and introduced into Bengal the title of zemindar or landholder, from the Persian word *zemin*, land; respecting whose rights and duties so wide a difference of opinion has prevailed. Without entering further into this controversy, which, as respects the zemindar, is more a speculative than a practical question, it may be observed, that the zemindars had lived for centuries in great splendour on the produce of their lands, which had quietly descended under the existing tenure through successive generations; that they had the power to sell, to alienate, or to mortgage; and that as long as they paid the annual tribute to government, they enjoyed secure possession of their lands. Under a despotic government arbitrary ejectments might no doubt occur; but these were rare, and they were universally regarded, both in law and in usage, as the illegal outrages of abused power. It is admitted on all hands that these rights belonged to the zemindars; and the only point that still remains in dispute, and it does not appear very material, seems to be, whether, according to the theory of the Mogul constitution, the receipt of the land-tax by the sovereign, or of his allotted share of the produce by the zemindar, entitled the one or the other to the character of proprietor of the land.

The zemindars, being bound to the state for the revenue, were necessarily invested with the power of collecting the land-tax from the subordinate landholders and tenants. They united, in this manner, legal authority with the possession of property, whilst, as judges and magistrates, they administered both civil and criminal justice, and were held responsible for all crimes committed within their respective boundaries. These powers they frequently abused, and oppressed the inferior landholders, the talookdars and the ryots, the hereditary cultivators, or, as others consider them, the proprietors of the land, by the most cruel exactions. It was to the principal landholders that government looked for the discharge of its demands, whilst the inferior occupants and tenants were bound each to his immediate superior for their several proportions of the stipulated tax.

Other tenures.

There were various other tenures by which lands were held in Bengal, namely, the Jaghire, Altumgha, Muddud Mash Ayma, and others. The first were grants of land on the condition of military service, or for the support of garrisons or any other public establishment, especially of a military nature. This would appear also to have been the conditions of the zemindary tenure, as Mr Rickards states that the zemindars of Bengal are expressly mentioned in the

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[1] This term of *meerass* was introduced by the Mohammedans. "Swastrium," says Mr Hodgson, "is the Sanscrit word, and is generally used by the Brahmins; and *caneatchy* by those Shudras (cultivating castes) who may not have adopted the general term *meerass*." (See *Fifth Report*, Appendix, p. 832, Extract from Hodgson's Report on the Revenues of Tinnevelly, 24th September 1807.) Caniatchikedar is possessor or proprietor, and fully answers to jelmkar. (See p. 833, *Fifth Report*, Mr Hodgson on the Revenues of Dindigul, 28th March 1808.)

[2] *Jelmkar* or *jenmkar* means an allodial proprietor; the term *jenm* meaning properly allodial right.

[3] *Fifth Report*, p. 834. "Neither the Hindu nor Mussulman government appear (supposing their right in the soil as proprietors to be indisputable, and proprietary right to be a right to demand what the proprietor pleases for his land) ever to have exercised the right. What was fair assessment, and what was exaction, was well known to the party governing and those governed. It is true, where, as under Tippoo Sultaun's reign, exaction had no limit, landed property could have no value; but where fraud could not counteract oppression, a hope of change for the better, or inability to resist, produced submission, till the load became too heavy to bear, and emigration the only source of relief."

Ayeen Akberry as furnishing their several contingents of cavalry, infantry, and artillery. The Altumgha grant, according to the terms of it, was in perpetuity. The other grants were for the support of learned men, or religious establishments. Many of the public functionaries of the Company denied the validity of these grants; they estimated the average loss, as it was called, as if there could be any loss where there never was any right, on these grants in Bengal and the ceded provinces at two and a half millions sterling, and contended that they were resumable, and were often actually resumed, at the pleasure of the prince. Colonel Todd, however, mentions, that in Rajpootana this right of resumption had fallen into disuse. "The right to resume," he observes, "may be presumed to exist; while the non-practice of it, the formalities of renewal being gone through, may be said to render the right a dead letter;" and, quoting a passage relative to the fiefs in Europe, that they were first moveable or resumable at pleasure, then perpetual or for life, and finally hereditary, he adds, "this is the precise gradation of fiefs in Mewar, a division of Rajpootana. There is reason to believe that these grants were in a progress to permanency all over India." But all permanent property in land was discountenanced by the policy of the British in India, who were perpetually picking holes in the tenures by which it was held, even where the deed of grant expresses in the plainest terms that it is perpetual, "from generation to generation."[1]

Division of the country into villages.

The country of Hindustan is divided into villages or districts, each comprising some hundreds or thousands of acres of arable and waste land. Every village is a separate community or township, and has its own establishment of public officers and tradesmen. These consisted of the *potail*, or head inhabitant, whose business it was to superintend the affairs of the village, to settle disputes amongst the inhabitants, to attend to the police, and to the collection of the public tax; the *curnum*, to whom it belonged to keep an account of the cultivation and produce of the land, to register the proprietors of the village, and to attest all deeds of sale, transfer, or assignment; the *boundary-man*, who preserves the limits of the village, or gives evidence of them in case of dispute; the priest, the schoolmaster, the astrologer; the smith, the carpenter, the potter, the washerman, the barber, the cowkeeper, the doctor, the dancing-girl, the musician, the poet, who were each rewarded for their labours out of the produce of the village lands. The amount of their shares on the gross produce is estimated at five and a half per cent. The collectors were allowed ten per cent., and after these and other minor deductions had been made, the remaining proportion of the crop was divided between the sovereign and the cultivator, in equal proportions. "Under this simple form of municipal government," says the Fifth Report, "the inhabitants of the country have lived from time immemorial. The boundaries of the villages have been but seldom altered; and though the villages themselves have been sometimes injured, and even desolated, by war, famine, and disease, the same name, the same limits, the same interests, and even the same families, have continued for ages. The inhabitants give themselves no trouble about the breaking up and division of kingdoms; while the village remains entire, they care not to what power it is transferred, or to what sovereign it devolves; its internal economy remains unchanged; the potail is still the head inhabitant, and still acts as the petty judge and magistrate, and collector or renter of the village." So deeply attached are the Hindus to their native villages and local manners, that, however they may be scattered by the desolation of war, their affections still centre in one common and cherished spot; insomuch that, in 1817, as is mentioned by Sir John Malcolm, and as has already been noticed, when peace was re-established in Central India, by the expulsion of the Pindarees and other freebooters, who laid waste the country, the inhabitants and officers of the villages re-assembled from every quarter, and the resurrection of these communities into life and action seemed to have been the work of an instant.

Land-tax.

The land-tax of the village is collected by the potail, assisted by a train of petty officers or under collectors, the putwarries, the peons, the pykes, and others, whose salaries form a deduction from the gross rent. The potail pays his collections to the zemindar, from whom they were received, under the Mogul government, by a higher officer, and finally remitted to the imperial treasury. The accounts of the *curnum*, or the *canongoe*, were also transmitted through various gradations of accountants, who superintended and checked the collection and receipt of the public revenue. In the year 1573, during the reign of Akbar, when the Mahommedans had completed the conquest of Hindustan, Rajah Torrel Mull, minister of finance to the emperor, from the accounts furnished by the canongoes and collectors of the revenue paid by the ryots, formed a general rent-roll for all the country, as well as a scheme of division, fixing the separate proportions of districts and villages. The revenue thus settled for Bengal, Behar, and Orissa, and usually called *tumar jumma* (rent), or standard assessment, amounted to

	Rupees.	
	10,693,152, at 2s. 3d.	L.1,202,979
In 1722, being a period of 149 years, it was increased, under Jaffier Khan, by means of Abwabs, which are arbitrary taxes added to the original or standard assessment, to.........	13,115,907	1,475,537
In 1728, by the additional taxes of Sujah Khan............	16,418,513	1,847,082

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[1] Colonel Munro, a great authority on all Indian questions, in a paper of remarks on a decision of the chief justice of Madras respecting a jaghire estate that was resumed by the Company, argues, from the arbitrary practices of Indian princes in taking away these rights, that no such rights exist, although they are defined in the clearest terms. "The grant," he observes, "is in the usual form,—'to be enjoyed by him and his descendants *for ever, from generation to generation.*' He is authorized to divide it among his descendants; and the local officers are required to consider the perwannah 'as a most positive peremptory mandate, and not to require a fresh sunnud every year.' The terms employed in such documents, 'for ever,' 'from generation to generation,' or, in Hindu grants, 'while the sun and moon endure,' are mere forms of expression, and are never supposed, either by the donor or the receiver, to convey the durability which they imply, or any beyond the will of the sovereign. The injunction with which they usually conclude—'Let them not require a fresh sunnud every year,' indicates plainly enough the opinion that such grants were not secure from revocation." (In Consultation, 15th March 1832.) The language here may be a "mere form of expression," yet it is impossible to frame in words a clearer legal title; and the doubt is, whether the subversion of such a title, however common amongst the despotic princes of Hindustan, ought not to be regarded as a tyrannical act rather than a legal precedent. No landed proprietor would, with such a title, surrender his estate, except to the power of the strongest. Custom may have rendered such acts familiar to the prostrate people of Hindustan; but if words like these are to be held as mere official forms, it is clear that no legal title to property can exist in India. Sir Thomas Munro mentions several examples of land held under common jaghire grants descending through several generations. He still insists, however, that, by the invariable custom of the country, they are resumable at the pleasure of the prince, though it seems extremely doubtful how far the practice of a despotic government in resuming lands can be received as a precedent against such a clear legal title.

	Rupees.	
In 1755, by Aliverdy Khan, to	18,644,067	L.2,097,550
In 1762–3, by Cossim Ali	24,118,912	2,713,377
In 1763–4	17,704,766	1,991,785

The arbitrary taxes termed Abwabs, added to the original standard assessment, consisted of duties on the transit of goods through the different chokies or toll-bars of the country, of taxes on cattle and stock of every description; of a capitation tax; of a tax on shops, manufactures, or stock in trade; and of fines and other arbitrary exactions; and, in proportion to the demands made on the zemindar, he was empowered to augment the contribution of his tenants. The standard revenue of Torrel Mull, amounting to L.1,202,979, appears to have been all that the country could bear; for, inconsiderable as was the augmented revenue of Jaffier Khan, it was only obtained by the most cruel tortures inflicted on the zemindars, many of whom he confined in pits filled with ordure, which he termed in derision Bykaut, or Hindu Paradise. In the reign of Meer Cossim, who was set up by the English, to whom he promised large sums as the price of his elevation, these oppressions were carried to a still greater height. The policy was to ascertain, by exact money, the produce of the land; and the whole surplus, after allowing a bare maintenance to the cultivator, was swept into the treasury.

English invested with the sovereignty of Bengal.

Although the ascendency of the English had for some years been thoroughly established in Bengal, and although they were formally invested in 1765 with the sovereignty of the country, its affairs were still administered in the name of the native prince, and according to the forms and policy of the ancient constitution. Justice was still dispensed by the native courts, and by the nabob's officers; the revenues still flowed through the same channels into the public exchequer; and all transactions with foreign powers were carried on under the same authority as formerly. But such was the increasing power of the English, that the government, as far as regarded the protection of the people, was dissolved. Neither the nabob nor his officers dared to offer any opposition to their sovereign will; and the tribunals of justice, so far from being a refuge to the oppressed, became subservient to the rapacity of the gomastahs, or Indian agents, employed by the Company's servants, and were converted by them into most efficacious instruments for oppressing and plundering the people.

The directors had been long dissatisfied with the proceedings of their servants, and with the produce of the land revenues, which had fallen far short of their expectations, and they now resolved to put an end to the double administration of the nabob and the Company; and, dispensing with the empty name of the former, to take upon themselves, ostensibly as well as really, the entire care and management of the land revenues. The dewanny of Bengal, Bahar, and Orissa, or the office of collector of the public revenues, which in the East implies the right of sovereignty, was conferred in perpetuity on the East India Company by a grant from the Mogul Shah Aulum, dated the 12th of August 1765. The assessment imposed on the country by Cossim Ali is stated by Sir John Shore to have been mere "pillage and rack-rent;" and it was an assessment on paper, as, out of the sum of L.2,882,724, there remained a balance undischarged of L.1,987,054, notwithstanding the cruelty with which the collection had been enforced. It was found necessary to reduce the assessment, in 1763–64, to L.1,991,785, out of which the sum realized was only L.857,070.[1] In 1764–65 the assessment imposed amounted to L.1,990,988. In 1765–66, the first year of the Company's administration, the assessment was 16,029,011 rupees, equal to L.1,803,263, of which 14,704,875 rupees (equal to L.1,654,298) were actually collected. In the two following years it was slightly increased, but deductions were afterwards made, as it was found impossible to collect it. Yet the sum actually realized was greater than ever was extorted from the country by all the cruelties of Jaffier Khan. But the methods by which it was collected were most ruinous. The landholders, failing almost universally in their engagements, were left to the mercy of the revenue-officers, by whom they were grievously oppressed. In many parts, the villages were deserted by the cultivators, and the land was left desolate. All these evils were still farther aggravated by a grievous famine which prevailed in Bengal in the year 1770, by which it is computed that about one-third of the inhabitants perished. But, in the midst of all this misery, the revenue was still violently kept up to its former standard. The deficiencies occasioned by the famine were re-assessed on those who survived this calamity; and so strictly were they levied, that the land revenue for that year exhibited an increase above that of the year preceding. The ruinous effects of this heavy exaction are stated at length in the different letters from the governor-general to the directors. In a letter, dated the 3d of November 1772, he observes, "It was naturally to be expected that the diminution of the revenue should have kept an equal pace with the other consequences of so great a calamity; that it did not, was owing to its being violently kept up to its former standard." He then describes the method by which this was accomplished, which was by "an assessment upon the actual inhabitants of every inferior division of the lands, to make up for the loss sustained in the rents of their neighbours, who are either dead or have fled the country." "The tax," he continues, "not being levied by any fixed rate or standard, fell heaviest on the wretched survivors of those villages which had suffered the greatest depopulation, and were of course the most entitled to the lenity of government. It had also this additional evil attending it, in common with every other variation from the regular practice, that it afforded an opportunity to the farmers, or shiedars, to levy other contributions off the people under colour of it, and even to increase this to whatever magnitude they pleased, since they were in course the judges of the loss sustained, and of the proportion which the inhabitants were to pay to replace it." To the same effect, Mr Middleton, one of the superintendents of the public revenue, observes, "When a very considerable portion, supposed even a third of the whole inhabitants, had perished, the remaining two thirds were obliged to pay for the lands now left without cultivators. The country has languished ever since, and the evil continues enhancing every day. The first remedy, without the adoption of which all other measures will be fruitless, is an universal remission of some considerable portion of the revenue throughout the provinces. Such remission should have been made immediately on the famine. Its not taking place then has made it more and more necessary every day; and the longer it is delayed, the more ruinous the consequences must be to this country and its revenue."

To correct these evils, supervisors, chosen from the Company's servants, were in 1769 stationed in different parts of the country, to superintend the native officers in the collection of the revenue and in the administration of justice; and two councils were appointed over the supervisors, one at Moorshedabad and another at Patna. These supervisors were instructed to procure information respecting the amount of the land revenues, the manner of collecting them, the amount of the cesses or arbitrary taxes, the origin and progress of those modern exactions, and also to inquire concerning the regulations of commerce and the administration of justice. The reports made by these supervisors concurred with all the other evidence received as to the wretched and oppressed state of the natives. "The nazims," they observed, "exacted what they could from the zemindars and great farmers of the revenue, whom they left at liberty to plunder all below; reserving to themselves the prerogative of plundering them in their turn, when they were supposed to have enriched themselves with the spoils of the country."

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[1] See Sir John Shore's Minute, *Fifth Report*, p. 176.

It was now resolved to make a settlement of the land revenues for five years commencing from the year 1772. For this purpose, a committee of the board, consisting of the president and five members, named the "Committee of Circuit," was appointed, who were to make a journey through the country, and were empowered to receive proposals for a new lease of the lands, first from their ancient possessors, and if their offers were deemed unsatisfactory, they were to be let by public auction to the highest bidder. These persons proceeded in their circuit through the country, publicly advertising and letting in farm, for the highest rent that could be obtained, the estates of such as hesitated to contract for the assessment proposed. A great proportion of the landed property throughout Bengal was thus exposed to auction; and, in the general sale, the former owners and the great nobility of the country were outbidden by adventurers, to whom property was acceptable on any terms; and were generally dispossessed of their lands, from the surplus produce of which a provision was assigned them by the indulgence of the revenue committee.

The supervisors who had been stationed in the different districts were invested with the necessary powers for the collection of the revenue, and were henceforth denominated collectors. A native officer was to be joined with them under the title of duan, to confirm and to check accounts, and to assist in all those multifarious details which were intelligible only to a native. Various regulations were adopted to check the exertions of the collectors; but the governor and council express their regret that it was not in their power wholly to remedy this evil. Under the Mogul government, the duty of collecting the revenues and of administering justice was united, as formerly mentioned, in the person of the zemindars. The new scheme for the management of the revenues subverted this ancient order of things. The zemindar was superseded both as collector and as judge, and his place was supplied by two courts, the one for civil, called the Dewanny Court, the other, called the Fonjdarry Court, for criminal proceedings, established in each district. In the criminal court the new collector of taxes was to act as president, to be assisted by two Mahommedan officers, the cauzee and the muftee, and by two Mohlavies, as interpreters of the law. The civil court consisted, in like manner, of the collector as president, assisted by the duan and other officers of the native court. Two supreme courts were, at the same time, established at Calcutta, for the review of the inferior courts, the one for civil cases, being called Dewanny Sudder Adawlut, and the other the chief court of criminal justice, or Nizamut Sudder Adawlut. To one of these all capital cases were reported, and were ultimately referred to the governor and council, who, finding the labour too great, restored, in 1774, this branch of administration to the nominal nabob, and carried back the court to Moorshedabad. It appeared that, for a long period before this, the administration of criminal justice was wholly at a stand. In the new arrangements all disputes about property not exceeding ten rupees in value were referred to the head man of the district to which the parties belonged.

In considering those regulations, the question naturally occurs, how these supervisors, who were now to act in the double capacity of collector and judge, became qualified for the discharge of such important functions. In all other countries, it is only by a previous course of laborious preparation that any one is qualified for the office of a judge; and to appoint an unqualified person would be reckoned both dangerous and absurd. But how much more dangerous and absurd was it to appoint uninstructed persons to act as judges in a foreign land, with whose language they are but imperfectly acquainted, and of whose laws, manners, and customs, they are thoroughly ignorant? If, among a comparatively rude people, the mode of proceeding be loose and arbitrary; if there be no books of written law, or of precedents to govern judicial decisions, which must consequently depend on the imperfect lights and analogies afforded by manners, religion, or customs, the incapacity of a foreigner for the discharge of such nice duties becomes even more glaring. By disposing of the administration of justice in this manner, it was clear that the judicial duties would either be neglected, or that they would still be performed as before, and with no increased chance of amendment by native officers. This new arrangement was, therefore, like many others, a useless innovation on the established practice of the country. There is another weighty objection to the union in one person of the duties of collector and judge, namely, that it was in the collection of the duties that the grossest oppression had been committed; the powers of the collectors being frequently perverted to the most iniquitous ends. Under this new project, those who sought redress from the courts of justice met with their oppressor in the capacity of judge. He judged in his own case, and of complaints brought against his own conduct. Justice was in this manner an empty name, unless it was supposed that the judge would pronounce himself an oppressor.

Under the five years' lease on which the land revenues had been farmed in 1772, the country was grievously overtaxed. The revenues fell into a heavy arrear the very first year, and the lands were let on a progressive rent. To collect the outstanding balances, and to force up the revenue to its standard, a host of extortioners was, under the name of aumils, or collectors, let loose upon the afflicted country. But the rents contracted for by the farmers of the revenue were greater than they could pay, and, notwithstanding all their efforts, the arrears continued to increase. On the five years' lease, they amounted to a sum equal in value to L.1,454,277, which was judged to be wholly irrecoverable; while, during the same period, the sums remitted, even under the rigorous management of public farmers, amounted to L.1,336,451. Nor was this the only evil arising from the mal-administration of the Company's servants. The zemindars, who are admitted on all hands, even by those who advocate the sovereign's right to the possession of the soil, to have lived in splendour on their hereditary possessions; in all cases to have possessed the powers of magistracy within their district, and, where the territory was large, to have exercised a species of sovereignty; were either despoiled of their estates, or, where they were induced, by a hereditary attachment to their possessions, to engage for the rent proposed, they were overwhelmed with taxes which they could not pay, and were thus involved in poverty and ruin. Where the zemindar was himself the farmer of the revenue, he exercised the same extortion on his inferiors which was applied to himself; where a money-jobber, having no interest whatever in the property of the tenants, was the farmer, there was no limit to his extortion and cruelty.

The defects in this system for the administration of the land revenues soon began to disclose themselves; and the rulers of India, whose government was one continued innovation, immediately resolved to make another considerable change in the state machinery which they had just set in motion. They abolished the superintendence of the collectors; and the country, with the exception of Chittagong and Tipperah, being formed into six grand divisions, viz. Calcutta, Burdwan, Moorshedabad, Dinazepore, Dacca, and Patna, a council was appointed for each of the last five, consisting of a chief and four senior servants, to whom were transferred the powers and duties of the collectors. They were to preside in the courts of justice, and to superintend the collections; and, in subordinate districts, they delegated their powers to naibs or aumils, who were natives, and who were appointed, like their superiors, to collect and to judge in all cases under the value of 1000 rupees. The empty privilege of appeal was, as formerly, reserved to the unsuccessful suitor in the provincial courts; and, to superintend the whole collections of the country, a grand revenue-office was established at the presidency. The district of Calcutta was placed under the peculiar superintendence of a committee of revenue, consisting of two members of the council and three inferior servants. These regulations, which were declared to be temporary, and only preparatory to something more permanent, failed as usual in all their important objects. The defective administration of justice amongst the natives was admitted and complained of by all parties, and the peace of the country was in consequence disturbed by the general prevalence of robbery and other enormous crimes. The truth is, that the new arrangements had subverted the ancient institutions and local manners of the country, and had thus left a void in its internal economy which the government was in vain endeavouring to fill up.

The lease of the lands expired in 1777; and, after various suggestions and consultations, it was resolved that the rent should be regulated by the average collections of the three preceding years, and that the lands should be let, not by auction, but by an agreement with their ancient possessors in preference to other competitors. The liberal views of Mr Francis, who proposed that, in lieu of the monopoly of salt and opium, a moderate duty should be imposed on those articles, and that a long series of oppression should thus be terminated, by giving freedom to trade, were rejected by the governor-general. In pursuance of the plan proposed, the lands were let from year to year until the necessary arrangements could be completed for the system which was now to be adopted of a permanent land-tax.

The attention of the British parliament had frequently been directed to the state of our Indian possessions, and to the transactions of the resident government; and, in 1784, a new system, of which we have already given an account, was established in Britain for the control of the local administration, under which Lord Cornwallis, who was chosen governor-general, was specially directed by the act of parliament, as well as by instructions from the directors and the board of control, "to inquire into the alleged grievances of the landholders, and, if founded in truth, to afford them redress; and to establish permanent rules for the settlement and collection of the land revenue, and for the administration of justice, founded on the ancient laws and local usages of the country."

Lord Cornwallis, on his arrival in India, did not deem matters fully ripe for the execution of the proposed plan, namely, the permanent settlement of the land revenue. On this important subject he found that the most intelligent of the Company's servants differed widely in opinion. Neither the nature of the land tenure, nor the rights of the different orders of people who shared amongst them the produce of the soil, were well understood. All that was distinctly known was the amount of the revenue; but whether it was too high or too low was still a disputed point amongst the English in India, although the country was visibly declining under the weight of assessment. In such diversity of opinion, the governor-general, anxious to proceed with caution, delayed for a little the plan of a permanent settlement. He let the lands, in the mean time, from year to year, through the agency of the district collectors; and information on which to found a more durable arrangement was diligently sought from every source.

Permanent settlement of Lord Cornwallis.

In 1789, Lord Cornwallis had resolved on the permanent settlement of the land revenues. This he conceived to be essential to the relief of the country, the condition of which he described to be wretched in the extreme. "I am sorry," he observes, "to be obliged to say, that agriculture and internal commerce have for many years been gradually declining; and that at present, excepting the class of shroffs and banyans (bankers and merchants), who reside almost entirely in towns, the inhabitants of these provinces are advancing hastily to a general state of poverty and wretchedness. In this description I must even include every zemindar in the Company's territories, which, though it may have been partly occasioned by their own indolence and extravagance, I am afraid must also be in a great measure attributed to the effects of our former system of management." "I may safely assert," adds he, "that one third of the Company's territory in Hindustan is now a jungle, inhabited only by wild beasts." In pursuance of his plan, Lord Cornwallis entered into a permanent settlement of the land revenues for ten years, which was afterwards declared unalterable; and the zemindars of Bengal, Bahar, and Orissa, were formally constituted legal and perpetual proprietors of their respective estates, on the payment of a fixed rent to the state. The ten years, or, as it is called, the *decennial settlement*, was completed in every district in 1793.

In thus excluding itself from any prospective increase of revenue by limiting its demand upon the zemindar, there can be no doubt that the government committed a grave error. One of the great results of the measure was to elevate the zemindars from the grade of revenue-agents to that of landlords; but it never could have been the intention of government to increase the old zemindary allowance of 10 or 15 per cent. to above 100, and yet this has been the result of the permanent settlement. Mr Holt Mackenzie produced before the Commons' committee of 1832, a statement showing the aggregate government demand on various estates within certain districts of Bengal, farmed by the court of wards on account of minor and other disqualified zemindars, the rent paid by the farmer, and the profit accruing to the ward. The result shows a profit on the whole of rather more than 100 per cent. If some portion of this vast overplus were appropriated to recruit the government revenue, and the remainder permitted to remain in the pockets of the cultivators, both the state and its subjects would be greatly benefited. This, however, cannot take place on account of the existing settlement. It must be recollected that this income is not to be regarded as the rent of a landlord but the profit of a collector. Never was service so magnificently requited by any government as the collecting the revenue in India under the permanent settlement. One estate particularized in Mr Mackenzie's paper, is situated in the Twenty-four Pergunnahs, where the settlement was made upon a detailed measurement. On this property the share of the government is 6625 rupees; that of the zemindar 1976. The profit here, though very ample, falls far short of the average. Of course, there are other instances in which it is very much above the average. One of these is in the district of the Jungle Mehals, where the government revenue is 3654 rupees, and the zemindar's profits no less than 16,023 rupees. The settlement was obviously made in a state of great ignorance on the part of the government as to the real amount of the land revenue payable by the cultivators; and in consequence, the zemindar's payment was, in many instances, fixed at a sum quite inadequate. Another cause for the great excess of the zemindar's receipts over their payments to government, arises from the further occupation of waste lands since the settlement; an advantage which was surrendered by government as imprudently as unreasonably.

There was another defect in the decennial settlement, that it provided no security for the under-tenants and ryots in the hereditary privileges which they claimed in the soil. As they varied in different places and depended on different rules, the subject appeared to involve details too intricate for European management; and the important task of settling with the ryots was, therefore, devolved upon the zemindars, with a mere general recommendation to be guided by the custom of the place, and to give the ryot a written copy of his lease. According to this plan, it was the great proprietors only who had any permanent interest in the lands, while the inferior proprietors and tenantry were at the mercy of the principal landholders, who might exact from them whatever they pleased. The under-tenants and cultivators, in this ill-defined state of their rights, had no interest whatever in the improvement of the soil, being well assured that they would in no case be left more than a bare maintenance; and this was one among the other errors of the settlement, that it was made entirely with the zemindars, who were notoriously ignorant, oppressive, and corrupt. Maliks and other inferior landholders were crushed, and the just titles of the talookdars and ryots were extinguished; they were placed in the power of the zemindars, on whom alone the government relied for the improvement of the country, but many of these were capitalists who entered on the office of zemindar in the spirit in which they embarked in a mercantile speculation, and whose only object was of course to make the largest profit on their outlay. They were often unacquainted with the habits, the feelings, the wants, and even the language of the cultivators. Many, moreover, were purchasers who were destitute even of the recommendation of commercial respectability. It is represented that banyans, money-lenders, menial servants of Europeans, vakeels, and other retainers of the courts of law, seized the opportunity of elevating themselves in society by purchasing into this new aristocracy.

Consequences of the tax.

The producers of agricultural wealth being thus divested of their rights, frequently combined to keep down cultivation, and force the zemindar to give up the estate. It soon appeared, that, in order to realize the revenue, it would be necessary to sell the lands; and this evil once begun, continued to increase. The revenue was not punctually paid; and, for the recovery of outstanding balances, lands to a great amount were at stated times exposed to auction. In the year 1796–97, the lands advertised for sale bore a rent of 2,870,061 sicca rupees (L.332,927); and those actually sold yielded an annual rent of 1,418,756 rupees (L.164,576). In 1797–98, the quantity of lands sold bore a rent of 2,274,076 rupees (L.255,833); and it is observed in the Fifth Report, p. 56, that "among the defaulters were some of the oldest and most respectable families of the country;" "the dismemberment of whose estates," continues the Report, "at the end of each succeeding year, threatened them with poverty and ruin, and, in some instances, presented difficulties to the revenue officers in their endeavours to preserve undiminished the amount of the public assessment." In order to check those evils, several alterations were made from time to time by Lord Cornwallis. But they appear to have been unavailing; and, in the year 1802, in a report from one of the collectors, we have the following melancholy picture of the state of the country:—" 'All the zemindars,' it is observed, 'with whom I ever had any communication, in this and in other districts, have but one sentiment respecting the rules at present in force for the collection of the public revenue. They all say that such a harsh and oppressive system was never before resorted to in this country; that the custom of imprisoning landholders for arrears of revenue was, in comparison, mild and indulgent to them; that though it was no doubt the intention of government to confer an important benefit on them, by abolishing this custom, it has been found by melancholy experience, that the system of sales and attachments, which has been substituted for it, has, in the course of a very few years, reduced most of the great zemindars in Bengal to distress and beggary, and produced a greater change in the landed property than has perhaps ever happened, in the same space of time, in any age or country, by the mere effect of internal regulations.'[1] In another part of the same document, the collector, after commenting on a regulation then recently introduced, observes, 'Before this period (1799), complaints of the inefficacy of the regulations were very general among the zemindars, or the proprietors of large estates; and it required little discernment to see that they had not the same powers over their tenants which government exercised over them. It was notorious that many of them had large arrears of rent due to them which they were utterly unable to recover, while government were selling their lands for arrears of assessment.' The collector adds, 'Farmers and intermediate tenants were, till lately, able to withhold their rents with impunity, and to set the authority of their landlords at defiance. Landholders had no direct control over them; they could not proceed against them, except through the courts of justice; and the ends of substantial justice were defeated by delays and costs of suit.' " To the same purpose Sir Henry Strachey observes, "That the men of opulence are now all men of yesterday; that the greatest men formerly were the Musulmen rulers, whose places we have now taken, and the Hindu zemindars. These two classes are now ruined and destroyed."[2]

The ruin of the zemindars was partly occasioned by another cause, namely, the want of any effectual method of enforcing their claims against the small tenants. The public officer was empowered to proceed against defaulters by a summary process, and to attach and sell, by public auction, the zemindar's land for the discharge of arrears; whilst against the under-tenants the zemindar had to seek redress by an ordinary suit at law, which was both tedious and expensive. To heighten this evil, the courts of justice were overloaded with a long arrear of undecided causes, so that no decision could be expected before the lapse of years. There were in the district of Burdwan above 30,000 undecided suits; and no decision could be expected within the ordinary duration of human life. The zemindar, in this manner, whilst he was compelled to pay, by the prompt and efficient process of government, was left to seek redress from his tenants through a labyrinth of endless litigation; and the knowledge of this impediment to justice gave great encouragement to the tenants to refuse payment of their rents. The ruin of the zemindar, therefore, was the inevitable consequence of this summary process to which he was exposed, while he could have no similar recourse on his tenants; and these regulations were universally complained of, and on the justest grounds. In an address from one of the collectors to the board of revenue, in behalf of the zemindar of Burdwan, who had in vain ap-

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[1] *Fifth Report*, printed in 1812, p. 60.

[2] See Answers to the Interrogatories of Government, dated 30th Jan. 1802.

Hindustan.

plied for redress to the civil courts, it is observed that he (the zemindar) begs leave to "submit to your consideration, whether or not it can be possible for him to discharge his engagements to government with that punctuality which the regulations require, unless he be armed with powers as prompt to enforce payment from his renters, as government had been pleased to authorize the use of in regard to its claims on him; and he seems to think it must have proceeded from an oversight, rather than from any just and avowed principle, that there should have been established two modes of judicial process under the same government; the one summary and efficient for the satisfaction of its own claims, the other tardy and uncertain in regard to the satisfaction of claims due to its subjects; more especially in a case like the present, where ability to discharge the one demand necessarily depends on the other demand being previously realized."

Oppression of the ryots.

The system which impoverished the zemindars proved equally ruinous to the ryots. It was the practice of the zemindar to contract for a certain rent with a land farmer, who subdivided the land into smaller portions, and let it to a variety of inferior tenants. To this head farmer it appears that a written agreement was given, according to the regulations; but the under-tenants were left, without any security, to the mercy of their superiors. It is well known, and admitted by the servants of the Company, that the ryot, even when he receives written agreements from the zemindar, is liable to indirect oppressions which no law can remedy; and though, owing to the expense and delay in the administration of justice, he could retaliate on the zemindar, by refusing payment of his rents, this privilege could be of little advantage to him, whilst it tended still farther to widen the breach between the landlord and the tenant, and to add to the hatred, strife, and violent destruction of interests by which the community was now, as it were, torn in pieces. To remedy the grievances which the zemindars suffered from the evasion of payment by their tenants, it was enacted in 1799 that they might have recourse to the same summary process against defaulters as was used by the government against themselves. They were empowered to seize the property of their tenants for arrears, previous to any legal judgment, or any proof of the justice of their claim. This regulation gave to the zemindars the power of unbounded oppression, against which the ryot had no redress, as he was effectually shut out of the courts of justice by the enormous expenses of law proceedings.[1] It was undoubtedly just that the zemindar should have the same efficient process for enforcing payment as was used against himself; but such was the unhappy condition of India, under the unskilful management of strangers, that every plan of reform seemed only to increase the general disorder. Her rulers wanted intelligence for the delicate task of domestic legislation; their schemes were crude and inapplicable, nor could they ever mould the various and jarring interests of the Indian community into any consistent scheme of civil order; so that, though they were continually patching their imperfect work, it still bore the same incongruous character, and the cure of one evil was constantly followed by an irruption of other and worse evils from some other quarter.

Notwithstanding these obvious evils, attempts have been made to repeat the unsuccessful experiment of a permanent settlement by extending it to the western provinces. These were in the first instance frustrated by the objections of Mr Cox and Mr Henry St George Tucker, who were appointed commissioners for carrying the plan into effect. It is remarkable that both these gentlemen were advocates for the system; but on being deputed to superintend its establishment in an untried spot, they perceived that objections existed to its introduction; and these they had the manliness and candour freely to point out. But, notwithstanding their representations, the Bengal government persisted in its determination to introduce the permanent settlement; and the commissioners, finding their views thus at variance with those of the supreme authority, felt themselves called upon to resign. The home government appears to have taken a view of the subject more just, calm, and statesmanlike than that of the local government, and, in the words of Mr Sullivan, "uniformly evinced throughout the whole correspondence on this grand question fully as strong an anxiety that the rights of individuals should not be infringed, as that the interests of the state should not be compromised by a premature discussion." A termination was put to the proposed extension of the system in 1817, when the board of control and the court of directors, after ample discussion, finally agreed upon the following points:—

"That the system of 1793, though originating in the most enlightened views and the most benevolent motives, and though having produced considerable good, has nevertheless been attended in the course of its operation with no small portion of evil to the people for whose happiness it was intended.

"That the same views and motives which dictated the original introduction of the permanent settlement twenty-five years ago, would not, after the experience which had been had of it, justify the immediate introduction of the same system into provinces for which a system of revenue administration is yet to be settled.

"That the creation of an artificial class of intermediate proprietors between the government and the cultivators of the soil, where a class of intermediate proprietors does not exist in the native institutions of the country, would be highly inexpedient.

"That no conclusive step ought to be taken towards a final settlement of the yet unsettled provinces, until it shall have been examined, and if possible ascertained, by diligent research and comparison of collected testimonies as well as by accurate survey of the lands to be settled, how far the principle of a system which would bring the government into immediate contact with the great body of the people, can be practically and usefully applied to them."

This decision was dictated by a sound policy. The attempt to create a landed aristocracy was from first to last based upon erroneous views. Had it been practicable, it could not be effected without the destruction of a mass of private rights, which it was the duty of the law to protect instead of subverting. The observations of Mr Campbell, of the Madras civil establishment, on this point are just and convincing. "In India," says he, "where the only aristocracy connected with the land are the mere hereditary farmers-general, or contract-agents of the government—and the soil itself is invariably occupied by a numerous class of petty proprietary cultivators—it was obviously impracticable to introduce the European theory of landlord and tenant without an infraction of individual rights. It never ought to have been, nor can it now even justly be, made a question for consideration or decision whether in India it be politic to give the preference to great or to small holders of land. The law and usage of the country have immemorially and irrevocably determined the right in the soil to be vested in particular classes. Whatever may be the extent or value of such right, the smallest no less than the greatest tenure should be held inviolably sacred; and the rights of millions of field proprietors to hold on defined terms directly of the state never can be abrogated for a mere theoretical improvement in the administration of the land revenue, without an act of the most sweeping confiscation ever hazarded by a civilized government. It was clearly the duty of a just government anxiously to protect all existing rights; and by defining its demand on the possessor of each tenure holding immediately of the state, to maintain every class in its respective situation, and to ensure the benefit of any remission or reduction in its land revenue to those who pay it, instead of allowing it to be intercepted by its intermediate revenue contractor, the zemindar."

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[1] All the collectors invariably bear testimony to the oppressions of the zemindars after the passing of the regulation of 1799.

But had there been no previous rights in the way, the attempt suddenly to call into existence an aristocracy whose claims were based neither on property nor ancient usage, would have failed. The plan, indeed, was nowhere distinguished by even the semblance of success, except in the districts where the zemindar's authority was continued in its ancient line; and in these cases that part of the plan which subjected the zemindar's right to sale in case of default was productive of the most serious mischief. Under the native powers it was not the practice to sell the zemindar's right. The zemindar himself was subject even to corporeal punishment, but his right was never brought to sale. The enforcement of such a system consequently outraged the feelings of all classes, where the institution was ancient; and the description of persons whom the sales frequently introduced to the exercise of the zemindary authority was little calculated to allay the feelings of irritation excited by the forcible expulsion of an old family.

The state of society which prevailed in Hindustan arose from the mixed operation of a peculiar system of laws, customs, manners, religion, and policy; and such an artificial structure required to be nicely and skilfully handled, instead of which it was lacerated in all its delicate parts by the rude hand of foreign interference. The English were ignorant even of the language of the people whom they had brought under their sway, and whom they now attempted to govern; and though they might know generally that the public revenues were derived from an impost on land, they were entirely inexperienced in the usages of the country, and in the financial details of the Mogul government. With what effect, therefore, could they interfere in such complicated details? how could they decide between the claims of justice and of fraud? how could they judge of cases connected with the peculiar usages of the country, and with all those minutiæ of local manners with which no foreigners can ever become thoroughly acquainted? The Company's servants, involved in such a labyrinth of complex concerns, possessed no clue to guide them to any equitable issue. Supposing their views to have been honest, they wanted intelligence to give them effect; and although they could enforce submission to their decrees, the country, under their usurped and ill-directed authority, presented one vast scene of anarchy and oppression. The directors in Europe readily ascribed all these evils to the misconduct and rapacity of their servants, which they heavily censured; and, in their correspondence with India, they express the most just, humane, and enlightened sentiments, and a sincere desire to promote the happiness of their subjects. But if they had only said to their servants "lower the assessment," these three words would have been of more avail than volumes of fine sentiment. The glory of a sovereign consists in the felicity of grateful millions, and this is the only true and legitimate end of all government. But the East India Company were intent on profit, on enriching themselves at the expense of their subjects; and the duty of the servants to their masters consisted in sending home a large investment. They were to possess themselves of as large a quantity as possible of the produce of the country, giving nothing in return, and to send it to Europe to be shared amongst the proprietors; and it was, accordingly, the boast of successive administrations how well they had succeeded in this matter; not how happy they had made their subjects, but how much of their property they had taken from them and sent to Europe.

Judicial system of Lord Cornwallis.

The institutions of Lord Cornwallis for the administration of civil and criminal justice appear to have been equally unsuccessful with his finance measures; and it soon appeared, as has already been stated, that the new courts of judicature had more business than they could manage, and such an arrear of undecided cases accumulated that the course of justice was nearly stopped. In this dilemma, the costs of suit were raised for the purpose of discouraging litigation; and this expedient being found ineffectual, they were raised a second time. To place justice out of the reach of the poorer and more numerous class, by laying a heavy tax on it, was indeed an easy and effectual method of discouraging litigation. It was, in fact, a denial of justice, a direct refusal to hear the complaints of the poor, who might, therefore, be harassed for ever after with impunity. Notwithstanding this discouragement, however, the evil went on increasing, and at last amounted to an almost total dissolution of civil order. As no decision was to be procured before the regularly-constituted tribunals, every man began to arm himself in his own quarrel; and the country thus became the scene of bloody affrays between armed individuals, unhappily left without any other resource for the decision of their differences. In some of those conflicts 4000 or 5000 persons were arrayed on each side, and many lives were lost. In a letter of the court of directors, dated October 1814, it is observed, "As to affrays respecting the possession and boundaries of lands and rents, this has been long a serious evil, and must, we conceive, have existed in a greater or less degree in every part of the country." "These affrays," continue the directors, "which often lead to homicides and woundings, have been very naturally ascribed by several of the judges to the difficulty of obtaining judicial redress."[1] In the district of Tirhoot, where the public peace had been frequently disturbed by those private feuds, the judge for the division of Patna observes, that they chiefly "arose from the accumulated arrears of suits," and "that the parties finding a delay in obtaining redress, had resorted to force."[2] Mr Melville, also a judge in the division of Dacca, expresses himself to the same purpose. "With respect to affrays," he observes, "attended with homicides and wounding, it is known that those disorders arose from attempts to retain by force possession of lands, or rents of lands, to which the different parties alleged separate claims." The same person afterwards states, that "in Chittagong, they (meaning these quarrels) had not only been frequent, but violent; that the police authority had been often resisted, and in one instance overpowered; that it would be wrong to disguise the length of time a claimant must wait, with the sacrifices he must make, before the decision of a civil court can be obtained."

Penal judicature and police

We shall now briefly advert to the system of penal judicature and police established by Lord Cornwallis; the object, in this case, being to give security to the people by the suppression of crimes. With reference to this object, however, the scheme has notoriously failed. Since the year 1793, India has become a prey to disorders of every sort, and to the worst of crimes. The crime of robbery, accompanied with murder, rose to a most alarming height, and was prosecuted with a degree of union, perseverance, and cruelty, inconceivable to those who live in the civilized communities of Europe. Robbery at this time was a regular profession, handed down from father to son; and the decoits, or gang-robbers, were formed, as the title implies, into powerful confederacies, and made their irruptions on the peaceful country with a force which it was vain to resist. They are described by Mr Hastings as "a race of outlaws, who live from father to son in a state of warfare against society, plundering and burning villages, and murdering the inhabitants." In the year 1772, the robbers are mentioned by the committee of circuit, and stated to be "not like robbers in England, individuals driven to such courses by sudden want; they are robbers by profession, and even by birth; they are formed into regular communities, and their families subsist by the spoils which they bring home to them."

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[1] See *Papers relating to the Police and Administration of Justice in Bengal from* 1810 *to the present time.* Printed by order of the House of Commons, 1819, p. 21.

[2] *Ibid.*, p. 22.

Increase of crimes.

All the reports of the judges employed in the administration of criminal justice concur in representing the deplorable prevalence of the atrocious crimes of gang-robbery and murder. Sir Henry Strachey, writing on this subject in 1802, observes, that the crime of decoity (that is, robbery by gangs) has increased greatly since the British administration of justice. Another judge, writing on the same subject in 1808, observes, "That decoity (gang-robbery) is very prevalent in Rajeshahye has been often stated. But if its vast extent were known; if the scenes of horror, the murders, the burnings, the excessive cruelties, which are continually perpetrated here, were properly represented to government, I am confident that some measures would be adopted to remedy the evil. Certainly there is not an individual belonging to the government who does not anxiously wish to save the people from robbery and massacre." (*Mill*, vol. iii., p. 311.) He afterwards adds, that such is the state of things which prevails all over Bengal; and as to his own particular district, he expresses his persuasion that no civilized country ever had so bad a police. To the same purpose Mr Dowdeswell, the secretary to the government in 1809, observes, in a report which he drew up on the general state of Bengal, "Were I to enumerate only a thousandth part of the atrocities of the decoits, and of the consequent sufferings of the people, and were I to soften that recital in every mode which language would permit, I should still despair of obtaining credit, solely on my own authority, for the accuracy of the narrative." "Robbery, rape, and even murder itself," continues he, "are not the worst figures in this horrid and disgusting picture. An expedient of common occurrence with the decoits, merely to induce a confession of property, supposed to be concealed, is to burn the proprietor with straw or torches, until he discloses the property, or perishes in the flames. And when they are actuated by a spirit of revenge against individuals, worse cruelties, if worse can be, are perpetrated by these remorseless criminals. If the information obtained is not extremely erroneous, the offender, hereafter noticed, himself committed fifteen murders in nineteen days; and volumes might be filled with the atrocities of the decoits, every line of which would make the blood run cold with horror." (*Fifth Report*, p. 603.)

It would far exceed our limits to trace in detail the cause of those evils which necessarily arose out of the very nature of the government now established. The truth is, the British were never qualified to act as legislators in India. They were too ignorant of the habits, manners, and character of the people, to meddle with their institutions, on which, however, they were continually innovating. By altering the old mode of settling the land revenues, they compromised the rights of the different classes of landholders and occupiers. Strife and contention immediately ensued, litigation burst upon society like a flood, the civil courts were overwhelmed with suits which they could not decide, and the people, desperate from a denial of justice, were involved in furious affrays with each other in prosecution of their rights, or, being driven from their lands, they had recourse to robbery for a subsistence. Business was thus, from various sources, accumulated in the criminal courts, which being encumbered with the delay, the expense, and all the tedious formalities of the English practice, proceeded with their decisions at much too slow a pace for the wants of the country; and the evil in this manner daily increased. The mischief of this delay was twofold,—1*st*, It allowed criminals, during the long interval between their apprehension and trial, to prepare the certain means of their escape, by the suborning of false witnesses, who, in the gross dissolution of morals in Hindustan, were always to be readily procured, and in any number; and, 2*dly*, It entailed a grievous hardship on the innocent, great numbers of whom were crowded into jails with the worst of felons, there to wait until the tardy hand of justice should bring them relief.

Defective police.

The inefficient state into which the police had fallen, was also one cause of the general prevalence of crimes. By the ancient institutions of the Mogul government ample means were provided for the preservation of the public peace. In every village a permanent body of guards and watchmen was maintained, whose business it was to assist in all the subordinate details both of the revenue and police, to convey the rents of the ryot to the district collector, to watch those ryots who were in arrear, to guard their crops from depredation, to act as guides and protectors to travellers, to collect information of any offences committed, and to report the arrival in the villages of suspicious persons. For these various services they had grants of land rent-free, or on very easy terms. Besides this standing force of guards and village watchmen, the zemindar, who was at the head of the police, and was held responsible for all crimes committed within his boundaries, had under his orders a large body of *pykes*, or armed constables, whom he could call out in aid of the police service, either for the apprehension of offenders, or to prevent breaches of the peace. These establishments, though they had fallen into a state of decay at the time of the permanent settlement in 1793, and though they were frequently perverted from their original purposes, yet existed in all parts of the country, and the police force was found to be in great efficiency and strength. The zemindary of Burdwan, a tract of country seventy-three miles long by forty-five broad, which was in the highest state of cultivation, and well stocked with inhabitants, maintained a body of 2400 village watchmen, who were distributed under their respective chiefs amongst the different villages, for the double purpose of protecting the inhabitants and of procuring information; besides 19,000 *pykes*, or armed constables, who were liable to be called out, under the orders of the zemindar, in aid of the police. Instead of improving upon those ancient establishments which had taken root in the country, which were interwoven with the frame and texture of Indian society, and which were, generally speaking, efficient, though frequently perverted from their original purposes, Lord Cornwallis demolished the whole structure. According to his new scheme of police, the zemindary constables were disbanded, and their lands, which were allowed them in lieu of pay, were resumed, that is, were seized by government. The country was divided into districts of twenty miles square, over which a native police officer or darogah was placed, with fifteen or twenty armed men under his orders; he was assisted also by the village watchmen, and such of the zemindary constables as were still retained in the public service. It was soon found, however, that the new police officers could not effectually call out this array in aid of the civil power. They wanted the personal consideration of the zemindars, who had long been looked up to with respect and reverence as the hereditary aristocracy of the country. The system, therefore, proved eminently inefficient; nor were the officers employed under the new plan found to be less corrupt than the disbanded constables of the zemindars. The merits of the plan appear to be pretty fairly estimated in the Fifth Report (p. 71), in which it is observed, that the head police officers, and "the inferior officers acting under them, with as much inclination to do evil, have less ability to do good than the zemindary servants employed before them." How vain was it to imagine that any better materials could be found for the regulation and government of the country than those which the country itself afforded. To complain of them was to complain of the general state of society out of which they were produced; and to throw them away because they were corrupt or otherwise imperfect, evinced an ignorance of the legislator's province, which is not to create materials, but to make the best use of those which are provided to his hand. Herein, then, consisted the error of the British legislators. They cast from them the only efficient instruments which were to be found for the government of the Indian community, while they had nothing to substitute in their place; and their plans, when tried in practice, were accordingly found to be idle theories, at variance with the whole frame and order of the society for whose use they were intended.

Prevalence of gang-robbery.

The pernicious consequences of thus rashly subverting the ancient establishments of the country were soon displayed in the alarming increase of crimes. The disbanded zemindary constables, whose lands were seized, were deprived of the means of living, and they necessarily betook themselves to theft and rapine for a subsistence. The country became infested with gangs of robbers and murderers, whose horrid cruelties struck terror into the peaceable inhabitants, whilst lesser crimes also became more frequent. The police was inadequate to the detection of offenders, the courts of justice to their conviction; and, amongst other evils, a host of false witnesses now arose, amid the general corruption of morals, who swore in the teeth of each other, perplexing all judicial proceedings, and confounding the innocent with the guilty. For remedy of these complicated evils various expedients were resorted to. Amongst others, a feeble attempt was made to revive the ancient powers which the zemindars had over the police; but this was attended with so little success that it was abandoned in 1810. In 1808 a superintendent of police was appointed, with a view, as was stated, of concentrating in his office all the information which might be obtained from different quarters, and of giving unity and vigour to the measures adopted for the apprehension of offenders; and, as a last resource, a regular establishment of police spies, called *goyendas*, was organized, and placed under a species of superintendents called *girdwars*, the office of the first being to point out the robbers, that of the latter to apprehend them. Notwithstanding all these measures crimes of every description appear to have gone on increasing; and in a minute of Lord Minto, dated November 1810, it is observed, "That a monstrous and disorganized state of society existed under the eye of the supreme British authorities, and almost at the very seat of that government to which the country might justly look for safety and protection; that the mischief could not wait for a slow remedy; that the people were perishing almost in our sight; that every week's delay was a doom of slaughter and torture against the defenceless inhabitants of very populous countries." The directors, in whose letter of the 28th of October 1814 this passage appears, confirm the truth of the statement by the following brief observation:—"That this representation of the late governor-general is not too highly coloured would appear from the minute of Mr Lumsden, and the reports of Mr Secretary Dowdeswell, forming also part of the proceedings in regard to Mr Earnst."[1]

Spies.

The new scheme of employing spies, however useful in some cases, was in other respects highly detrimental to the peace of the community. Those spies, and more especially their superintendents (*girdwars*), became, in many cases, the pests of society. They took advantage of the power which they possessed of apprehending suspected persons to extort money from them; and frequently, under threats of immediate apprehension, they laid under contribution all classes indiscriminately. It is stated, in a letter of the directors dated October 1814, on the authority of Mr Dick, a circuit judge, that "whole villages are put under contribution, or subjected to the rapacity and spiteful machinations of the vilest members of society."[2] In some cases the innocent were brought to trial, and convicted on suborned evidence, procured by these wretches.

Incapacity of European judges.

Amongst the other causes of these evils may be enumerated the incapacity of Europeans to officiate as judges in a society so peculiarly constituted as that of India. This is a fact which is deeply regretted by all the most experienced servants of the Company, from Sir John Shore downwards. In two essential qualifications for the judicial chair Europeans must always be surpassed by the natives of India. They can neither acquire the same familiarity with the vernacular languages, nor obtain the same keen insight into native character. The ruling authorities have not been insensible to these shortcomings, and a remedy has been sought in the more extensive employment of native agency, subject only to careful European supervision. Europeans mix little with the natives in their ordinary business or amusements; and when, under such disadvantages, they attempt to officiate as judges, they have always found the difficulty of appreciating or understanding even the most ordinary transactions of a society, with the rules and principles of which they are entirely unacquainted. What is intelligible by intuition to a native, is a mystery to them; and it is easy to conceive how these difficulties must be accumulated on them in any case involving a long train of circumstantial or contradictory evidence. It is not, as every one knows, on the mere naked testimony of a witness, that a judge entirely relies; it is the tone, the manner, the living evidence of expression and character, which impresses upon testimony the stamp of truth, which carries conviction to the mind, and saves a judge from the miserable dilemma of being blown about by every wind of opposite evidence. These discriminations are, however, far too nice for a European judge in an Indian court, and he frequently knows not what to believe. He cannot, by any judicious cross-examination, extort the truth from contradictory witnesses. In any train of questions involving the peculiar usages of the country, his stock of knowledge is soon exhausted. A story which hangs together in all its main circumstances may yet be inconsistent in some of its minute and delicate points. But a European can never detect inconsistencies which are wrapt up in the veil of local manners, and hence he lies at the mercy of every perjured witness who chooses to practise upon his ignorance. The truth of this statement is illustrated and confirmed by the concurring reports of many of those who have acted in this trying situation. Sir Henry Strachey, whose reports to the supreme government abound in most just, enlightened, and comprehensive views of Indian society and manners, observes, that "nothing is more common, even after a minute and laborious examination of evidence on both sides, than for the judge to be left in utter doubt respecting the points at issue. This proceeds chiefly from our very imperfect connection with the natives, and our scanty knowledge, after all our study, of their manners, customs, and languages. Within these few years, too, the natives have attained a sort of legal knowledge, as it is called; that is to say, a skill in the arts of collusion, intrigue, perjury, and subordination, which enables them to perplex and baffle us with infinite facility." "We perhaps judge too much by rule; we imagine things to be incredible because they have not before fallen within our experience. We make not sufficient allowance for the loose, vague, and inaccurate mode in which the natives tell a story; for their not comprehending us, and our not comprehending them. We hurry, terrify, and confound them with our eagerness and impatience." "We cannot," adds the same discriminating observer, "study the genius of the people in its own sphere of action. We know little of their domestic life, their knowledge, conversation, amusements, their trades and castes, or any of those national and individual characteristics which are essential to a complete knowledge of them. Every day affords us examples of something new and surprising; and we have no principle to guide us in the investigation of facts, except an extreme diffidence of our opinion, a consciousness of inability to judge of what is probable or improbable." "The evil I complain of is extensive, and, I fear, irreparable. The difficulty we experience in discerning truth and falsehood among the natives may be ascribed, I think, chiefly to our want of connection and intercourse with them; to the peculiarity of their manners and habits, their excessive ignorance of our characters, and our almost equal ignorance of theirs." The following passage, from the same document, gives a striking view of the inefficiency of European judges:—"The evidence on every trial convinces us, that innumerable robberies and murders, that atrocities of the worst conceivable kind, are committed, and that very often the perpetrators are before us; yet do we find ourselves, from causes of the nature above described, constrained to let them loose again to prey on society, or, at the utmost, to direct that they be discharged, on giving security for their good behaviour." "The judge of circuit is from day to day engaged in trying large gangs for robbery and murder, and letting them go; and the country continues to be overrun with them, to a degree truly deplorable."[1]

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[1] See *Papers relating to the Police and to the Administration of Civil and Criminal Justice in Bengal, Fort George, &c., from* 1810 *to the present time.* Printed in 1819, p. 24.

[2] *Papers printed by order of the House of Commons,* 1819.

In fact, a grave error had been committed in attempting to transact the public business of the country by means of European agency. This was the early practice of our Indian administration. The Marquis Wellesley, writing to the home authorities at the close of the last century, thus enunciates the principle:—"The duty and policy of the British government in India, therefore, require that the system of confiding the immediate exercise of every branch and department of the government to Europeans educated in its own service, and subject to its own direct control, should be diffused as widely as possible, as well with a view to the stability of our own interests as to the happiness and welfare of our own subjects." The experiment was fully tried, but resulted in disappointment, inasmuch as it was impossible to carry it out otherwise than very imperfectly, except at an enormous expense. Another mode, that of employing native agency to a large extent, was more readily available. Native functionaries might be obtained upon lower terms, and in some essential points they would enjoy advantages over Europeans. It was feared, however, that they could not be trusted; and if remunerated at the low scale formerly allotted to them, and unwatched by any superior, the apprehension was not unreasonable. The problem was to unite economy and despatch with efficiency and integrity; and the solution is found in the extensive employment of native agency, subject to careful European supervision. This has been tried, and works well. The change has taken place within the last twenty years, during which period several new offices of trust and emolument have been opened to the natives of India, and those previously allotted to them have been materially advanced both in emolument and responsibility. Civil justice, in fact, is almost wholly dispensed by native judges. They are distributed into three grades—principal sudder aumeens, sudder aumeens, and moonsiffs. The jurisdiction of the two lower grades is limited to suits in which the matter in dispute does not exceed a certain value, the limit being of course higher in regard to the upper of these two grades than to the inferior. To the jurisdiction of the highest native judge there is no such limit. To these different classes of native judges is entrusted the original cognizance of all civil suits; and no person, whether British or native, is exempt from their jurisdiction. The first grade of native judges (principal sudder aumeens) may sit in appeal from the decrees of the two inferior courts; and as the law, except in special cases, allows but one trial and one appeal, the power of final decision in by far the larger number of suits rests with native judges. Further, suits wherein the amount in dispute exceeds L.500 may be tried either by the principal sudder aumeen or by the European zillah judge, if he so please. But in either case an appeal lies only to the highest Company's court, the sudder adawlah. Here, then, the native judge exercises the same extent of jurisdiction as the European functionary. Native and British qualification and integrity are placed on the same level. The suits now entrusted to a head native judge were confided before 1837 to no officer below a European provincial judge. By recent enactments natives of India are eligible to the office of deputy magistrate. They are competent in that capacity to exercise the powers of the European covenanted assistant, and even, under orders of the local government, the full powers of magistrate. When entrusted with the latter, their power of punishment extends to three years' imprisonment, and they are also competent, in cases of assault and trespass committed by Europeans on natives, to inflict a fine to the extent of 500 rupees, and to imprison for the term of two months if the fine be not paid. Natives are frequently invested with full powers of magistrate.

Judicial establishments.

The judicial establishments of Bengal, over which European judges preside, are,—

1*st*, A high court of appeal, termed the sudder dewanny adawlut; and the nizamut adawlut, or the chief civil and criminal court, which sits in Calcutta, and is composed of judges selected from the civil servants of the East India Company. On the civil side this court has ceased to exercise any original jurisdiction, but it is the court of final appeal in the presidency, and controls all the subordinate civil tribunals. Besides regular appeals from the decisions of the European zillah judge, and in certain cases from those of the principal sudder aumeen, the court is competent to admit second or special appeals from decisions of the courts below on regular appeals. The grounds for special appeal are,—when the judgments shall appear inconsistent with law or the practice or usage of the courts. The power thus given to the sudder court of hearing special appeals extends their means of supervision, and brings judicially before them the proceedings and decisions of all classes of judicial officers, and affords opportunity for correcting errors and insuring consistency, it being one of their duties to regulate the practice and proceedings of the lower courts. Moreover, each judicial officer is required by law to record his decisions, and the reasons for them, in his own vernacular tongue, and this affords the sudder court extended means of judging correctly of the individual qualifications of their subordinates. The sudder court sits daily. In the trial of appeals the proceedings of the lower tribunals are read before one or more judges. A single judge is competent to confirm a decree. Two of three sitting together must concur for its reversal, whether the appeal be regular or special. Decisions of the court in suits exceeding in value L.1000 may be carried by appeal before the Queen in council. On the criminal side the court has cognizance in all matters relating to criminal justice and the police of the country, but it exercises no original jurisdiction. Appeals from the sessions judges lie to this court, but it cannot enhance the amount of punishment, nor reverse an acquittal. The sentences of this court are final. In cases of murder, and other crimes requiring greater punishment than sixteen years' imprisonment (which is the limit of the sessions judges' power), all the proceedings of the trial are referred for the orders of the nizamut. The Mohammedan law-officer of this court (unless the futwa be dispensed with) first records his judgment, and all the documents are then submitted to the judges of the nizamut. If the case be not capital, it is decided by the sentence of a single judge. Sentences of death require the concurrence of two judges. Trials before the sessions judge for crimes punishable by a limited period of imprisonment are also referred for the disposal of the nizamut in cases where the sessions judge differs from the opinion of the Mohammedan law-officer.

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[1] Answers to Interrogatories of Government, 30th January 1802, *Fifth Report.*

2nd, The zillah courts, over which European judges preside and supervise the dispensation of justice by their native functionaries. It is competent to the European judge to withdraw suits from the courts below and to try them himself. He hears appeals from the decisions of his principal native judge when the matter in dispute does not exceed the value of L.500; but he may transfer appeals from the decisions of the other subordinate courts to the file of the principal native judge. In the sessions court the judge is required to try all persons committed for heinous offences by the magistrates. He has not the power of life and death, but his jurisdiction extends to sixteen years' imprisonment. All capital cases, after trial, must be referred for the disposal of the nizamut adawlut, together with those cases, as already intimated, in which the sessions judge dissents from the opinion of his Mohmamedan law-officer. Persons not professing the Mohammedan faith are not to be tried under the provisions of the Mohammedan law, but under the regulations, the judge being assisted by a punchayet, or assessors, or a jury, but having power to overrule their opinion. The sessions judge holds a monthly jail delivery, though in fact he may be said to be constantly sitting. He sits in appeal from the sentences passed by the magistrates and their assistants. A similar plan of jurisdiction is in force at Madras and Bombay.

At each presidency there is a supreme or Queen's court, in which the judges are appointed by the crown, and the modes of procedure are assimilated to those of the courts at Westminster. In conclusion, it may be observed that the judicial system of India is necessarily one of most heterogeneous character, and it must probably continue so for a period of which the duration cannot be anticipated. The law of the Hindus is founded upon their religion. It is of course in many respects barbarous and absurd. It is also sometimes extremely vague, and on the whole very imperfect. The Mohammedans introduced their law, which, like that of the Hindus, was closely connected with their religion. The settlement of the British created a necessity for the introduction of a system of law differing from either. The law of England thus obtained a footing in India, but it did not altogether supersede either of the systems which it found previously in operation. But the Hindu and Mohammedan codes were such as no European people could consent to administer; they were therefore modified in practice, and, while their leading principles were adhered to, their more barbarous provisions were softened or rejected. Circumstances also continually arose to show the necessity of some additional rules for the administration of justice; and the governments of India from time to time enacted various regulations, which, unless annulled by the authorities at home, have the force of law. The principles of judicial administration in India are consequently derived from no fewer than from four different sources,—the institutions of the Hindus, those of the Mohammedans, the English law, and the regulations of the Indian governments.

The permanent zemindary settlement was extended to Benares in 1795. It has been seen that the attempt to introduce this system into the north-western provinces was delayed in the first instance by the objections of the commissioners, which, however, were directed not against the principle, but the time and local circumstances of its application; and that it was finally suspended by a solemn decision of the home authorities. This was indeed a fortunate circumstance; and we may ascribe to it the fact that the landed estates in these provinces remain in the hands of the true proprietors, and that rapacious intruders have not become lords of the soil. A revenue settlement, based upon a careful survey, has now been effected. Under this settlement, the rights of every cultivator, whether landlord or tenant, have been ascertained and recorded; and, for the protection of these rights, a system of registration of titles to land has been introduced. The government assessment, calculated upon the basis of two-thirds of the net rent, has been fixed for a period of thirty years. By this limitation of the public demand a valuable and marketable private property has been created in the land, and every landholder, however petty his holding, is to a certain extent a capitalist. The following table exhibits the amount of land revenue, together with the population, area, and other particulars relating to these provinces:—

NORTH-WESTERN PROVINCES.

Number of Townships		80,883
Area in Acres		46,070,658
LAND ASSESSED TO REVENUE,—	Acres.	
Cultivated	23,112,183	
Culturable	9,816,749	
		32,928,932
LAND UNASSESSED,—		
Rent Free	1,733,443	
Barren	11,408,283	
		13,141,726
Total area in Acres		46,070,658
		Rupees.
Demand on account of Land Revenue		405,29,921

	R.	A.	P.
Rate per Acre on Total Area	0	14	1
On Total Assessed Land	1	3	8
On Total Cultivation	1	12	1

POPULATION.

HINDOO,—		
Agricultural	13,127,956	
Non-Agricultural	6,324,690	
		19,452,646
MOHAMMEDAN AND OTHERS,—		
Agricultural	1,596,277	
Non-Agricultural	2,150,745	
		3,747,022
Total Population of the North-Western Provinces		23,199,668

Number of Persons to each square Statute Mile	322·3
Number of Acres to each Person	1·99
Average Amount of Revenue per Head	1·742

In Madras the course adopted was altogether at variance with the feelings of the people, and the consequences were not more happy. In the Northern Circars, indeed, there was an ancient aristocracy, to whom the people looked up as their hereditary superiors, and through whom the supreme government could most conveniently realize its revenue. But in the other districts to which the permanent settlement was extended a novel and not very happy attempt was made to create an aristocracy by public auction. A cluster of villages called a mootah or zemindary was put up to sale, and the highest bidder became the new hereditary zemindar or mootahdar, the terms being synonymous. The government revenue had been previously assessed, not upon each field, nor upon each village, but upon the whole mootah or zemindary, and for this the new speculator in nobility was held accountable. There was under this system no bond of connection between the cultivators and the purchasers of the zemindary right, who were totally unconnected with the land; they were monied men desirous of elevating themselves by their wealth into the rank of rajahs. *Parvenus* are proverbially haughty and overbearing; and it is represented, and may readily be believed, that the ryots suffered considerable annoyance from these speculators. In consequence, however, of the provision made on their behalf, they frequently succeeded in vindicating their rights, and were generally in the course of time emancipated altogether from the dominion of the newly created zemindars, most of whom gradually failed, and with their families became involved in distress. The zemindars so completely mismanaged their zemindaries, that in the northern districts only one remained in a prosperous condition, their zemindaries having been for the most part transferred to the government officers as security for the payment of the revenue, and that they might be retrieved from the disorder into which they had fallen. In the Company's jaghire, in 1826, the zemindaries were reduced to 651 villages, paying a fixed jumma of 297,940 rupees; while lands had reverted to government to the extent of 1217 villages, paying a revenue of 488,960 rupees. In the Salem district a similar result followed. In the Dindigul district the zemindary settlement was introduced in 1804; but in 1807, the lands, with scarcely any exception, reverted to the government. That the permanent zemindary system is a bad one for the cultivator, there can be little doubt; that it is a bad one for the government, is equally clear. It has been suggested that under a zemindary system the rights of the ryots might be ascertained and protected. This, however, would be to combine two systems, instead of adopting one; and as one of the recommendations of the zemindary plan is its apparent simplicity and facility of application, such an appendage to it as the proposal implies can scarcely find favour in the eyes of those who regard it as an instrument for collecting the revenue with the smallest portion of trouble. But, if the rights of the ryots be admitted (and they are clearer than the rights of any other persons in India), on what principle can we justify the withdrawing from them the natural protection of government.

The observations of Sir Thomas Munro on the question are replete with sound vigorous sense. He says—"If, in place of lowering the assessment, and letting landed property rise in the natural way, we want to have great landlords raised at once where none exist, and for this purpose create zemindars, and turn over to each of them some hundreds of ryots, we should commit a gross injustice; because we should enable the zemindar in time to degrade the ryots from the rank of tenants-in-chief to that of tenants-at-will, and often to that of mere cultivators or labourers. We say that we leave the ryots free to act and to make their own terms with the zemindars or renters, and that if they were wronged the courts will protect them. We put them out of sight, deliver them over to a superior, and then we tell them that they are free to make their own terms, and that there are courts to secure their rights. But with what pretence of justice can we place them under any set of men to make terms for their property, and to defend it against them in courts of law? They have no superior but government; they are tenants-in-chief, and ought not to be obliged to make terms except with government. But it is said that the zemindar does not infringe their rights, because he has no authority to demand more than the dues of government as regulated by the usage of the country, and that if the parties be left to themselves things will find their proper level. They will find the level which they have found in Bengal and several districts under this government, and which the weak always find when they are left to contend with the strong. The question is, whether we are to continue the country in its natural state, occupied by a great body of independent ryots, and to enable them, by a lighter assessment, to rise gradually to the rank of landlords; or whether we are to place the country in an artificial state, by dividing it into villages or larger districts among a new class of landholders, who will inevitably, at no distant period, by the subdivision of their new property, fall to the level of ryots; while the ryots will, at the same time, have sunk from the rank of independent tenants-in-chief to that of sub-tenants and cultivators. It is, whether we are to raise the landholders we have, or to create a new set, and see them fall." The actual working of the system in Madras is described in another part of the minute from which the last quotation is made. "There is no analogy whatever between the landlord of England and his tenants, and the moohtadar or new village zemindar of this country and his ryots. In England the landlord is respected by the farmer as his superior; here a zemindar has no such respect, for the principal ryots of most villages regard him as not more than their equal, and often as their inferior. He is often the former potail or head ryot of the village; but he is frequently some petty shopkeeper, or merchant, or some adventurer or public servant out of employ. Whichever of these he is, he has usually very little property. He has none for the improvement of the village; but, on the contrary, looks to the village as the means of improving his own circumstances. The ryots, by being placed under him, sink from the rank of tenants of the government to that of tenants of an individual. They are transferred from a superior, who has no interest but in their protection and welfare, to one whose interest it is to enlarge his own property at the expense of theirs; who seeks, by every way, however unjustifiable, to get into his own hands all the best lands of the village, and whose situation affords him many facilities in depriving the ancient possessors of theirs. The ryots are jealous of a man whose new power and influence they have so much to fear. They frequently combine in order to keep down the cultivation, and force him, for their own security, to give up the village. And hence it has happened, that on the one side the opposition of the ryots, and on the other the oppression of the new zemindar, have in many instances caused villages which were flourishing and moderately assessed to revert to the circar from inability to pay their assessment." Never, indeed, were good intentions so lamentably frustrated as they have been by this system; and to attempt to make it universal throughout our Indian possessions, might shake the security of our empire. The system is radically vicious. Where, however, it already exists, we must tolerate it; but it would be a most fatal error, as all experience shows, to endeavour to extend it. Again, quoting the words of Sir Thomas Munro, when speaking of the effects produced by the forcible introduction of this system: "Such an innovation would be much more fatal to the old rights of property than conquest by a foreign enemy; for such a conquest, though it overthrew the government, would leave the people in their former condition; but this internal change, the village revolution, changes everything, and throws both influence and property into new hands. It deranges the order of society; it depresses one class of men for the sake of raising another; it weakens the respect and authority of ancient offices and institutions; and the local administration, conducted by their means, is rendered much more difficult. It is time that we should learn that neither the face of a country, its property, or its society, are things that can be suddenly improved by any contrivances of ours, though they may be greatly injured by what we mean for their good; that we should take every country as we find it, and not rashly attempt to regulate its landed property, either in its accumulation or division; that whether it be held by a great body of ryots, or by a few zemindars, or by a mixture of both, our business is not with its distribution, but with its protection; and that if, while we protect, we assess it moderately, and leave it to its natural course, it will in time flourish, and assume that form which is most suitable to the condition of the people."

The observations of the same distinguished person on the general principles which should guide those who undertake the high task of improving the condition of India, are no less just and instructive :—"We are now," he says, "masters of a very extensive empire, and we should endeavour to improve and secure it by a good internal administration. Our experience is too short to judge what rules are best calculated for the purpose. It is only within the last thirty years that we have begun to acquire any practical knowledge; a longer period must probably elapse before we can ascertain what is best. Such a period is as nothing in the existence of a people; but we act as if this were as limited as the life of an individual. We proceed in a country of which we know little or nothing as if we knew every thing, and as if every thing must be done now, and nothing could be done hereafter. We feel our ignorance of Indian revenue and the difficulties arising from it; and, instead of seeking to remedy it, by acquiring more knowledge, we endeavour to get rid of the difficulty by precipitately making permanent settlements, which relieve us from the troublesome task of minute or accurate investigation, and which are better adapted to perpetuate our ignorance than to protect the people. We must not be led away by fanciful theories, founded on European models, which will inevitably end in disappointment. We must not too hastily declare any rights permanent, lest we give to one class what belongs to another. We must proceed patiently, and as our knowledge of the manners and customs of the people and the nature and resources of the country increase, frame gradually, from the existing institutions, such a system as may advance the prosperity of the country, and be satisfactory to the people. The knowledge most necessary for this end is that of the landed property and its assessment; for the land is not only the great source of the public revenue, but on its fair and moderate assessment depend the comfort and happiness of the people." In another place Sir Thomas Munro adverts to the mistakes which have been committed in a manner which should operate as a warning against indiscreet zeal for the future :—"Our great error in this country, during a long course of years, has been too much precipitation in attempting to better the condition of the people, with hardly any knowledge of the means by which it was to be accomplished, and, indeed, without seeming to think that any other than good intentions were necessary. It is a dangerous system of government, in a country of which our knowledge is very imperfect, to be constantly urged by the desire of settling every thing permanently, to do every thing in a hurry, and, in consequence, wrong; and in our zeal for permanency, to put the remedy out of our reach. The ruling vice of our government is innovation; and its innovation has been so little guided by a knowledge of the people, that, though made after what was thought by us to be a mature discussion, it must appear to them as little better than mere caprice." Such observations, which would scarcely at any time be unseasonable, are peculiarly deserving of notice in an age, the ruling vice of which is that which Sir Thomas Munro ascribes to the English authority in India—innovation. The great error of concluding that laws and institutions which produce good effects in one country will therefore produce good effects in all other countries, must be carefully avoided; and if it be necessary to bear this in mind with regard to that which has been tried, though under different circumstances, the necessity is still more imperious with reference to systems altogether untried, and which have not the sanction of even a partial or local experience. If we would benefit the people of India, we must legislate for them as they are, and not as theorists conceive they ought to be. We must respect their local usages and institutions, wherever they are not productive of positive evil, and even where they are, they must be removed with a gentle hand. The general habit of the people is submission to authority, and it will be our own fault if they learn a different lesson. If we are content to derive a moderate revenue from the land, and to abstain from all interference with existing rights, except to protect them, the people will advance in wealth and happiness, and the British dominion take root in their interests and feelings. But if fanciful schemes, concocted in the closets of speculators and sciolists, framed with an ostentatious disregard of local peculiarities, claiming an universal applicability, and, like a patent medicine, "warranted to keep good in any climate," are imposed upon a people little addicted to novelty, in place of the institutions to which they have been accustomed—which have grown with the growth of the nation, and become part of its very essence—discontent, disgust, and confusion will be inevitable, and the final results may be such as no friend, either to India or England, can wish to contemplate. But while we discourage such a mischievous activity, we must not take refuge in indolence and supineness. It is at once our interest and our duty to settle nothing permanently till it can be settled in a manner satisfactory to the people; but it is also our interest and our duty to spare no labour that may be necessary to enable us to acquire that minute knowledge of Indian institutions which is indispensable to a satisfactory settlement. Of two plans we must not give the preference to one solely on the ground of its involving less trouble than the other. Nothing must be left to chance or accident, nor must the preservation of any class of rights be suffered to depend upon the clamorous violence with which they may happen to be urged. The weak as well as the strong, the silent as well as the loud, the ignorant as well as the informed, must be protected, and as we must not be parsimonious of labour, so neither must we be impatient of the consumption of time. The work to be accomplished is not that of a day or a year; and provided no time be wasted, it will, if well done, be done sufficiently early. The great principle to be observed in any mode of settlement is to offer as little violence as possible to the habits and feelings of the people. Wherever these do not stand in the way, wherever there is room for the exercise of a free choice, there can be no doubt at all that the ryot-war system is that which is best calculated to secure the cultivator from oppression, best calculated to promote industry, order, and independence, best calculated to advance the general prosperity of the country, and best calculated to protect the pecuniary interests of the government. That it is generally most consonant to the feelings of the people is certain. It is equally certain that the ryot-war system is the only one by which all individual rights can be protected, indeed, the only one by which they can be ascertained. And thus, unless a portion of the rights of the people, probably the most valuable rights of the most valuable class of the people, are to be regarded as unworthy of notice, a ryot-war settlement must be the basis of any other. The observations of Mr David Hill, formerly secretary to the government of Madras, upon this subject are much to the purpose; of course the settlement of which he speaks is such a one as it would become a just and upright government to make. He says, "You can no more form a zemindary settlement without a ryot-war one than you can write a correct hand without spelling, although in either case you may be unconscious of the subsidiary operation. The ryot-war settlement is an essential part of the zemindary one. If the officers of the government do not make settlements with the ryots, the zemindar must, and therefore the objections that are taken against a ryot-war settlement will not be obviated by the substitution of the other, except in as far as those objections apply to the ryot-war settlement being executed by the officers of government." The following account of the practical working of the plan will be acceptable to those who take an interest in the subject :—

"In the spring of each year, every native collector, of whom there are generally ten or twelve under the European officer in charge of a large province, makes the circuit of his district, to ascertain the fields which are occupied, and the individual holding the highest tenure in each. He then allows the poorer ryots to relinquish any fields they may not desire longer to retain, and grants these or other unoccupied or waste fields to such other ryots as desire to extend their cultivation.

"The settlement itself is not begun by the European collector until towards the harvest, when the native collector of each district, with his district accountant, is, in the first instance, summoned to meet him. The records of the district accountant show the result of the native collector's previous circuit through the villages of his district. The quantity of land in each village, with its assessment, is ascertained; that portion of it which the ryots have agreed to cultivate is distinguished from the rest, and the reduced field survey assessment on it, after the usual deductions in favour of those who have the revenue alienated to them, or remitted in their favour, forms the native collector's estimate of the probable settlement of the land revenue for the season. He then affords personal explanations as to the general state of the several villages in his district, and the local causes of those changes which are observable in the accounts compared with those of former years.

"This preliminary having been completed, the village accountants are next summoned to attend the European collector. Their more detailed accounts show how far the several ryots have completed the engagements into which they have entered with the native collector, and what fields of the land agreed to be cultivated have been left waste. The causes of these alterations are minutely investigated and explained, and the records of the village accountants are checked by information obtained from their competitors or other sources.

"The collector's native establishment then prepare from their data a separate account for every individual ryot, specifying the name of each field, whether irrigated, unirrigated, or garden-land, cultivated by him, or at his risk and charge, its number in the survey accounts, and its assessments, with the alienations or remissions (if any) in his favour. This account also exhibits the ryot's stock, the number of his cattle, sheep, &c.; that also of the persons of his family, male or female, the extent of land exempted from revenue cultivated by him, invariably on very easy terms; and his actual payments to the government for many years past. These, which are called the rough ryot-war accounts, form the basis of the European collector's final settlement; and when any discussion arises with a particular ryot, they enable the collector to decide the point at issue without delay, for they contain in fact a summary revenue history of each individual contributor.

"These accounts having been prepared for each ryot, the whole of the cultivators themselves in eight or ten villages, are ultimately summoned at the same time to the collector's presence. Here the account of each man, and the deductions (if any) made in his favour, are compared in detail with his own personal information by the collector's native establishment; any items in it to which objections are started are examined, discussed, and, if erroneous, corrected. It is here that the frauds of the village accountants are detected, by the envy, jealousy, or honesty of one ryot pointing out the favours improperly granted to his neighbour. The objections of the ryots, if ill-founded, are overruled by the explanations of the head of the village, the village accountant, or the other cultivators in the same village, or by the exhortations of the inhabitants of the neighbouring villages also present, for these persons never hesitate voluntarily to interfere, and to reprimand such as start unfounded objections; and a ryot who obstinately demurs for hours to the laboured and authoritative reasoning of the collector's native establishment, will often give way at once to the voluntary arguments of his fellows, whose explanations are, perhaps, better adapted to his capacity, and whose opinion being more disinterested, no doubt carries with it more weight. But if the ryot's objections are valid, he always persists in appealing to the collector himself. The details of every ryot-war settlement must devolve on the native servants. The presence of the European officer is no doubt useful to superintend the whole; but it is chiefly requisite, in order to afford on the spot, to every discontented ryot, this facility of instant access and immediate appeal, which affords the best check against either fraud or oppression in the course of the settlement. The collector, if a judicious revenue officer, seldom has occasion to decide such questions himself; he soon learns to distinguish amongst the ryots assembled which are those universally respected throughout the country for their good conduct, impartiality, and sound sense; and his call upon them for an opinion, invariably given publicly, without any previous preparation, whilst it silences all complaint, relieves the officer of the government from the odium of deciding questions in which its interests may often be involved.

"All discussions with the ryots having thus been terminated, the puttah or lease and its counterpart are drawn out, and the former having been sealed by the collector, the whole of the ryots in each village are called before him. Every man here separately exchanges engagements with the government, to the number of 60,000 or 70,000 in some provinces, and receives from the European collector's own hands his lease, accompanied by the betel-leaf, &c., the usual seal of all native compacts. If any ryot still objects to the terms of his lease, he declines to receive it, and the grounds of his objection are here formally discussed, and finally decided by the collector in open public audience.

"In each village its head or potail, the chief of the police, is also invariably the village collector on account of government. He realizes from each individual ryot the amount of government revenue as the instalments fall due, and remits it to the native collector of the district, also vested with magisterial powers similar to those of a justice of the peace, whence it is forwarded to the European collector, uniting in his person the superintendence of both the revenue and police departments over the entire province."

Such is the mode of proceeding adopted in those parts of the territories under the Madras presidency, subject to the ryot-war system, and it appears to possess many advantages.

In Bombay the revenue settlement is chiefly ryot-war. Under the new survey now in progress, the lands are subdivided into fields of moderate size, so that each subdivision is rendered easy of cultivation by a farmer of limited means. The government assessment is calculated separately upon each field, and leases granted for thirty years' duration at a fixed and invariable sum, binding on the government for the whole term, but with the option on the part of the cultivator of surrendering any one or more of his fields, or altogether putting an end to his lease at the close of any given year.

The great source from which the financial wants of the state are supplied is the land revenue. The other chief sources of Indian revenue are the monopolies of salt and opium, the customs duties, the duties included under the term abkarree, comprising those on spirituous liquors, intoxicating drugs, and some other articles; the post-office receipts, and the mint and stamp duties. Of these various modes of taxation, the monopoly of salt is the only one against which any reasonable objection can be raised. It exists in Madras, in the north-western provinces, and in the lower provinces of Bengal. In the last mentioned provinces the East India Company make advances to a description of persons called Molunghees, who are the manufacturers, and the salt is disposed of by auction at monthly sales. In Madras the salt is sold at a fixed price, which does not exceed one-fourth of the average price in Bengal; but it is said that the profit derived from it is considerable, the cost of production being comparatively small. Various objections have been taken to this source of revenue; and one of them is certainly not undeserving of consideration. It cannot be denied that a regulation which, for the mere purpose of revenue, adds enormously to the price of an article which must be regarded as a prime necessary of life, is an evil of no small magnitude. But those who urge this are bound to show how the same amount of revenue could be raised less injuriously. It is quite clear that it must be raised by some means. The wants of the state must be provided for, and an annual deficiency of upwards of a million and a half sterling, which would result from the abolition of the salt monopoly, could not be supplied with any degree of certainty from new sources. Upon this ground the Company have been permitted, notwithstanding the extinction of their commercial character, to retain this branch of trade. Some modification in the mode of realizing the salt revenue is however about to take place. The monopoly of manufacture has been denounced in the House of Commons, and it has been resolved to try the experiment of permitting the manufacture by private individuals under a system of excise. In Bengal the revenue from opium is realized by means of a government monopoly. No person within the Bengal territories is allowed to grow the poppy, except on account of the government. Annual engagements are entered into by the cultivators under a system of pecuniary advances, to sow a certain quantity of land with the poppy, and the whole produce in the form of opium is delivered to the government at a fixed rate. The engagements on the part of the cultivators are optional. A large revenue is derived from the transit of the opium of Malwa through the British territories of Bombay for exportation to China. Previous to the year 1831, the British government reserved to itself a monopoly of the drug which was purchased by the British resident at Indore, and sold by auction either at Bombay or at Calcutta. But in that year it was deemed advisable to relinquish the monopoly in Central India, to open the trade to the operations of private enterprise, and to substitute, as a source of revenue in place of the abandoned system, the grant at a specified rate of passes, to cover the transit of opium through the Company's territories to the port of Bombay. The following table contains the latest account of Indian revenue and taxation:—

Excise	L.28,614	
Land revenue	15,391,666	
Sayer, &c.	1,157,214	
Moturpha	119,257	
		L.16,696,751
Mint duties		129,079
Stamp duties		487,955
Customs		1,684,763
Salt		2,099,959
Opium		4,259,778
Tobacco		89,677
Miscellaneous		2,384,275
Total		L.27,832,237

The commercial monopoly of the East India Company was granted by William III. in the year 1698, and it was confirmed by 9th and 10th William III. c. 44. The legislative enactments regarding the territorial possessions of the Company commenced in 1767. In that year it was agreed that, in consideration of an annual payment of L.400,000, the territorial possessions should remain in possession of the Company for two years, and afterwards for five years from the 1st of February 1769. There was paid to the public, under these two acts, from 1768 to 1775, the sum of L.2,169,398. In 1773 the affairs of the Company were much embarrassed, and they presented a petition to parliament soliciting a loan for four years, and a sum of L.1,400,000 was accordingly lent; and at this time parliament first assumed the regulation of the Company's affairs. The dividend was restricted to 6 per cent. till this loan should be repaid, and afterwards to 7 per cent. It was enacted that the directors should be elected for four years, six of them, being a fourth part, to vacate their office annually by rotation; the qualification to vote in the court of proprietors to be raised from L.500 to L.1000. A new court of judicature was at the same time established at Calcutta, consisting of a chief justice and three principal judges, appointed by the crown; and a superiority was given to Bengal over the other presidencies; an appropriation was made of the revenues and profits of the Company, and they were required to make half-yearly statements of their debts, and of the profit and loss incurred on their trade and revenues. The loan of L.1,400,000 having been discharged, two other acts were passed, by which the territory was continued to the Company for one year. In 1781 an act was passed continuing the territoral revenues and privileges of the Company till the 1st of March 1791, and then to be taken away only on a three years' notice; providing also that the Company should pay annually L.400,000 to the public, besides three-fourths of any surplus revenue that might accrue.[1] Under this act the Company paid to the public L.400,000 in satisfaction of all claims up to the 1st March 1781. But of the annual sum of L.400,000, which was afterwards to be paid, the public received only L.300,000; and in 1783 the Company were allowed to borrow L.800,000, and out of this borrowed money to pay a dividend of 8 per cent. By the act of 33d Geo. III. c. 52, passed in 1793, the British territories in India, together with the exclusive trade, were continued to the Company for twenty years; and the Company agreed to pay L.500,000 annually, unless prevented by war expenditure. But only two payments were made, of L.250,000 each, under this act, in 1793 and 1794. In 1814 the charter of the Company was renewed for twenty years; the trade to India opened under certain limitations, with the exception of the trade to China, the monopoly of which, with all the territorial revenues, was continued till 20th of April 1834. In 1833 a new act was brought forward by Mr Grant, for the future administration of the vast dominions of the Company, and for the general regulation of their affairs. By this act the commercial privileges of the East India Company were abolished, and the trade to India and to China was thrown open to all British subjects. The government of India was still vested in the directors of the Company, in conjunction with the board of control, according to the provisions of Mr Pitt's bill. All natural born British subjects were permitted to reside without license in any part of the territories which were under the government of the Company on the 1st day of January 1800, in any part of the countries ceded by the nabob of the Carnatic, of the province of Cuttack, and of the settlements of Singapore and Malacca. The only conditions required are,—that the party shall proceed by sea, and shall on arrival give notice of his name, place of destination, and objects of pursuit. A license is still necessary in the territories not specially excepted by the act. A British subject may hold lands in any place where he is authorized to reside. The reform of judicial proceedings, and the compilation of a uniform code of laws for Hindus and Mohammedans as well as European subjects, a great and important undertaking, forms part of this comprehensive and enlightened plan for the government of India. In 1833, in consequence of the great extension of British territory, it was enacted by parliament that the presidency of Bengal should be divided, and a portion of it formed into a new presidency, to be styled the presidency of Agra. But a later act of parliament authorized the East India Company to suspend the execution of the contemplated division, and provided that during such suspension the governor-general in council might appoint a servant of the Company of ten years' residence to be lieutenant-governor of the north-western provinces under such limitations as may be prescribed. Under that act the establishment of a new presidency was accordingly suspended, and a lieutenant-governor of the north-western provinces appointed. By a later act

Mr Grant's act.

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[1] On this clause Colonel Munro justly observes, "This is converting India into a rack-rent estate for England."

the suspension is to remain until the court of directors shall otherwise determine, and in the meantime the provisions for the appointment of a lieutenant-governor of the north-western provinces, and the arrangements consequent thereon, are to be in force. Under the sanction of the same act a lieutenant-governor has been likewise appointed over the lower provinces of Bengal; and the East India Company are further empowered to erect another new presidency, and, pending its formation, they may authorize the establishment of an additional lieutenant-governorship. This privilege has not yet been exercised.

The objects of the Company were originally purely commercial; and could they have pursued them in peace and security they would have sought nothing further. Their enemies compelled them to unite with the character of the merchant that of the soldier and the civil governor. The British legislature has effected a change scarcely less unexpected. In 1813 the trade with India was thrown open; twenty years afterwards the Company relinquished the field to their competitors. The history of the world affords nothing more extraordinary than the present posture of the Company. Formed exclusively for the prosecution of a desirable branch of commerce, it has renounced trade, yet continues to exist for purposes which its founders never contemplated. Called incidentally to the exercise of civil and military power, it continues to wield that power now that its original character has disappeared, and when it has no longer any interest in those commercial advantages which it was the single purpose of its conquests to secure. The act of 1833 suspended the mercantile career of the Company, and it now exists only as an instrument for governing the country, which the wisdom and spirit of its servants has annexed to the British crown. The whole of the Company's property, territorial and commercial, having been surrendered, its debts and liabilities are charged upon India, and a dividend of L.10, 10s. per cent. on their capital stock secured; the dividend redeemable at the rate of L.200 for every L.100 stock after April 1874, and at an earlier period on the demand of the Company, should they be deprived of the government of India. For the better securing the redemption of the dividend, a fund is formed, under the control of the commissioners for the reduction of the national debt, termed the Security Fund of the India Company. For the purposes of this fund a sum of L.2,000,000 has been invested in the public funds, there to accumulate to the amount of L.12,000,000.

It will now be proper to advert to the present constitution of the Company and the Government of India as settled by the last and preceding acts of parliament. The authority of the Company is exercised through the court of proprietors and the court of directors. To be qualified to vote in the former court, a proprietor must have been twelve months in possession of stock to the amount of at least L.1000; this sum entitles him to one vote, L.3000 to two votes, L.6000 to three votes, and L.10,000 to four votes. The proprietors have the privilege of electing a specified number of the directors; of making bye-laws for the regulation of the Company, which are binding when not at variance with the law of the land, and of controlling all grants of money exceeding L.600. The directors are bound to convene a general court on the requisition of nine qualified proprietors; and such court, while it may discuss any matter connected with the affairs of India, has no power of rescinding a measure adopted by the directors, and approved by the board of control. In the election of directors a proprietor may vote by attorney. The constitution of the court of directors has been subjected to considerable modification by the provisions of an act of parliament passed in 1853. By the charter of William III., there were to be twenty-four directors, thirteen or more to constitute a court for the transaction of business; such directors to be elected annually by the members of the Company, and each director to be possessed of at least L.2000 stock. By the act known as the regulating act, 13th Geo. III., cap. 63, some alterations as to the qualifications of voters were made; the number of twenty-four directors was retained, but instead of the whole being elected annually, six only were to be chosen in each year to serve for four years, at the expiration of which term the retiring six were to be incapable of re-election until the lapse of one year. This state of the law continued until the act passed in 1853 came into operation. By that act it will be seen that the number of directors is reduced from twenty-four to eighteen; that of these, three in the first instance, and eventually six, are to be nominated by the Crown; that ten directors are sufficient to form a court; that the signatures of three specified members of the court, or of two of them duly countersigned, are to have the effect of the signatures of the majority previously required by a bye-law of the Company; that the term of service for each director, whether elected by the proprietors or appointed by the Crown, will, when the act shall come fully into operation, be six years; that directors having completed this term are to be immediately eligible for re-election or re-appointment; that all directors appointed by the Crown must have resided ten years in India in the service either of the Crown or of the Company, and that six of those to be elected by the proprietors must also have resided in India ten years, no such condition having previously been required; that the stock qualification for a director is reduced from L.2000 to L.1000; that elections are to be biennial instead of annual, and that a new oath is substituted for those formerly administered to the directors. The chairman and deputy-chairman receive each a salary of L.1000, and every other director L.500 per annum. The military patronage of India is still vested in the court, but the right of making appointments to the civil service has been withdrawn from the directors, and writerships for India are now thrown open to public competition, as are also the appointments to the medical service of the Company. At the first examination under the new system of parties offering themselves as assistant-surgeons, Mr Chuckerbutty, a native of Bengal, came forward as a candidate and succeeded in carrying off an appointment. The successful candidates for civil appointments will not be required to finish their education at Haileybury; and the institution known as the Haileybury College is about to be abolished.

The East India Company consists, according to the latest calculation, of 1750 proprietors, who are privileged to meet in a general court and vote. A proprietor of the Company's stock, provided it has been in his possession for twelve months, to the amount of L.1000, has one vote; of L.3000, two; of L.6000, three; and of L.10,000, four votes; several proprietors hold stock under L.1000, and are not qualified to vote. The total number of votes is estimated at 2600. The proprietors meet every quarter. Their powers are limited to the election of directors, to the framing of bye-laws, and to the control of salaries or pensions exceeding L.200 a-year, or gratuities exceeding L.600. In the court of directors and the board of control is vested the sovereignty of India; they regulate by their supreme authority the policy of the resident government, and the court of proprietors has no power to interfere with their orders.

Presidencies.

India is divided into the three presidencies of Bengal, Madras, and Bombay. The governor-general is governor of the presidency of Bengal, which, in addition to several large provinces and extensive tracts of territory, includes within its limits, as already noticed, the two lieutenant-governorships of Bengal, and the N.W. provinces. The governor-general is appointed by the court of directors, subject to the pleasure of the Crown. His council, nominated by the court, subject to the approbation of her Majesty, consists of four members, three of them being servants of the

Company of ten years' standing. The fourth member of council is not to be chosen from the servants of the Company, but his appointment also is dependent on the approbation of the Crown. The act of parliament passed in 1853 provided for the addition of several legislative councillors to the council of India, but these are not entitled to sit or vote except at meetings for making laws and regulations. They consist of one civil servant for each of the presidencies, and for each lieutenant-governorship, and of two of the judges of the supreme court of judicature at Calcutta. The court of directors may also appoint the commander-in-chief of the forces in India, an extraordinary member of council. The governor-general in council is supreme in India, but all laws and regulations disallowed by the court of directors, under the control of the board, are to be forthwith repealed, and no law is to be made without their previous sanction, which shall give to any courts of justice, except those established by royal charter, the power of punishing her Majesty's European subjects with death, or which shall abolish any of the courts established by charter. The presence of the governor-general or vice-president, or some ordinary member of council, and six other members, is necessary to give validity to any act of legislation. The other functions of government may be exercised by the governor-general and one member. If the voices are equal, the governor-general has a second vote; and in cases where he may consider the peace and safety of the country materially affected, he may, after certain forms, act on his own responsibility in opposition to the opinion of the majority of the council. The administration of the affairs of each of the subordinate presidencies of Madras and Bombay is committed to a governor and three councillors. The governor-general is governor of the presidency of Fort-William, in Bengal, and has the power of appointing a deputy-governor in case of necessity; but it is competent to the court of directors to supersede these provisions whenever they shall think fit, and to appoint a separate governor for the presidency of Bengal. The appointments to the subordinate presidencies are subject to the same regulations as that of the governor-general and his council. If the court of directors do not supply vacancies within two months' notice of them, the crown may appoint. The Queen may also remove any person holding office under the Company. The same power of removal is possessed by the court, with the exception of officers appointed by the Crown. And the court, under the control of the board, have the further power of reducing the number of councillors in any of the presidencies, or of suspending the appointment of councils altogether.

Indian army.

Each presidency has its separate army, commander-in-chief, and military establishment. But the commander-in-chief of the Queen's and Company's forces in India has a general authority over the military force in the other presidencies. The total armed force in British India is about 290,000. This force consists—1*st*, of the Queen's infantry and cavalry; 2*d*, of the East India Company's European engineers, artillery, and infantry; and, 3*d*, of the Company's native artillery, cavalry, and infantry. The European troops in India—Queen's, and Company's—amount, according to the latest accounts, to 49,400; the native troops to 240,120, highly distinguished by their valour, good conduct, and discipline. The complement of European officers to each infantry regiment is, one colonel, one lieutenant-colonel, one major, six captains, ten lieutenants, and five cornets or ensigns. Of native officers there is a subahdar and jemadar to each company. The expense of the Anglo-Indian army at the three presidencies of Bengal, Madras, and Bombay, in 1854, was respectively L.5,278,642, L.2,666,069, and L.1,589,846, giving a total of L.9,534,557. The Indian navy consists of six frigates and eleven armed steamers. The British ecclesiastical establishment consists of three bishops, and 129 European chaplains, the Bishop of Calcutta being the metropolitan bishop in India. There are also Scottish Presbyterian churches at Calcutta, Madras, and Bombay; two chaplains of the Church of Scotland being maintained by the government at each presidency.

The British entered India as traders. They were compelled to exchange the operations of commerce for the labours of war. Success attended their military career, and renewed provocations urged them to continue it. Victory has followed victory, and conquest been accumulated upon conquest, until the dominion of Britain embraces the larger portion of India, and its influence extends over the whole. To look back upon the achievements of our countrymen cannot but be gratifying to our national sympathies; to look forward to the probable fate of that empire which their skill and courage raised from such small beginnings, is a duty which is imposed upon us by a regard to our national honour, as well as to the integrity of the British dominions. The stability and permanency of our power may be endangered either from within or from without. Our first attention must naturally be directed to our own subjects. From their hostility, if provoked, our greatest danger would arise; on their attachment, if secured, our safety may be firmly based. To acquire the confidence of the people over whom we rule, and, having acquired, to preserve it, must be the grand objects of our policy. In those parts which have been longest subjected to our rule, our power is most firmly established. The people and the government have become more habituated to each other, and our authority is more cheerfully recognized from a perception of the benefits which it has conferred. For some years past natives of India have been appointed to offices of high trust and emolument. Civil justice, indeed, is now almost wholly dispensed by native judges. This enlightened policy was confirmed by the British parliament in 1833, and again in 1853; and the free admission of the natives, of whatever religion or caste, to all offices, and of British settlers into any part of India, there to acquire property or land, or to carry on any trade or profession, is calculated to promote the lasting advantage of India, establishing, as it does, the principles of freedom, not upon the mere arbitrary regulation of the supreme council, which may be recalled, but on the solid authority of a British act of parliament, which no inferior power can disannul.

Under this liberal and comprehensive law—the Magna Charta of Indian freedom—the British merchant may transfer his capital, and his superior intelligence and industry, to the most remote parts of Hindustan; he may engage in trade, in manufactures, or in agriculture; and this free intercourse of India with Britain must in time produce important effects on the character and manners of the people. Hindustan appears, indeed, to be on the eve of a great moral revolution. The spirit of improvement has long slumbered amongst that singular people; and the division of the people into castes, and those superstitions to which they are attached with a blind devotion, are unfavourable to its progress. But the influence of European manners now begins to be seen; and, considering that the Hindus are a conquered people, long bowed under a foreign yoke, that, on the other hand, power, dominion, honour, and promotion belong to the British, it is no wonder that the prostrate and servile Hindu should be induced gradually to forsake the manners and superstitions, and even the language of his forefathers, for the enlightened views and purer faith of his victorious preceptors. This great and signal revolution is already begun. The manners, the customs, the language of Britain are beginning to take root in India. They have been adopted by many natives of distinction, by zemindars, as well as by the rajahs and princes of the country; and from their example they are spreading amongst the other classes. Hindu children of both sexes crowd the British seminaries established at Calcutta; the rising generation resort to the colleges, and are instructed in English literature and science; they frequent the medical and surgical schools; and there is a growing disposition to adopt the free and liberal manners, and all the other improvements of modern Europe. This moral change, which is already begun, will soon, by the free influx of Europeans, reach the remotest parts of Hindustan. Capital will be introduced, agriculture will be promoted, and improved modes of labour will be adopted. And all these changes will be brought about, not by any violent subversion of existing institutions, but gradually, through the quiet influence of moral causes.

Amongst other sources of improvement in Hindustan, may be reckoned the laudable zeal of the government for the instruction of the people, by the institution of colleges and schools throughout the country, in which are taught all the different branches of literature and science. It was stipulated by the charter in 1814, that a sum of L.10,000 should be annually applied to the purposes of education; which sum has been augmented, by the liberality of the government, to L.80,000 in 1853. Previous to the year 1821 the only native educational establishments founded in India by the British government were the Mohammedan College at Calcutta, and the Sanscrit College at Benares, established respectively in 1781 and 1792. The Hindu College of Calcutta, though founded in 1816, was not subjected to government superintendence until 1823. In 1835 the number of seminaries had increased to fourteen, while, in 1853, in the upper and lower provinces of Bengal alone there were upwards of forty. In the earlier founded colleges the studies were purely Oriental; in those subsequently established they are European. The preservation of native learning was the avowed object in the one case; the communication of useful knowledge, and the affording facilities for the study of elegant literature were the ends sought in the other. The instruction of the masses in this knowledge was the ultimate end to be attained; but much valuable time was unfortunately lost, pending the result of the experiment resorted to in the first instance of translating English literature into Arabic and Sanscrit, the classical languages of the East. Under this arrangement, before a native student could become versed in European knowledge, it was indispensable that he should first become an accomplished Oriental scholar. The scheme was unsuccessful. But upon the termination of the East India Company's charter in 1834 the subject again came under consideration; and on the 7th March 1835 the government of India passed a resolution substituting the English for the Oriental scheme of education. The new plan offers to the native student a complete education in European literature, philosophy, and science, through the medium of the English language; it introduces him to the entire range of science and literature, so far as he is able to receive it, the limit being that alone fixed by nature in regard to his own capacity. English is now the classical language of India. Colleges and schools have been established in the principal cities and towns, and the old Mohammedan and Hindu institutions, though upheld as seminaries of Oriental learning, have had English classes attached to them. Stipends formerly paid to pupils without reference to ability, diligence, or acquirements, have been abolished, and in lieu thereof, scholarships have been founded, which can be gained only by passing a satisfactory examination. Junior scholarships are also attached to the new schools, tenable at the central college to which the school is subordinate, and where a higher course of instruction is available. Another important step in the advance of national education has just been taken, and grants in aid are now bestowed, both upon native and missionary schools, in furtherance of secular instruction—the religious tuition of the scholars being left to the discretion of the masters and proprietors of the schools. And with these institutions for the education of the people is now combined that mighty engine the press, which, though opposed in its first efforts, and rigorously persecuted, has in India, as in all other countries, finally broken down all the restraints of despotism, and achieved its own freedom. To these sources of improvement may be added the missionary labours, which are ardently pursued all over India, in the establishment of schools, in the sending out of preachers, and in the printing and dispersing of the sacred volume and other works in the native languages, on which large sums of money have been expended. Such are the various institutions which are in progress for the civilization of Hindustan, and which are destined ere long to produce important results, not only in that country, but throughout the whole extent of Asia. But those great moral changes which affect the condition of society are in their nature slow and gradual; they cannot be hastened forward, more especially amongst such a people as the Hindus, whose minds are enthralled by the force of their peculiar habits and religion, by immemorial usages, and by the deep-rooted prejudices of ignorance. We cannot expect that long-established habits will be suddenly relinquished, or that fixed impressions will at once yield to the voice of truth. But Great Britain has at last, and in earnest, undertaken the task of instructing her Indian subjects. The foundation is laid; the work of improvement is begun; the seeds of knowledge have been widely dispersed over the congenial soil, and they will assuredly spring up, and in due season yield the desired increase.

But while the arts of peace are treated with favour, we must be prepared for the opposite state if it should become necessary. Looking to this contingency the Indian army becomes an object of vast importance. Our dominions are not assailable from without only. Within their circle are portions of territory under the rule of native powers, nominally allies indeed, but for the most part to be regarded as hollow friends. The formidable alliance formed some years since to drive us from India shows the feelings with which we are regarded by the old Mohammedan authorities; and though their power is now broken and destroyed, we must not imagine that their hostile feeling towards us is abated. We must therefore at all times be prepared to defend ourselves. The knowledge that we are so prepared will be the best security for our safety and the general peace. From without we have little to fear. The frontier of our dominions is singularly unassailable, considering the extent of territory—the country, of which a part is subjected to our direct rule, and the whole to our influence, being in a great degree secured by nature from external attack. The sea rolls around a large portion of it; mountains affording few passes; and desert countries scarcely passable at all, bound the rest. Russia has been regarded with some apprehension, and she may possibly have been well disposed to add India to her vast empire; but her energies and capacity for intrigue have been hitherto directed to a quarter more dear to her ambition than India. The grand object to which Russia has ever appeared willing to sacrifice every other is the incorporation of Turkey with her dominions. But in her recent attempt to accomplish her purpose she has been signally foiled, and as her resources have been severely crippled by the struggle, a considerable period must doubtless elapse before Russia can be in a condition to turn her eyes farther eastward. In the meantime it is gratifying to know that the British empire in India is in such a state of security as must disarm every fear, and leave its rulers at perfect liberty to devote an undivided attention to the advancement of the happiness of the people. (E. T.)

HINGE, an iron or brass joint, on which doors, lids, gates, and shutters swing, fold, open, or shut up. The common form of a hinge is two leaves, perforated with holes for screws, and furnished each with projecting segments of a hollow cylinder, which fit into each other, and are secured by means of a central pin. This joint is applied by screwing one leaf to the door and the other to the doorpost. Hinges for gates and out-house doors are made in the form of the letter T; they are called *cross-garnets.* They are sometimes made with long straps and hooks to fix in the stiles, so that the gate or door may be lifted off its hinges when required. Hinges for the doors of rooms are called *butts*, and are of various kinds. Hinges for shutters are termed *back-flaps.* Similar kinds are used for the joints of bedsteads, and for Pembroke and other tables. **H** and **H–** hinges, so called from their form, are in common use. Improved forms of hinges have been made the subjects of numerous patents. Collinge's hinge, improved by Redmund, has its bearing pin in the form of a conical stem, with a sharper conical top corresponding with the bearing socket, and over this is a hollow cap containing oil, which enables the two surfaces to work with great truth and freedom. Redmund's hinges or *rising-butts* have the hollow cylinder which is attached to the leaves divided, not at right angles to the pin, as is usual, but by spiral or helical lines, so that on opening the door it is lifted from the floor by the rubbing surfaces of the hinge moving upwards in a helical line, so that when the door is left to itself, its weight causes it to descend by the inclined rubbing surfaces, and thus to close itself. The door can, however, be made to stand wide open by cutting away a portion of the helical curves so as to form two horizontal planes, which become opposed to each other when the door is opened sufficiently to form a right angle with its position when shut. Hence the door will close of itself, when it is not pushed open more than 50° or 60°; but it will stand wide open if pushed to 90°. Spring-hinges for the swing-doors of public offices, &c., made to open either way, and to return quickly to their shut-to position, are numerous. In Whitechurch's hinge, doors, windows, &c., can be opened either to the right or left hand. Nettlefold's hinge for book-cases allows the door to fold back quite level with the book-shelves, so that books close to the hinge can be taken out and put in with facility. There are also numerous patents for casting iron and brass hinges, as well as for stamping the same. (C. T.)

HINNOM, or rather BEN-HIMMON, an unknown person, who seems to have given his name to the valley which bounds Jerusalem on the N., below Mount Zion. (See GEHENNA.)

HINOJOSA DEL DUGUE, a secular town of Spain, in the province of Estremadura, and bishopric of Cordova. It contains a parish church, a monastery, a convent, and two hospitals. It is situated in a level district surrounded with hills; and its boundaries are washed by the Rivers Zujar and Guamatilla. The climate and the water are excellent. Pop. 7748.

HIPPARCHUS and HIPPIAS, the sons of Pisistratus, succeeded their father in the *tyrannis* of Athens. Strictly speaking the right of government belonged to Hippias, who, on the express testimony of Thucydides (which, however, is at variance with that of other historians), was the elder of the two, but the brothers seem to have administered public affairs conjointly with an extraordinary unity of purpose. They carried out the principles of their father, and the period of their sway, at least till the murder of Hipparchus, B.C. 514 (see HARMODIUS), was looked upon by the people of Athens as a sort of golden age. After his brother's death Hippias' character underwent a total change. He became a "tyrannus" of the worst type, and ruled with such intolerable severity that he was at last obliged to fly from Attica to escape the fury of the many enemies he had raised about him. After various wanderings, he took refuge in the court of Darius, king of Persia, and instigated that monarch to the invasion of his native country. He joined the expedition sent out under Datis and Artaphernes, and accompanied it to the field of Marathon, after which all trace of him in history is lost.

HIPPARCHUS, the most celebrated of all the ancient astronomers, was a native of Nicæa in Bithynia, and flourished in the second century B.C. His history and works are very fully discussed in the historical part of the art. ASTRONOMY.

HIPPOCRATES, the "Father of Medicine," was born in the Island of Cos, B.C. 460. By his father Heraclides, he was descended from Æsculapius, and by his mother Phænarete, from Hercules. After the preliminary instruction received from his father, he proceeded to Athens to prosecute medicine under Herodicus. He studied philosophy under Georgias, and some add Democritus of Abdera. He travelled in Thessaly, Macedonia, and Scythia, latterly settling down in the first of these places. Here he died at Larissa about B.C. 357, at the age of about 100.

A parallel has been drawn between Homer, the father of verse, and Hippocrates, the father of medicine. Each remounts to great antiquity, and each is first in order of excellence. Yet so little is known about either, that the history of each has become clogged with numerous accretions of mere fable; while, passing to the opposite extreme, some have doubted whether the men themselves ever existed at all. Some of the stories circulated about Hippocrates may be mentioned. He is represented as having the charge of a library at Cos or Cnidos. Having used the works of others much too freely in his writings, and fearing detection, he is said to have set the library on fire. But the uniform respect, even veneration, with which he was regarded in his own day appears satisfactorily to contradict such a story. Plato, his contemporary, speaks of him in very high terms; and as to the conflagration, Pliny speaks of the destruction by fire of votive tablets, without reference to books or Hippocrates. The story appears to have been invented three centuries after Hipprocrates by one Andreas. A similar story is told of Avicenna. Another story represents Hippocrates as sent for during the illness of the son of Perdiccas II. of Macedonia, and as discovering, by mere appearances, that the malady was caused by the young man's being in love with Philas, his father's concubine. A similar tale is told of Erasistratus at the court of Seleucus Nicanor. According to a third story the portrait of Hippocrates was taken, by some of his disciples, to a physiognomist. It was declared by him to be that of an old man of lascivious character. His disciples laughed at the conclusion as utterly incorrect; but Hippocrates declared that the physiognomist had rightly discerned his natural character, which, however, had been subdued by him. A similar story is told of Socrates. He is described as receiving extraordinary honours from the Athenians, and this connects him with another story, which relates to his removing a plague by keeping up large fires in the streets, and burning aromatic substances. By this means the atmosphere was purified. It is argued that this cannot refer to the celebrated plague by which Athens was devastated, else Thucydides, in describing it, would have made reference to Hippocrates. The other story is that which refers to the mission of Hystanus, the Persian satrap, from Artaxerxes Longimanus, to request Hippocrates to come to the Persian court, and give the king the benefit of his medical skill. Hippocrates replied that he would not accept of any presents to go and help the enemies of Greece.

Hippocrates created a new era in medicine. Up to his time medical knowledge was mainly monopolized by the priests, who kept to themselves as much as they did know. Emancipated from the jugglery of the priests, the study of medicine became henceforth an independent profession. Hippocrates theorized but little, his leading principles being the result of extensive observation of facts. The infirmities to which men as nations or individuals were subject, he traced to two leading causes—climate and diet. Hence he inculcates the importance of considering the changes of the seasons, the state of the atmosphere, the distribution of heat, water, moisture, &c. Diet is to be regulated, not only by the state of the patient, but also by the season of the year. Thus wine is to be used more sparingly in summer than in winter. In cases of fever, diet is to be reduced to liquid, though not so as to starve the patient. Each period of the year, according to him, has its peculiar malady. Hippocrates excells especially in describing the symptoms of diseases. His description of the sharp nose, sunken eyes, leaden hue, and dry forehead, which often precedes death, has been called the *Facies Hippocratica.* He gives minute directions for the discovery of empyema in the chest, notices the changes which take place in ulcers before death, and points out how symptoms may be ascertained from the manner in which the patient lies in bed.

In his treatise on the *Nature of Man* he enounces the theory of elements. As there are the four elements—fire, air, earth, and water; so there are in the human composition the four humours—blood, phlegm, bile, and black bile. When these are mixed in certain proportions the human body enjoys health; but disease is the result of a want of the proper proportion. He was the first to assign three periods to the course of a malady, and for the last, or the crisis, he assigned certain days, known as the *critical days.* These were the 4th, 7th, 11th, 14th, 17th, and 20th, displaying a regularity which may have existed more in his day and in his country than among us, owing partly to climate and partly to the simple habits of the people.

His knowledge of anatomy was very defective. He speaks of the muscles simply as flesh; he confounds the veins and arteries, also the nerves, tendons, and ligaments. As to generation, he believed that the male child came from the right side of the matrix, and the female child from the left. However, he came to some correct conclusions regarding the cranium and the viscera. It is possible that this may have been the result of examinations in the case of severe accidents to patients. The dissection of the human subject, in those days, appears to have been avoided from superstitious motives. Hippocrates did not advance so far as to separate surgery from medicine. He employed the cautery in some cases, as appears from his maxim—that what cannot be cured by medicine must be cured by the knife; and what cannot be cured by the knife must be cured by fire.

He practised bleeding, and in cases of inflammation he recommended the bleeding to take place near the inflamed part. He was acquainted with cupping also. He knew the medicinal properties of several minerals and vegetables, and used to employ violent purgatives. He is known to have practised auscultation. He was not aware of the importance of the pulse in detecting symptoms. He recommended consultations of physicians.

The candour and openness of Hippocrates stand out in noble relief from the secrecy and trickery of the priests, from whose monopoly he wrested the profession of medicine. On several occasions he mentions the mistakes into which, in his earlier practice, he had fallen, that others might have the benefit of his warning. More lofty and humane views than those which occur in his writings regarding the work of a physician are nowhere else to be met with:—"Be not too eager merely to get wealth by your profession. Give medical aid at times gratuitously, satisfied with the gratitude and esteem of others. Give assistance, as occasion presents itself, to the poor and the stranger; for if you love mankind you will love your profession. When you are required at a consultation, do not use great words, and do not speak in a studied and pompous manner—nothing more surely indicates incapacity." In the "oath" the physician is represented as solemnly promising, "My sole object shall be to afford consolation and medical relief to the sick, to be true to the confidence which they repose in me, and to avoid even the suspicion of having abused it, particularly in regard to women." He appears to have been very conscientious in the discharge of his professional duties. It has been objected that, by merely observing the course of nature, and trusting too much to her *vis medicatrix,* Hippocrates allowed his patients to die; and there appears to be some truth in the allegation.

Hippocrates wrote in the Ionic dialect, but numerous Atticisms occur in his works. What is known as the *Hippocratic Collection* is a great number of works, amounting to about 70, of which only a few are certainly known to be from the Hippocrates of whom we are speaking. The works to be ascribed to him are the *Aphorisms, Prognostics, Epidemics,* the treatise on *Air, Water,* and *Locality,* the treatise on the *Diet* to be used in acute diseases, &c. Of the others, some are probably by him, others possibly by him, and many certainly not by him. This confusion has been ascribed to two causes:—First, There were many medical writers not only of the same name, but also of the same family of Hippocrates. Thus the family of Hippocrates contained not fewer than seven physicians of greater or less eminence, spreading over a period of about 300 years. The tendency in such a case is to ascribe to the most distinguished the works of those less distinguished. But, secondly, when the Ptolemæan kings were founding the celebrated Alexandrian library, which was to surpass that of the kings of Pergamos, the works of Hippocrates were eagerly sought, and purchased at a high price. The consequence was that there was an inducement to the dishonest to palm off upon the Alexandrians books under the name of Hippocrates which were not his. Several of the works falsely ascribed to him can be at once set aside by the pomposity of style so totally different from the brevity of Hippocrates, bordering, as it often does, on obscurity. In cases of mutilation and interpolation, where an attempt has been made to imitate the Hippocratic conciseness, the critic has to look for statements which are contradictory of those in works known to be by Hippocrates, or inconsistent with the medical knowledge possessed in his day. The Alexandrian librarians set about effecting a discrimination between the genuine and the spurious; and Galen professes, in his day, to have been able to distinguish the works of Hippocrates from those merely ascribed to him. Many editions of his works have existed, and vast quantities have been written upon them. There have been 70 editions of his *Prognostics,* and 300 of his famous *Aphorisms.* The most eminent men have been his editors and commentators, *e. g.,* Celsus, Galen, &c., Amongst his biographers are to be mentioned especially Soranus, also Dacier, Le Clerc, Grimm, Sprengel, &c. The Paris edition by Littre contains a French translation and critical notes.

The following classification is made on the principle recommended by Erotian, the eldest glossator of Hippocrates, and adopted and improved by Foes:—1. Greek Editions, Venice, 1526, in folio, Aldus and Asulanus; Basil, 1538, in folio, Froben, a more complete and exact edition than the preceding. 2. Greek and Latin editions, Venice, 1588, in folio, Mercuriali; Frankfort, 1595, 1621, 1624, and 1645, in folio; Geneva, 1657, in two vols. folio; Leyden, 1665, in two vols. 8vo; the Variorum edition, Vienna, 1743-49, in two vols. folio, Stephen Mack. 3. Latin editions, Rome, 1525, in folio, Calvo; Rome, 1549, 1610, 1619, in folio; Basil, 1526, in folio; Venice, 1545, in folio, the version of Cornarius; Basil, 1558, in folio; Venice, 1575, in folio, Marinelli; Frankfort, 1596, in 8vo, Foes; Altenburg, 1806, in three vols. 8vo, Pierer, with a learned dissertation on the state of medicine before the time of Hippocrates. 4. Greek and French edition, Paris, 1811, 1815, in four vols. 12mo. 5. Numerous editions in French and other modern languages.

HIPPOCRENE. See HELICON.

HIPPODROME was the place where the horse and chariot races of the Greeks took place. The way in which the Hippodrome was constructed is found in Pausanias, though there is some difficulty in making out precisely the details. The slope of a hill was chosen to form one side of the Hippodrome; opposite to this, and forming an oblong, was raised an artificial mound, connected with the slope by a semicircular termination. At the extremity opposite to to the semicircle was the portico. From this end the chariots started, and as they kept to the right side, it was made a little longer than the left side. Thus each pair, the one of which started from the right side, and the other from the left, would have equal spaces to run. However, considerable numbers of chariots were often competing in the same race. In this case it is supposed that while the first pair started simultaneously, the second pair started just at the moment when the first were abreast of them, and so of the others. Each chariot had its own stall, from which it started when a cord was removed from before it. A bronze eagle and dolphin were used as a signal at the time of starting. The eagle was raised into the air, while the dolphin was lowered. Forming part of the axis of the Hippodrome was a wall with a goal at each end. Round this the chariots were required to pass several times. Along the sides of the Hippodrome seats were ranged for the spectators, special seats being reserved for the magistrates. See AMPHITHEATRE, and CIRCUS.

HIPPOGRYPH, a mythical animal, represented as a winged horse, with the head of a griffin. This conception has been revived by Ariosto, and still later has been reproduced by Wieland.

HIPPOLYTE, ST, a town of France, department of Gard, and arrondissement of Le Vigan, 20 miles E. by S. of the town of that name. It lies at the foot of the Cevennes, near the source of the Vidourle. Its chief manufactures are silk and cotton stockings and woollen cloths. Pop. 5700.

HIPPOLYTUS, a bishop and ecclesiastical writer belonging to the first half of the third century, whose name has recently acquired distinction and importance in connection with a recovered treatise of great value. The history of this treatise is full of interest. Among various other Greek manuscripts brought from Mount Athos to Paris in 1842, and deposited in the great national library, there was an anonymous one of the fourteenth century, written on cotton paper, and registered as a *Book on all Heresies.* It failed for some time to attract any special notice; but the attention of M. Emmanuel Miller, a functionary of the institution, being at length excited by some fragments of Pindar, and of an unknown lyric poet which it contained, he was led to examine it more closely, and to adopt the conclusion that it was a lost treatise of Origen. Under this persuasion he offered it for publication to the University of Oxford, from whose press it appeared in 1851, under the editorship of M. Miller, and bearing the title *Origenis Philosophumena, sive omnium Hæresium Refutatio.* Shortly afterwards it was studied by the Chevalier Bunsen, and after a careful and elaborate investigation it was conclusively established by him to be a genuine work of the third century, and that its real author was not Origen but Hippolytus, a presbyter of the Church of Rome, and bishop of the harbour of Rome, *Portus.* This conclusion has been confirmed by the combined labours of other scholars, especially of Dr Duncker and Dr Jacobi in Germany, and of Dr Wordsworth in England.

Previous to the recovery of this treatise Hippolytus can be said to have had little more than a mythical existence. His name was indeed a celebrated one in early Christian history. He was known to have been a bishop; but so little else was positively known of him that it remained a matter of uncertainty whether the seat of his labours was in the east or in the west. Neander (*C. H.*, vol. ii., p. 471) considered the evidence on each side to be pretty equally balanced. Yet it appears to us, on the whole, that the evidence clearly inclined in favour of the latter, even before the recent discovery. The conjecture of Le Moyne, that the Portus Romanus associated with the name of Hippolytus was Aden in Arabia,—a conjecture which Cave authoritatively carried out,—Bunsen has plainly shown to have rested on no better foundation than a misinterpretation of one of the passages in Eusebius, in which Hippolytus is mentioned (*Euseb.*, vi. 20). At any rate there can now remain no doubt, after the researches of Bunsen, that the author of the treatise *Against all the Heresies*—the Hippolytus of Eusebius and Jerome—was bishop of Portus, the new harbour of Rome, on the northern bank of the Tiber, lying opposite to the more ancient Ostia. At this time it had become a place of considerable population and importance—a bustling harbour of all nations. Here Hippolytus lived and laboured. He was a disciple of Irenæus, and his Greek education under that teacher had peculiarly fitted him to act as a sort of missionary bishop among the representatives of the various nations that were here congregated. While occupying a perfectly independent position in his own episcopal sphere of labour, he was at the same time a presbyter of the Roman Church, and shared in the deliberations of the Presbyterial council which met in that city.

In the ninth book of the recovered work, which treats of the heresies prevalent at Rome in Hippolytus's own time, and especially of that of Noetus, patronized by two Roman bishops, Zephyrinus and Callistus, and zealously opposed by Hippolytus, we have a very lively and graphic picture of the ecclesiastical state of Rome in the beginning of the third century. For this, however, the reader must be referred to the treatise itself or to the Chevalier Bunsen's analysis and reproduction of it in his third letter to Archdeacon Hare on the subject, contained in the first volume of his elaborate work on *Hippolytus and his Age.* His other works survive for the most part only in fragments.

Hippolytus, as he is seen in this work, claims undoubtedly to be regarded as a distinguished father of the Ante-Nicene Church. Of unwavering moral intrepidity, genuine honesty of character, and sense and talents inferior to none of his contemporaries, he was at the same time the predecessor of Origen in speculative power and comprehension, as well as in oratorical pretensions. He combined with more depth and knowledge than his illustrious teacher the philosophical enlightenment which Irenæus had kindled in the west. His familiarity with the course of Grecian speculation was especially serviceable in enabling him to trace the origin of the various heresies to whose refutation he devoted himself. He was the first preacher of note in the Roman Church, having elevated the mere popular exposition of the gospel, which was all that prevailed in the shape of a sermon in that church before his time, into the set homiletic address, characterized by science and eloquence, which "was his favourite mode," according to Bunsen, "of treating exegetical and polemical subjects." (J. T—H.)

HIPPONAX, a celebrated Greek satirist, was a native of Ephesus; and flourished in the latter half of the sixth century B.C. He was an ardent lover of freedom, and wrote and spoke so boldly in its favour, that Comas and Athenagoras, the tyrants of Ephesus, expelled him from his birth-place. He took refuge in Clazomenæ, where he lived and died in great poverty. Hipponax was one of the bitterest of all the Greek writers of satire, and in the classics the epithet "Pikros" is generally attached to his name. He found the subjects of his satire in the effeminacy and immorality of his countrymen, and in their superstitious idolatry. The faithlessness of women was also a favourite theme for his sarcasm; and in two of his remaining lines he says "a husband has two happy days in his life, one when he welcomes home his bride, and another when he follows her to the grave." Hipponax was in person little, and marvellously ugly, and the Chian sculptors Athenis and Bupalus amused themselves by exaggerating and caricaturing his ugliness. The enraged poet avenged himself by directing against them the most poisonous shafts in his quiver; and it is said, though the story is probably unfounded, that Bupalus, in shame and despair, committed suicide. After the death of Hipponax it was suggested by Alcæus of Messene that his tomb should be strewed with thorns and thistles, instead of roses and vine-leaves; and another epigrammatist warns the traveller against approaching it too closely, lest they rouse the wasp sleeping within. Of Hipponax's poems only about a hundred lines are extant. They have been preserved by Welcker in his *Hipponactis et Ananii iambographorum Fragmenta*, Götting., 1817, and have been published by other scholars of Welcker's day, such as Bergk and Meineke. They serve to show that the reports of his bitterness are not unfounded, but that he could relieve the severity of his satire by an abundant play of light and graceful fancy.

Hipponax introduced a curious change in the structure of the old iambic trimeter. In the last foot he substituted for the iambus a trochee or a spondee, giving the verse a lame or limping rhythm, from which it was called choliambus or iambus scazon. He also takes similar liberties with many others of the metres which he employs, and the innovation, though strange, is said to be well adapted to the general effect of the iambus, as it was moulded in the hands of Hipponax.

HIPPOPOTAMUS. See index to MAMMALIA.

HIRE, PHILIPPE DE LA, a distinguished French geometer of the seventeenth and eighteenth centuries, was born in Paris in 1640. His father, Laurent de la Hire, was a painter and engraver of considerable note, and the son's education was at first shaped so as to fit him for the same career. In his twentieth year La Hire made a pilgrimage into Italy, and while at Venice fell in with the Conic Sections of Apollonius, which determined his taste for mathematical study. His own treatise on this subject, published in 1685, under the title of *Sectiones Conicæ in Novem Libros Distributæ*, is the most important of all his works. In 1678 he was admitted into the Academy of Sciences, and was afterwards appointed by Colbert to assist Picard in conducting the surveys for a general map of France. A few years later it devolved upon him to continue, along with Cassini, the measurements of the meridian begun by Picard in 1669, and the work was progressing happily till stopped by the untimely death of Colbert. He was subsequently employed on a great number of public works, of which the most important were connected with the supply of water to Versailles and Paris. "France might have had in La Hire," says Fontenelle, "an entire Academy of Sciences." He was a quiet man, of great practical prudence, very reserved in manner, and of the most spotless integrity of personal character. His piety was as much admired by his friends as his probity. He was twice married, and two of his sons were admitted into the Academy of Sciences, the one on the score of his geometrical, the other of his botanical knowledge. La Hire died suddenly in 1718. His principal works are—

Nouvelle Méthode de Géometrie pour les Sections des Superficies Coniques et Cylindriques, Paris, 1673, in 4to; *De Cycloïde Opusculum*, ibid. 1676, in 4to; *Nouveaux Eléments des Sections Coniques, les Lieux Géometriques, la construction ou affection des Equations*, ibid. 1679, in 12mo; *La Gnomonique, ou l'art de tracer des cadrans*, ibid. 1682, in 12mo; *Sectiones Conicæ, in ix. libros distributæ*, ibid. 1685, in folio; *Tabulæ Astronomicæ, Ludovici Magni jussu et munificentia exaratæ*, ibid. 1702, in 4to; *L'Ecole des Arpenteurs, avec un Abrégé du Nivellement*, ibid. 1689, in 8vo; *Traité de Mécanique, où l'on explique tout ce qui est nécessaire dans la pratique des Arts*, ibid. 1675, in 12mo; besides a great number of *Mémoires*, in different journals, and in the Collection of the Academy. La Hire was also editor of the *Traité du Nivellement* by Picard; of the *Traité du Mouvement des Eaux* by Mariotte, and joint editor with Boivin and Thévenot of the *Veteres Mathematici Græc. et Latin.*, 1693.

HIRPINI, an inland people of Italy who inhabited the southern portion of Samnium. They are sometimes regarded as merely a Samnite tribe, by others they are looked upon as an independent nation. The country they inhabited was the wild and mountainous district traversed by the Sabatus, Calor, and Tamarus, tributaries of the Vulturnus, and on the eastern side of the Apennine ridge, the upper course of the Aufidus. In the early history of Rome the Hirpini are found identifying themselves with their Samnite neighbours against their common foes. They seem to have been subdued in the early part of the third century B.C., as in 268 B.C. Beneventum, the key of all their military positions, was colonized by Roman settlers. In the second Punic War the Hirpini appear in history for the first time as an independent people. Revolting from their old conquerors, they joined the Carthaginian invaders, and though they were unable to recapture their stronghold of Beneventum, they remained faithful to Hannibal till the defeat at the Metaurus restored the empire of Italy to his opponents. In the year of that event the Hirpini made their peace with their old masters by betraying into their hands the garrisons of their allies. From this time till the outbreak of the Social War, the Hirpini seemed to have continued steadfast in their allegiance. On that occasion, however, they set the example of revolt to the allies, and might have become formidable enemies, had not the rapid successes of Sulla induced them to repair their error by a complete submission. At the close of this war the Hirpini obtained the franchise, and do not again appear in history as an independent people. Their chief towns were Beneventum, Æculanum, Trivicum, Equus Tuticus, Murgantia, and Aquilonia. The most important of these are given under their respective heads.

HIRSCHBERG, a fortified town of Prussian Silesia, capital of a cognominal circle in the government of Liegnitz, and 25 miles S.W. of the town of that name, on the River Baber. It is the seat of the superior courts for the circle, and a great emporium for linen manufactures and hosiery. In the town and neighbourhood are bleaching works, paper-mills, and sugar-refineries; and not far off is the celebrated watering-place of Warmbrunn. Pop. 7654.

HISPANIA. See SPAIN.

HISSAR, a town of Hindustan, and the principal place of a Pergunnah, situated in the British district of Hurreeanah, within the jurisdiction of the lieutenant-governor of the N.W. provinces. The country is fertile, but labours under a scarcity of water, which detracts from its fertility. It is only watered by one small stream, namely, the Sursutty. In order to supply the means of irrigation, one of the Afghan emperors, who lived in the fourteenth century, caused two canals to be cut, one from the Sutlej, and the other from the Jumna, both of which joined at the city of Hissar, whence they are supposed to have been divided into a number of branches, so that the water was nearly all distributed over the lands, and the remainder fell into a lake called Bhedar. Under the influence of this extensive irrigation the country became fertile, and yielded two abundant crops in the year. These canals were suffered to fall to decay, but in 1825 the branch from the Jumna was cleared out by order of the British government as far as Darbah, 25 miles N.W. of Hissar, to which place it is navigable for timber rafts. The neighbouring country produces horses, camels, and cattle. The inhabitants are chiefly Jauts, with the exception of a few Rajpoots; there are also villages of Rajpoots who have embraced the Mohammedan religion. This district imports matchlocks, swords, coarse white cloth, salt, sugar, and a small quantity of rice and spices. The exports are horses, camels, bullocks, and ghee. During the prosperity of the Mogul government the town and district were considered the personal estate of the heir-apparent to the throne. Hissar was built by Sultan Feroz, who gave previous directions for the digging of the two canals above mentioned; after which he laid the foundations of the town and fortress, which he built of stone brought from the neighbouring hills of Nosa, and completed it in less than three years. E. Long. 75. 50., N. Lat. 29. 8. (E. T.)

HISTIÆA, or Oreus, in *Ancient Geography*, an important city of Eubœa, on the northern extremity of the island, and giving name to the district of Histiæotis. It was a very ancient city, and like most of the old cities of Greece, its origin is doubtful and obscure. When the Persians were finally expelled from Greece, it passed into the hands of the Athenians, and when Eubœa revolted from that people, and was again subdued, the old inhabitants of the town were expelled, and 2000 Athenian colonists settled in their stead. It was at this date that the city exchanged its original name for that of Oreus, by which it was afterwards more generally known. At the end of the Peloponnesian War the descendants of the old inhabitants were restored by the Spartans, under whose dominion the city had fallen, and to whom it remained faithful till the battle of Leuctra, when it revolted from them. In the war between Philip and the Greeks Oreus was frequently contested, and in B.C. 200 it was stormed by the Romans. Under the Romans Oreus gradually fell into decay. Some ruins of its fortifications are all that now remain to tell of its ancient greatness.

HISTOLOGY (ἱστὸς texture, λόγος treatise), the science of the minute structure of tissues. See Anatomy.

HISTORY.

History may be considered either as a department of human knowledge and intellectual exercise, or as a form of literary composition. In the observations that follow, we shall consider it under both these aspects.

I. HISTORY CONSIDERED AS A DEPARTMENT OF HUMAN KNOWLEDGE AND INTELLECTUAL EXERCISE.

1. Bacon's famous division of human knowledge or "learning," recognises it as consisting of three parts:—History, relating itself chiefly to the memory; philosophy, relating itself chiefly to the reason or understanding; and poetry, relating itself chiefly to the imagination. This distribution, though sometimes objected to, and perhaps not theoretically perfect, is substantially a good one; and it has the advantage of a massive foundation in our popular and well-understood psychology. It is not, of course, meant that in history no other faculty than the memory is called into exercise, any more than it is meant that philosophy can dispense with the memory and the imagination, or that poetry can dispense with the memory and the reason. What is meant is, that precisely as the mind may, while still acting as a whole, cast itself at one time by preference into what may be called the remembering mood, at another into what may be called the judging or reasoning mood, and at a third into what be called the imagining or creating mood, so to each of these moods of the total mind there corresponds a department of possible intellectual acquisition. History, then, according to this interpretation of Bacon's words, is that department of knowledge or intellectual exercise which lies open to the total mind when it assumes more especially the remembering or recollecting mood. In other words, it is the business of history to record or remember the past events or transactions of the world of whatever kind, and, in remembering them, to let them produce whatever further effect on the mind is consistent with the continuance of the mood named memory. This latter part of the definition is of some importance. The mind may be strictly and properly in what we have called the remembering mood; it may be recalling a past incident and dwelling on it; and yet, even while the main act is still that of remembering, the impression of the incident is not exhausted in that act, but there is a certain contemporaneous effect on the whole mind, including the feelings, the fancy, and the reason. One may remember with a purpose, or, in remembering, some feeling, or reasoning, or generalization may suggest itself; and still the act, as a whole, may be essentially that of remembering. And so in history. To record or bring to recollection past events is its characteristic function; but past events cannot be adequately recorded or brought to recollection, without at the same time affecting the feelings and the imagination, and without receiving at the same time some sort of interpretation according to the constitution of the person remembering, his acquired ideas and modes of thinking, or his immediate circumstances and purpose. No man can exercise an act of memory in common life without doing something more; nor can it be different with history, which is recollection, so to speak, on the great scale.

2. The adequate recollection of *any* past event or transaction, or of *any* series of past events and transactions is, in this sense, history. Hence the forms that history may assume are infinite. There may be a history of the transactions of a single individual during twenty-four hours; there may be a history of a club; there may be a history of a parliamentary measure or of one notable passage in the career of a nation; there may be a history of a king's reign, or of the rise, growth, and decay of some political party. Thus also we have histories of painting, histories of the steam-engine, histories of commerce, histories of cookery, histories of literature, histories of philosophy; and there is no reason why we should not have a history of history. These histories, in which certain orders of past facts are purposely selected for record and interpretation to the exclusion of the rest, are called special histories. One variety of special history—that which concerns itself with the lives of distinguished individual men—is constituted into a great department by itself under the name of *biography*. In all these varieties of history the purpose is the same—the recollection of facts exactly as they happened, and in their chronological order, so as to bring out their full impression and significance.

3. But though the adequate record of any series of past facts of whatever kind is, in this wide sense, history, we understand something different by history proper. By history proper, and especially when we distinguish it, as we generally do, from biography, we understand that kind of record which has reference to the acts and circumstances of men, as collected into communities or social masses. On this point Dr Arnold, in his *Lectures on History*, has some pertinent remarks: "The general idea of history," he says, "seems to me to be that it is the biography of a society; it does not appear to me to be history at all, but simply biography, unless it finds in the persons who are its subject something of a common purpose, the accomplishment of which is the object of their common life. History is to the common life of many what biography is to the life of an individual. Take for instance any common family, and its

members are soon so scattered from one another, and are engaged in such different pursuits, that, although it is possible to write the biography of each individual, yet there can be no such thing, properly speaking, as the history of the family. But suppose all the members of the family to be thrown together in one place, amidst strangers or savages, then there immediately arises a common life, a unity of action, interest, and purpose, distinct from others around them, which renders them at once a fit subject for history. Whether consciously or not, every society must have in it something of community; and so far as the members of it are members, so far as they are each incomplete parts, but, taken together, form the whole, so far it appears to me their joint life is the proper subject of history." According to this description, history, in its specific sense, is the adequate record of the collective acts and experiences of men when they are grouped together into societies. The societies may be large or small. A club is, to some extent, a society; a political party acting together in a state in opposition to other parties is a society; a beleaguered garrison is a society; a colony of a hundred individuals or so, engaged in settling themselves on a distant shore, is a society. In all these cases there would be the phenomenon of a common or collective life, resulting from the scattered actions of the individual atoms composing the society; and it would be the business of history to trace this common life, and to exhibit the course or career of the society as such. In general, however, the kind of society which is considered a fit object of history, is that organized society which we call a state, *i.e.*, a society having a certain *political* unity within itself, determining its own laws, and leading so far a distinct existence from other and surrounding communities, though related to them more or less. Here, again, the dimensions of the society which is made the object of study may differ. The entire ancient state of Athens, the history of which is so splendid, did not, at its highest prosperity, comprise a population of above 400,000 persons, slaves included; and mere cities were often states in the ancient world, with all that character of political unity and independence which is implied in the notion of a state. The same has been the case in modern Italy—as in the republican days of Venice, Florence, Genoa, &c. But at all times there have been political unities of much wider extent. Thus the Athenians, the Spartans, the Thebans, and others, though really political unities in themselves, and so having separate histories, became merged, even in their own fancy to some extent, in that more comprehensive unity called the Greek or Hellenic nation, the history of which collectively would be a higher undertaking. Again, even more comprehensive than the political unity called a nation, have been those vast unities, known both in ancient and modern times, called empires; consisting of aggregates of nations factitiously grasped together by conquest, intermarriages of sovereign houses, and the like. Such empires, whether so constituted as to preserve to a certain extent the inferior unities of their component parts, or so constituted as to obliterate these unities and centralize all the functions of government in one spot, become subjects of history. In short, what history demands as its appropriate object is *any* collective mass of human beings, of whatever size, presenting the characteristics of political unity, and consequently of common political life. For most purposes, in the present state of the world, the typical form of history may be considered to be the history of a nation. The *nation*—whether consisting, as in the cases of Great Britain and France, of twenty or thirty millions of people, or, as in the case of the modern kingdom of Greece, of only one or two millions—such is the form of political unity with which now, and indeed for some ages past, we are most familiar. Austria, indeed, is an empire or cluster of nations; Germany, as such, is a confederacy; and Russia, with a large national core, possesses imperial appendages. The histories of these states, accordingly, must have a corresponding character. On the whole, however, we may think of the nation as being the type, at this stage of the world, of those social aggregates of men whose common life it is the business of history to observe and relate.

4. The life of a nation, however, may be recorded either in parts or as a whole. We possess histories of both these kinds. By the record or history of a nation's life as a whole, we mean a record or history which, beginning at the first moment of the nation's recognizable existence, follows it through all its stages of growth, energy, and power, and does not quit it, until, by absorption into other nations, or by the entire breaking up of its organization, it may be considered to have lost its political identity and perished. In a retrospect of the past duration of the world, we see a wave-like series of such completed national lives. Far back in primeval time, a country or nation called Egypt looms into view; for ages it has a visible career peculiar to itself; but at a certain point, its peculiar organization is dissolved, or nearly so, before the touch of Greek or Græco-Macedonian rule; at that point, therefore, original Egypt may be assumed as having come to an end; and though other Egypts succeed, they are new Egypts rather than modifications of the old one, and must have separate histories. So also the Greek people ran their course, and though the name remained, the *thing* disappeared. So, on a still more extensive scale with the Romans, the successive stages of whose existence—first as a community of Central Italy, then as masters of Italy, then as rulers of a Mediterranean empire, which fell into ruin by degrees—are so well marked. In such instances we can have complete histories, corresponding to the complete biography of an individual man from his birth, through his youth and manhood, to his old age and death. But in the case of nations not yet dead, but flourishing and going on, it is different. The most complete history we can have in such cases is a history starting from the commencement, or, as one may say, birth of the nation so far as that can be ascertained, and carrying the nation on to its present state, whatever that may be. Thus the most complete French history would be one beginning with Druidical and Roman Gaul, and exhibiting the successive modifications of this society through which it has shaped itself into existing France. Similarly, the most complete English history would be one commencing with the Druidical Britain into which Cæsar tried to push himself, and ending with Britain, as it is now figuring in the world. Such complete histories of nations still running their course we do have, but they are not numerous. The histories of such nations are generally presented to us in portions. Thus, we have histories of France during the reigns of the Bourbons, histories of France from 1789 to 1815, histories of England from the Norman conquest till the accession of James I., histories of England during the reign of George III., and the like. Some point in the national history is selected, and the narrative is carried on a certain distance forward from that point.

5. Whichever of these forms is adopted, the true notion of history still is, that it is the biography of a nation—in the one case complete, and giving the whole life; in the other, representing some portion of the life. The question then occurs, What constitutes this common or collective life of the nation, which it is the duty of the historian to trace; where is it to be sought for; in what facts does it lie involved?

6. The answer to this question is as important as it is difficult. Generally speaking, one may say that, since the common or collective life of the nation is the resultant of all the acts and all the experiences of all the separate individuals that have lived in the nation, the larger one's knowledge of all these acts and experiences, and, in fact, of everything however minute in any way relating to any and all of the individuals of the nation singly, the better will

the purposes of history be served. No fact is too mean to be of use—no collection of facts would be too extensive for the ends of the historian. An adequate recollection, according to our definition of what that means, of all that has been thought, said, done, or suffered, by all that have lived in a community from first to last, in proper order—this would be the absolute ideal of a history of the community. The perception of the common life would be involved in such a recollection of all that went to constitute it. But necessity here imposes a limitation. We cannot, by any amount of research, know all that all the successive millions forming a community have thought, said, done, suffered, or seemed; the facts that we can know, or that, knowing, we can visibly take into account, are, at best, in every case, but a miserable percentage of this ideal aggregate. But, though this consideration impairs the perfection of history, it impairs it only to the same extent that every form of intellectual practice must be impaired by the limited nature of the human faculties. The real question is, Since all cannot be known and remembered, what is it best to know and remember? Since the facts out of which we must construct our histories in idea are but a small proportion, a mere remaining shred of that enormous, intertwined infinity of facts which actually went into the histories while the web was being woven, are there any kinds or orders of facts which, more than others, it is desirable, for the purposes of history, to secure and keep hold of? Seeing that we cannot take account of all, but may take account of some things, what things may we take account of, with the greatest likelihood of fulfilling the essential requirements of history?

7. The answer is suggested by the definition of history. If history is the account of the collective life of a nation, and if we cannot know *all* the facts that entered into the constitution of that life, we ought to inquire whether there are any *kinds* or *orders* of facts in which, more than in the others, the collective *vitality* of a nation is represented and embodied. If there are, then, whatever facts we neglect, it should not be these. But such orders of facts—vital facts they may be called—there obviously are. In every community, for example, though all contribute to the common life, all do not contribute in an equal degree. Some individuals, in every age, either from their endowments or their circumstances, or from both combined, exert a more powerful influence than the rest—contain in themselves, so to speak, a larger portion of the general life. Hence it is one of the rules of history to attend in a particular manner to the lives and actions of powerful individual men; and it is always felt that by fastening the regards on such men, describing their physiognomies and characters, and relating their movements, the problem of history is simplified, and its true end is to a considerable extent attained. The universal instinct of writers of history recognizes this fact. Again, besides the agency of powerful individuals, there is the agency in every society of what may be called powerful physical accidents, such as famines, epidemics, earthquakes, and the like; and also the agency of occasional accidents more properly social, such as great inventions and discoveries made unawares, or almost so. All events of this kind, producing as they do large effects on the whole community at once, are felt to have special claims on the notice of the historian, and are therefore always commemorated in histories. Farther, all societies are so constituted that, in the nature of things, the common vitality is not equally distributed through all parts of their mass, but the higher functions of the general life are lodged necessarily more in one part than in the others. For example, in the ancient communities, a large portion of the population always consisted of slaves, upon whom were devolved the lower industrial functions, while the higher or directing functions were exercised by an upper order of freemen, and more especially, within that order, by certain portions of it. Now, though any history of the Athenians would be defective, which did not contain a suggestion of the existence and the habits of the slave-population, which did not in fact keep continually present in the reader's imagination the thousands of slaves who were toiling daily underneath that platform of public life which was occupied by the free *demos* and its orators, yet every one knows that the real history of Athens, the actions which made it illustrious, came out of the votes and deliberations of this *demos*. And so, with modifications, in modern societies. Not only do certain scattered individuals contain in them such a share of the general vitality that they may be taken to some extent as representing the whole; but the arrangements of all communities are such that, for historical purposes, the attention need not be equally distributed over all parts, but, provided all parts are suggested and kept in view, may be most concentrated on some parts, where the higher functions are localized. In extension of this remark we may note, that in all histories it is considered important to have correct lists of the rulers or chief magistrates, and to have the physiognomy and character of each in succession pretty distinctly sketched. This is considered necessary, even when the rulers are men personally of no particular mark, or goodness, or energy; and the reason is that, since these men were the principal personages in their communities while they lived, the most conspicuous social objects, the centres of general regard, it is like reviving part of the consciousness of the generations which looked at them, to set them up again one after another in their order. Apart altogether from any effect that George IV. may have exercised personally on British history during his reign, it is to be remembered that, by the fact of his position, he was during that period an object much present in the thoughts of the British people; and hence that, by keeping him in view, we recover, as it were, so much of the mental habit of his contemporaries. Indeed, this is the principle on which the practice of dating events by the reigns of kings and the like is founded.

8. Among the various other ways in which the problem of history is simplified, none is more important than that which is afforded by the power of studying the progressive life of a nation in its art, its literature, and its philosophy or systematic speculation. In the works of art (whether in music, in painting, in sculpture, or in architecture) which a nation produces, its thoughts, its tendencies, all that is most general and characteristic in its intellectual, emotional, and moral life, is symbolized and embodied; and the due interpretation of any such series of works of art will reveal much to the historian. So with literature. The body of literature bequeathed by a nation is a living abstract of its moods, its passions, its likings, its aspirations; and a due acquaintance with a nation's literature, and, above all, with its highest national poetry, is essential to one who would write its history. Farther, and perhaps still more profoundly, the innermost life of a nation, the very principle of its life (*i.e.*, its mode of thinking), is to be gathered from the history of its philosophy and religion. What is speculation to-day becomes action to-morrow; and hence the true thread of a nation's life is to be found above all in the succession of its thoughts and maxims on those subjects which are of the greatest generality and importance to the human race. There has been a perception of this among historians, but not so distinct as there might be.

9. After all, however, history would be in a somewhat uncertain predicament, unless it could prescribe to itself a more definite and rigid path of inquiry than we have yet indicated. Although the life of a nation is to be studied in the characters and actions of its great men individually, in the traditions of great physical occurrences which have affected it, in the records of its inventions and discoveries, in accounts of the social habits and movements of its direct-

ing classes, in the portraits and dates of its successive sovereigns, in its art, its literature, and its philosophy, it is to be studied most authentically and surely in *the recorded series of its public acts.* The public acts of a nation accurately recorded, are the true backbone of every history; and whatever other information there is, must be arranged round *that.* But what are the public acts of a nation? They are the acts performed by the nation expressly as a nation. Any general movement of a nation, even when not formal, may be considered as such an act; but, for all real purposes, the acts of a nation are to be regarded as those done in the name of the nation by its government. In every society that has yet existed on the face of the earth, there has been a government of some kind or other—a certain organ or apparatus located somewhere in the body-politic, and charged, in an express manner, with the performance of the functions appertaining to the common life. It matters not whether the apparatus is a despotic sovereignty lodged in a single person, or a popular assembly, or an oligarchical council, or a system of combined powers and checks. Nor does it matter whether the apparatus remains uniformly the same, or is changed from time to time. So long as a government officiates for a nation, the nation acts through it; and hence the attention of the historian must always be fixed on the government of the nation whose life he is representing, and he must take its acts as the corporate acts of the nation.

10. Now, a nation, through its government, is capable of two distinct kinds of political action,—action referring solely to itself; and action referring to other nations. In other words, the public acts of any nation are either acts of home policy, or acts of foreign or international policy. The distinction is a simple and popular one, but it is not the less true and comprehensive. The historian must never lose sight of it. He must always keep distinct in his mind these two series of acts,—the acts of a nation, through its government, relating to its own internal affairs; and the acts of the same nation, also through its government, having reference to other nations. (1.) The acts of a nation relating to its own internal affairs are of various kinds,—popular agitations, public discussions, parliamentary debates, deliberations in council by those who exercise the government, consultations between the sovereign and his advisers, and the like; but the ultimate form which all such acts assume in every nation is that of *decrees, orders,* and *laws.* Wherever we can find a decree, an order, or a law, there we have in the most solid and authentic form an exhibition of the collective life of the nation; for every such decree, order, or law, represents the decision come to by the nation through its rulers upon some point of social necessity arising at that moment and occupying more or less the national thought. Every law represents the nation applying, at some particular moment, its collective energy and ingenuity, or even folly and prejudice, according to the forms in use, to the determination of some felt social need or emergency of the moment; and what more intimate exhibition of the collective life can there be than this? The history of every nation, therefore, is most authentically preserved in its statute-book, *i.e.*, using the word statute-book in its widest sense, in the continuous series of its written laws, edicts, regulations, &c. about the entire miscellany of its domestic matters, such as trade, taxation, crime, education, and the like, including, of course, the provisions relating to its own constitutional system or mechanism. Here the historian treads, as it were, on adamant. In other matters there may be mistakes and misconceptions; but when the historian announces the fact, that in such and such a year, a nation passed such and such an enactment, or repealed such and such an enactment, he can be sure that he is on firm ground; and if he can step from one fact of this kind to another throughout his whole narrative, he has a solid road-way. (2.) Precisely so it is in matters of international activity. The international activity of countries takes various forms. War is one form, and it has hitherto been the form predominant in the history of the world. "The history of mankind," Napoleon III. is reported to have said, "is the history of armies." But commerce is another form; and diplomacy has in all times found some scope in arrangements unconnected with war. Just, however, as all domestic political activity takes its solid issue ultimately in laws, enactments, or institutions, so all international political activity may be considered as registering itself in what are called *treaties.* The treaties of a nation, using that word in its largest sense, as including all kinds of mutual agreements among nations, are, in its external history, what the body of its written laws is in its internal. Here also the historian feels his ground firm. A treaty like that of Utrecht or that of Vienna, is like the balancing of accounts after a long term of energetic and confused action. One sees the actual result at last, and can compare it with the aims and the means.

11. Historians have always attended with some care to treaties; and, indeed, accounts of great battles and great campaigns, and of the treaties in which they ended, have always constituted a large proportion of the matter of our histories. Perhaps less attention has been paid to the internal history of countries as preserved in their statute-books; and Mr Froude has recently done good service by calling attention to this fact, with especial reference to English history, in one of the *Oxford Essays.* But there may be exaggeration even on this side. The end of history is to realize and exhibit the whole collective life of a nation; and though the main acts of this collective life are most authentically registered in enactments and treaties, much of this life, and even of what is most interesting and significant in it, would elude us, if we did not trace it through other and more subtle manifestations. For example, the collective mind and energy of Britain at the present time would be gathered but meagrely from the current series of our parliamentary enactments and diplomatic arrangements; nor does the whole river of the national life run even in the procedure which gives rise to these solid results. Hence the necessity of falling back on all those kinds of matter which we have already indicated as belonging to history; the art, literature, and philosophy of a country, the lives of its great men, &c. Hence the necessity also of neglecting nothing that can serve to make the historical recollection more true, deep, and vivid. A casual anecdote or reported saying, a glimpse of some old social custom, may often irradiate a whole tract of past time. The rule, as regards the preliminary investigation of the facts, is that by all means one ought to strive to get *as close to the transaction itself as possible;* the rule as regards the proportionate value of the facts so ascertained, is that *the "interest" of a fact is the measure of its historical importance.* This last rule may appear questionable; but duly understood, it will be found to be just. What interests one man may not interest another; but for every individual severally, true history may be defined to be whatever of the actual past he recollects with interest.

12. In order to see what are the chief *sources* of history, we have only to express in another form the substance of what we have been saying. The main sources of history may be arranged, in the order of their importance, as follows:—1. Written or otherwise registered laws and treaties; in which are embodied, in their order, the deliberate determinations of nations with respect to the successive exigencies, internal and external, through which they passed. This source is available chiefly for the history of modern nations; only scraps of the laws and treaties of the ancient nations remaining to us in their original form. 2. Public contemporary registers of notable occurrences. These, in

the express documentary form, are also most numerous for modern nations; but, for ancient times, facts may be often ascertained, and dates may be fixed, from monumental inscriptions, coins, medals, &c. 3. More general accounts of national transactions, given by those who have recorded them, and especially by contemporaries and eye-witnesses. A large proportion of what are called the "original materials" of all histories consists of such accounts, which are to be examined and checked by each other. 4. Authentic accounts of the physiognomics, lives, and characters of eminent men, and especially of eminent public men, visibly connected with national transactions. 5. Remaining works of art, and the whole surviving literature of a nation, for the period concerned, both as exhibiting the national tendencies and modes of thinking, and also as embodying incidentally particles of historical fact. 6. All miscellaneous sources of information respecting customs, costumes, food, furniture, occupations, &c. &c.; under which head, if not under some of the preceding, might be included busts, portraits, topographical views, engravings, and the like. One may also note here the occasional possibility that there is of rendering a narrative of past actions more vivid by actually visiting remarkable localities, buildings, &c., or museums of antiquities. Here the historian can communicate through his senses with actual remnants of the past. A battle-field is a portion of the earth's surface, retaining, as it were, the scar of the action which passed over it; an old castle or street is, as it were, the shell once filled with an old form of life; a suit of armour with a bullet-hole in it suggests more accurately the warrior who moved and fought within it. The most extensive use of this help to history is in travelling over countries which were the scenes of great events, so as to realize the permanent features of their scenery, whether geological, botanical, or artificial.

13. Nothing has yet been said of the distinction, recognised by Bacon, and very generally kept up since, between the civil and the ecclesiastical history of a nation. That distinction, however, though convenient, is not fundamental; and much harm may be done by regarding it as such. Obviously it is inapplicable to the history of ancient communities; and though, with regard to modern Christian nations, there are good practical reasons for attending to it, they are purely reasons of practice, and not of theory. The history of the church is a splendid subject, and may well be undertaken apart; but not because of any real isolation of the facts included in the series thus chosen for special treatment. The best history of England would also necessarily be the best history of the Church of England.

14. Hitherto we have spoken of history, in its typical form, as the account of the life of one of those organized social masses called nations; frequently, however, we use the word history in its larger and more generic sense, as involving an account of the aggregate transactions of many nations, or indeed, of the whole known world, during a certain portion of past time. Thus, Gibbon's *History of the Decline and Fall of the Roman Empire* is virtually a mediæval history—a history of all the chief nations of the world during a thousand years. And thus we rise to the very highest conception of history—that implied in such phrases as "the teaching of history," "no other instance of this is to be found in history," and the like. History, in this supreme sense, is sometimes called universal history; and the object-matter of history, so understood, is *the whole past course of humanity from the first moment of its existence to the present hour.* This is true history, in the sense we have in view when we consider it as one of the great divisions of human knowledge and intellectual exercise. The historian, in this high sense, as distinct from the philosopher and the poet, is the man who makes it his aim to have an accurate continuous knowledge of all that has taken place on this earth since it contained human beings, and, along with that knowledge, an adequate sense of its whole significance. Hypothetically, indeed, one might go farther, and say that the aim of the historian, as such, is to be able to frame to himself an adequate continuous recollection of all that has passed in time, not restricting himself to time as connected with the existence of our species, nor even to time as connected with our world only. Except, however, in as far as geology might be made to yield a history of our earth anterior to the appearance of humanity, such an extension of history is purely ideal; and history can be nothing else for us than that vast collective life of humanity as a whole, to which all national histories are but tributaries. Let us glance at the conditions and divisions of history in this aspect.

15. The first and most difficult problem of universal history, as just defined, is to fix the point of its beginning—*i.e.*, the time of the first appearance and activity of man on this planet. The unaided condition of the human race now, as regards this problem, is analogous to that of a man trying to fix the date of his own birth by his own recollection. He cannot do so. He may work his memory backwards more or less distinctly to within a few years of his birth; but the date of his birth, and the circumstances of his infant years he can know only from external information. Very much so it is with the race as a whole. Regarding the commencement of the existence of humanity on the earth, and the subsequent period of what may be called its infancy, the mere memory of humanity is necessarily at fault. Two kinds of external information are depended on for filling up the blank—the information contained in the Biblical records of the creation and beginnings of the race; and any collateral information to be derived from geological researches. In short, history, at this its first stage, is merged in theology and geology; and the historian must have his conclusions given to him from beyond the field of his own science. Even so supplied, the conclusions are not numerous. Hitherto scientific geology has not even professed to be able to determine anything precise respecting the epoch at which the earth was first inhabited by man, or respecting the conditions of its first human inhabitants. And though the Hebrew Scriptures narrate the story of the creation of mankind, and of the fortunes of its first generations, with an exactness not offered by any other record—telling of the creation of an original pair on one part of the earth's surface, tracing the descent of successive generations from that pair, and describing a great catastrophe or deluge which destroyed all these generations, with the exception of a single family, who were left to re-people the world—commentators have found the utmost difficulty in settling the dates of these events, and in casting the whole narration into a chronological form. No fewer than two or three hundred different chronological schemes have been proposed, all based on calculations from the durations of the lives of the patriarchs and other numerical data furnished by the Biblical text. The shortest of these fixes the date of the creation of man at the year B.C. 3483; the longest at the year B.C. 6984—a discrepancy of more than 3000 years. The cause of these differences is the difference existing in the passages supplying the data, between the Hebrew text of the Old Testament and the Samaritan text and the Septuagint version. The chronological scheme commonly adopted in British tables of history, during the last two centuries, is that of Archbishop Usher, which fixes the epoch of the creation at B.C. 4004, and that of the deluge at B.C. 2348.

16. Even after passing beyond this first stage in the history of the world, and assuming whatever date for the deluge he considers most probable, the historian still encounters a large tract of time respecting which, unless he proceeds implicitly on the information given in the Hebrew Scriptures, he must remain totally silent. Availing himself, however, of those parts of the Mosaic record which relate to the re-peopling of the world after the deluge, he is able to

impart a specific character to this portion of universal history which would otherwise be wanting. He can conceive it as the period of the dispersion of mankind over the earth, and of their division into nations, tongues, and peoples. And here, whatever collateral light elucidating the Mosaic account he can bring to his assistance so as to vivify his idea of human activity during this tract of time, must be derived, not, as before, from the science of geology, but from the so-called science of ethnology. The object of this science is to trace the affinities of existing nations and tribes on the earth, by the study of their physiognomical and physiological analogies and differences, the analogies and differences of their habits and mental characteristics, and the analogies and differences of their languages—so as to exhibit their genealogical descent, and, if possible, refer them back to several original stocks, springing from one root. So far as the science has yet gone, its great doctrine is that, whatever independent reasons there are for believing in the original unity of the race, yet, for historical purposes, we must conceive to ourselves humanity at the dawn of the remotest age to which its own unaided memory can penetrate, as consisting, not of one perfectly homogeneous mass aggregated on one spot, but of several distinct masses already distributed more or less densely over the various quarters of the earth, and each broken into minor subdivisions. In accordance with this general doctrine of ethnology, various schemes have been proposed. One of the most distinct and convenient is that which avers that, as far back as ordinary records carry us, we find the earth, as now, divided out among three great stocks or varieties of mankind,—the NEGRO variety, having the African continent, or the greater part of it, for their home; the MONGOLIAN variety, spread over Northern, Central, and Eastern Asia, and possibly also expatiating in America; and the CAUCASIAN variety (this is an absurd and misleading name, but no proper equivalent has yet been proposed), possessing Western Asia, Europe, and the Mediterranean margin of Africa, and subdivided conspicuously into—(1.) the *Semitic* or *Syro-Arabian* family, clustered together in the Western region of Asia between the Tigris and the Mediterranean, and in the adjacent parts of Africa; and (2.) the *Japetic* or *Indo-European* family, more widely distributed in the remaining Caucasian parts of Asia and Africa, and over all Europe. According, then, to ethnology, the business of the historian proper commences at that point of past time at which, so far as we have information, the whole or the greater part of the earth's surface can be conceived as overspread by human inhabitants of one or other of the three main types still existing—Negroes, Mongolians, or Caucasians;—these human inhabitants thinly dispersed perhaps in some parts as mere loose and roaming tribes, but in others showing a tendency to aggregate themselves into those larger consolidations which we call nations. Accepting the common chronology, he may fix this point, if he pleases, at about B.C. 2000. At that far-distant period it does appear as if the earth had been tolerably well overspread by human beings arranged very much as they now are—Negroes in Africa, south of Mount Atlas; Mongolians in Central, Northern, and Eastern Asia; and Caucasians in Western Asia, Northern Africa, and Europe; and as if already at various points these human beings had begun to form themselves into compact national masses.

17. Coming down from this point, it is the business of the historian to keep his eye roving, as it were, round the globe, on the watch for the first authentic appearances of activity on the part of any of those national masses which, he has already concluded, have been silently and obscurely forming themselves at different points on its surface. It is with communities and nations that the historian has to deal; and not till the earth furnishes him with at least one such community or nation on which he can fasten his attention, does his work properly commence. Now, here again, there are differences among historians. Some believe that, by means of records and monuments, we can carry back the histories of certain ancient nations as far as B.C. 2000, if not farther; others, more sceptical, doubt if we can go as far back as B.C. 1000, or even B.C. 800, and regard the traditions of events and the lists of kings, &c., by means of which certain of the ancient nations pushed the retrospect of their own respective histories beyond that point, as nothing more than mythology and legend. Of late this historical scepticism has certainly been exaggerated; and the researches of archæologists seem gradually to be verifying the belief that, though on the whole the period between B.C. 2000 and B.C. 800 is the domain of mythology, yet even in that period we can lay down, as it were, a causeway of solid fact respecting certain individual nations. Without entering on this controversy (which, indeed, can only be conducted satisfactorily by discussing the antiquity of each nation apart), let us enumerate those nations which, by general consent hitherto, have been reckoned as the most ancient in the world, and, as such, the first objects of the historian's solicitude:—1. In the great expanse of Negro humanity, conceived as possessing Southern and Central Africa from time immemorial, the only native consolidation that presents itself in early times with even a possible claim on the separate attention of the historian is that of the so-called *Ethiopians*, of whom we hear as a very ancient nation lying far inland beyond Upper Egypt. 2. Glancing over the vast Mongolian tracts of Asia and America, the historian encounters glimpses here and there at an early period of nations or aggregates of tribes under the vague names of Scythians and the like; but the only permanent and important consolidation whose antiquity, as maintained by itself, he feels bound to investigate, is that of the *Chinese*. The Mexicans and Peruvians of America do not come into view till comparatively modern times; so that, to all intents and purposes, America is excluded from ancient history. 3. Passing to the Caucasian regions of Western and Southern Asia, Northern Africa, and Europe, the historian is struck by the difference which these regions present. Here, instead of one nation looming into his view, he finds a considerable number of distinct nations contemporaneously or in swift succession competing for his notice. First, far to the east, and to a great extent isolated from the rest, are the *Indians*, a primeval mass of the Japetic or Indo-European race, at least claiming a high antiquity, which, like that of the Chinese, requires to be investigated. Next, clustered together in what we have defined as the Semitic or Syro-Arabian portion of the general Caucasian area—*i.e.*, in Western Asia, between the Mediterranean and the Tigris, and in the adjacent parts of Africa—are a group of Semitic nations, among which the most conspicuous are the *Egyptians*, the *Hebrews*, the *Phœnicians*, and the *Assyrians* and *Babylonians*. Lastly, in the remaining Indo-European portions of Asia, a little later in point of time, Japetic nations, such as the *Medes* and *Persians* of the Iranian table-land, and the *Lydians* of Asia Minor, are discerned rising into importance; while, if the attention is extended into Europe, the beginnings of such nations as the *Greeks*, the *Etruscans*, &c., are at the same time visible.

18. The first portion or division of universal history, therefore, is that which collects and narrates all that can be ascertained respecting the origin and early transactions of these primeval consolidations of mankind on our earth's surface, *up to that point at which their histories cease to be separate, and appear to become involved, to some extent at least, in one general movement, the tracing of which may more properly be made the business of the remaining parts of history.* Now there can be no difference of opinion as to the geographical region in which this general movement presented itself—the first heavings, as it were, of humanity in its efforts to assume that common course which it was to maintain through-

out all time. It was not in Negro Africa, it was not in Mongolian Asia, it was not in Japetic Europe; it was, beyond all question, in that portion of Western Asia (adjacent Africa included; and, indeed, the Nile was always accounted an Asiatic river by the ancient geographers) which we still think of most when we speak of "the Oriental nations," and in which, as we have just stated, a cluster of distinguished Semitic nations was in contact with one or two Japetic ones, or rather with the elements of such. Every schoolboy knows that the Indians and the Chinese, whatever their antiquity and importance, stand apart and isolated to a great extent from the regular course of ancient history, so far as we can trace it; and that the true beginnings of "world-history," as such, are to be sought for among the mutual conflicts of those famous nations clustered together in smaller masses on that portion of the East beyond or near the Levant, where, as Napoleon alleged, the human soul had ever throbbed most powerfully—the Egyptians, the Hebrews, the Phœnicians, the Assyrians and Babylonians, and the Medes and Persians. When we try to fix, however, the date or epoch at which we are to account the mere separate histories of these nations to have ended, and the general movement to have begun, there is greater room for difference. From the earliest times of which we have any glimpse, these nations, or at least the Semitic ones, were warring with each other, and making conquests. We hear of early Egyptian conquests, of early Assyrian conquests, and even of early Ethiopian conquests. The Assyrians, in particular, stand forth in our schemes of universal history as the first people who pursued a regular and known career, aiming at the subjugation and political combination of the elements that lay around them. In our traditional schemes of universal history we have presented to us three successive *Assyrian monarchies*—the first, beginning shortly after the period assigned to the deluge, and ending somewhere about B.C. 2000, when a conqueror, Ninus, extended it immensely so as to form a great empire, with Nineveh for its capital; the second, beginning at the date of this Ninus, and lasting till the death of a luxurious monarch called Sardanapalus, B.C. 876, when the empire was dismembered; and the third, a monarchy of lesser dimensions, founded amid the ruins of the second, and lasting till the destruction of Nineveh, B.C. 606, by its subjects the Medes and Babylonians, under the Babylonian viceroy Nabopolassar. After this event, according to the same schemes of history, the unity of historic interest is centred in the so-called *Babylonian monarchy*, founded by Nabopolassar, and maintained and extended by his son Nebuchadnezzar and other successors, till the year B.C. 538, when the Medes and Persians, who had in the meantime risen to a position of some importance, captured Babylon, and began a new Oriental rule. Now the historian, after due investigation, may, if he chooses, date the commencement of world-history as such either from the last Assyrian monarchy, or from the Babylonian monarchy which superseded it. For many reasons, however, in the present state of our knowledge, it seems to us that it would be better to regard the general political movement of the human race, as beginning rather at the point where for the first time the mastery is seen transferred to a nation of the Japetic or Indo-European race—*i.e.*, at the overthrow of the Babylonian empire by the Medes and Persians, B.C. 538—and the establishment of that Medo-Persian empire, which, in the hands of Cyrus the Great (died B.C. 529) and his successors Cambyses (B.C. 529-521), and Darius (B.C. 521-485), became organized by farther conquests, in which the Lydians were included, into the vast combination known as the *Persian empire.* According to this view, Cyrus is the first hero of universal history, as such; and the Persians are the first to lead the march of the general historic evolution. The best arrangement, then, as we think, for the purposes of universal history would be one which would constitute in the first place a great division by itself, under the name of PRIMEVAL ANCIENT HISTORY; assigning to this division the duty of collecting all that can be ascertained respecting the beginnings of those early consolidations of the race which we have enumerated, and of narrating their several histories, either in parallel lines where they keep separate, or otherwise where they commingle, on to that point (say the reign of Darius) where they merge in the authentic unity of the Persian empire.

19. Beyond this, the historian's course is so clear that it may be indicated briefly. The Persian monarchy, including all Asia from the Indus to the Ægean, precipitated itself upon Europe, thus determining that the world's pedigree should be continued through the Japetic nations of the West. When Darius (B.C. 490) attempted to conquer the Greeks, the earth changed its historic centre. The Greek and Hellenic race, already so nobly prepared for its honourable office (and, for the purposes of the universal historian, all Grecian history anterior to B.C. 490 would here come in by way of retrospect, including any authentic matter that might be ascertained respecting the Trojans and other Pelasgian nations of Asia Minor and Southern Europe), was inaugurated into that office at the battle of Marathon; and for a considerable period onward the main thread of universal history has to be traced in the *History of Greece.* This history, of which the Græco-Macedonian dominion of Alexander the Great and his successors may be viewed as a prolongation under different conditions from those which existed while the Athenians, the Lacedæmonians, the Thebans, &c., acted as separate or as confederate states, closes with the appearance of the Romans as a conquering people out of Italy. Transferring his regards to this imperial people (and here again the anterior of Italy itself, while the Romans were being cradled in it, as well as the by-past histories of the Carthaginians and other Mediterranean nations left out of the Persian empire, and of that of the Macedonians, but about to be included in that of the Romans, will be best managed by way of retrospect), the universal historian has a clear path in *Roman History*, as far as the fourth or fifth century of our era; at which point, by general consent, ANCIENT HISTORY closes, in the disintegration of the Roman empire by the northern races, and the commencement of a new order of things.

20. Onwards from this point there is no theoretical difficulty, though the complexity of the movement, arising from the multitude of the nations taking part in it, may occasion a practical one to the historian. MODERN HISTORY, commencing say at the year 395 of the Christian era, when the Roman empire, on the death of Theodosius, was permanently divided into the two empires of the West and East, consists, as all know, of two parts,—*Mediæval History*, which carries on the general movement from A.D. 395, at which time the empire of the West was already tottering before the attacks of the Goths and other Germanic peoples, to A.D. 1453, when the taking of Constantinople by the Turks put an end to the long-surviving empire of the East; and *Recent Modern History*, carrying on the movement from A.D. 1453 to the present time. Under both these heads, by keeping up with due skill the distinction between the "History of the West" and the "History of the East," the historian is able to include everything in its proper place. Thus, under *Mediæval History*, the "History of the West," commencing with a survey of the Roman empire of the West at the period of its decay, then passes on to an account of the Germanic peoples who were to be its destroyers, details the actions of these peoples in disrupting the empire, and forming the new societies of France, Italy, Spain, Britain, Germany, &c., and conducts the conjoint story of these societies through the eras of Charlemagne, Hildebrand, &c., to the eve of the Reformation; while the

"History of the East" (the necessary connections being exhibited throughout) includes the history during the same period of the Byzantine empire, the related histories of the Arabs, Tartars, and Turks, and to some extent that of the Slavonian nations. So, under *Recent Modern History*, there may be assigned to the department of "the West" all the transactions, national and international, of the occidental nations of Europe since 1453, including, as an important part of the story, an account of their colonizing energies as exhibited in Africa, Asia, and, above all, in America—now for the first time added to the theatre of history; while to the department of "the East" may be assigned the narrative of Turkish domination, and of interrupting Persian conquests, together with the necessary survey up to the present hour of the rest of native Asia.

21. It may be well to exhibit in a tabular form the divisions of universal history as they have been sketched in the foregoing paragraphs.

HISTORY consists of

- I. ANCIENT HISTORY, consisting of …………
  - I. Primeval Ancient History, including, after a sufficient ethnographical survey of the globe at the earliest possible date, the several histories of the most ancient known nations, such as the Ethiopians, the Indians, the Chinese, the Egyptians, the Hebrews, the Phœnicians, the Assyrians and Babylonians, the Lydians, the Medes and Persians, together with an account of the mutual actions of some of these upon each other, which resulted, after a preliminary era of *Assyrian* and *Babylonian* domination, in the formation of the *Persian empire* (B.C. 538–485).
  - II. Classical Ancient History; subdivided into ……………………………………
    - 1. *Grecian History*, beginning with the necessary retrospect of the history of the Grecian lands, and of the lands related to them prior to B.C. 490, and then carrying on the general movement, first through the true Hellenic, and then through the Græco-Macedonian era, as far as B.C. 168 or thereby.
    - 2. *Roman History*, involving a like retrospect of Italy and of the parts of the Mediterranean world related to it (Carthage, Spain, &c.), as far as B.C. 168, and then carrying all the historic world on, directly or by implication, as far as A.D. 395.
- II. MODERN HISTORY, consisting of …………
  - I. Mediæval History; from A.D. 395 till A.D. 1453, divisible into……………
    - 1. *The Mediæval History of the West*, including an account of the action of the Gothic races on the Roman empire of the West, and the histories of the societies of France, Italy, Spain, Britain, Germany, &c., formed by that action, severally and conjointly, till the eve of the Reformation.
    - 2. *The History of the East*, including that of the Byzantine empire, and the related histories of the Arabs, the Tartars, the Turks, and also, so far, of the Slavonians.
  - II. Recent Modern History; from A.D. 1453 till the present time, also divisible into ……………………………………
    - 1. *The Recent History of the West*, continuing that of the occidental nations of Europe severally and conjointly since 1453, and exhibiting these nations, and especially the Anglo-Saxon race, expatiating in Africa, Asia, and America, and there, and most notably in the last, grafting new nationalities and new forms of civilization.
    - 2. *The Recent History of the East*, comprising that of the Turkish empire, and whatever references to China and other districts of Asia are necessary to complete our view of the present state of the whole world.

Of course far more minute subdivisions than are indicated in this table would be necessary to make it perfect. Thus Roman History is divisible into the periods of the *Commonwealth* and the *Empire;* Western Mediæval History is divisible into the *Frankish Period* and the *Feudal Period;* and the History of the *United States* and of other American formations stands out as something more than a mere appendix to the recent history of the West—a kind of new development of humanity in its course towards the future.

22. The historian, then, as distinct from the poet or the philosopher, is the man who, having some such scheme of the whole past course of humanity in his mind, can fill it up with a minute and accurate knowledge of all the facts constituting its separate parts, so as to embrace the whole career of the world, from the primeval period of darkness onwards through classical, mediæval, and modern times, in one vast continuous recollection. Such men there have been and are, though naturally, as the world goes on, their number must become smaller and smaller. Niebuhr was such a man; and indeed all great scholars of ancient or modern

times have been men of this class. The terms "learning" or "erudition," as we now use them, are, in this sense, but synonyms for historical knowledge, or rather for parts of that knowledge; for what are our philologists but men of colossal memories for certain orders of those facts which universal history includes?

23. But is the historian merely a man of overloaded memory? All that enormous store of facts having been slowly acquired and treasured up, do they lie in his mind with no more of cohesion than is involved in the mere order of place and time in which they came into being? Certainly they ought not to do so; and it is to the discredit of the person pretending to be a historian if they do. Memory, as we have said, is but the name for a certain mood of the total mind; and, unless therefore the facts of universal history are themselves such as to be positively incapable of any other organization than that implied in the accidental order of their individual juxtaposition and succession, there is no reason why history should not be something more than a mere vast register of dates and particulars. We invariably assume that it is something more. We speak of "the lessons" of history. Washington, when the future organization of the United States was being discussed, drew up a list of all the most notable confederacies of states known in the world, in order that, by studying the constitution and history of each, he might assist his conclusion as to the best constitution for the thirteen American colonies. And so every day we appeal to precedents, and draw inferences from the past as to the proper course in existing social and political emergencies. We even define history as "philosophy teaching by example." And what does all this indicate but the universality of the belief that, as there is a certain invariable order of nature in the physical world, so there is in the historical or social world; that in this world also like effects must follow like causes, so that, when circumstances are the same, we have a right to infer that results will be the same? Generalizing this belief, we speak of the "course of humanity," of "the career of the race," of "the movement of human affairs," and the like; all which phrases imply that certain conclusions as to the nature and connexions of the facts recollected are involved in the recollection.

24. Speculations having reference to the mutual connections and the general bearing of the facts of past history as a whole, form what is called *The Philosophy of History.* There has always been some such philosophy. The ancient Greek historian Thucydides, for example, not only relates facts, but reasons about them; that is, he is fond of referring historical effects to what he considers their causes, and of drawing general conclusions from the story which he is telling. On this account he is often called a philosophical historian. But all the ancient historians, not mere annalists, are to some extent philosophical, in the same sense; that is, they mix reflections with their narrative, and recognise connections between causes and effects. Every one of them proceeds on the notion that, where social circumstances are similar, social results will be similar. Such men as Aristotle went much further, and tried, by studying the constitutions of different communities, and their effects on their prosperity, to establish general principles as to the best forms of government for a body-politic, and the probable destinies of this or that state. Moreover, the religious mind in all ages has always recognised a certain order in the affairs of nations, a certain course and tendency in the lives of communities as well as in the lives of individuals. Every ancient community fancied its fortunes to be under the guardianship of some deity or deities, the action of whose will and purpose might be discerned in everything that befel it. In modern times the notion of a Providence regulating human affairs, and guiding the destinies of nations, has been familiar to all noble and great minds. "What are all our histories, and records of actions of past times," said Cromwell, "but God manifesting himself that he hath shaken, and tumbled down, and trampled under foot whatsoever He hath not planted?" And in the Christian view of Providence this notion takes a much more specific form; so that all history is viewed as the gradual unfolding of that Divine scheme of which Christianity is the essence.

25. But while a philosophy of history in this sense has always existed, the idea of history as an inductive science—the idea of regarding the phenomena of society as happening according to certain fixed laws, which may be ascertained to some extent by observation, like the laws of physical nature—is comparatively recent. The honour of first distinctly expounding this idea is generally assigned to an Italian thinker, Vico (1688–1744), who in the year 1725 published a work entitled *Scienza Nuova*, or "Principles of a new Science." In this work, which, with much that was obscure and vague, contained many brilliant perceptions, Vico developed the notion of the possibility of arriving at fixed laws of social growth and decay by observing the actual course of communities. He was very sanguine in his hopes of the extent to which this science might be carried. Making it his fundamental maxim that when circumstances are the same results will be the same, he believed that after a sufficient study of the past we might be able to predict the future so certainly that we might even calculate the duration of a nation's existence. He believed that by an examination of the histories of past states it would be possible to find out the necessary and eternal career through which, with certain variations, all states must pass; and he believed that in the same way the law of the movement of humanity as a whole might be ascertained. Subsequent philosophers, both in France and in Germany, some of them without any knowledge of Vico's speculations, pursued a similar train of thought. Montesquieu, for example, did much by his inquiries into the effects of climate and the like upon the social forms and habits of nations (1748), to accustom people to a scientific manner of looking at history. Herder also, in his *Ideas towards a Philosophy of History* (1774), helped forward the same speculation. But perhaps the broadest and deepest assertion during last century of the possibility of reducing the phenomena of society and history, as well as any other kind of phenomena, within the scope of a science, was that made by Kant in his Essay entitled *Idea of a Universal History in a Cosmopolitical Point of View* (1784). The following are one or two sentences from this Essay:—"Whatever be the conception of the liberty of the will which one may form in a metaphysical point of view, its phenomena—human actions—are determined, just as well as every other kind of natural events, according to universal laws of nature. It is to be hoped that history, which is occupied with the narration of these phenomena, will, when it contemplates the play of the liberty of the human will on the large scale, discover a regular course in it; so that what seems irregular and capricious in individual cases shall appear, as regards the whole species, as a continually progressive though slow unfolding of its original tendencies. Thus marriages, births, and deaths, seem—as the free-will of man has so great an influence on them—to be subject to no rule according to which their number can be previously determined by reckoning; and yet the yearly tables of them in great nations evince that they happen just as much according to constant laws of nature as the equally inconstant rains whose happening cannot be determined singly, but which on the whole do not fail to maintain the growth of plants, the flow of rivers, and other dispositions of nature, in a uniform, uninterrupted course. . . . . One cannot forbear a certain indignation at seeing the actions of men represented on the theatre of the great world; and, notwithstanding the wisdom of individuals appearing here and there, at finding

at last everything in the gross composed of madness, of childish vanity, and frequently of childish wickedness and rage of destruction. There is here no expedient for the philosopher but that of endeavouring to discover *a design of nature* in this nonsensical course of human affairs; so that a history of creatures who proceed without a plan may nevertheless be possible, according to such a determinate plan of nature."

26. The idea thus propounded by a few of the most original minds of last century has since passed into the general belief of all thinkers, so that all are now prepared to regard the term history as including not merely the vast miscellany of the individual facts of the past, but also whatever body of truths or principles relative to the action of men in societies can be obtained by a sound study and fair generalization of these facts. Hitherto, however, notwithstanding the prevalence through Europe, and more especially in France, of a spirit of historical generalization arising from this new view of history, the body of such ascertained historical truths or principles is very small. The cause of this is the vast complexity of the facts which are the objects of social science. If in the science of chemistry we are still only in the process of arriving at laws and principles, how can we expect to be far advanced in the task of discovering the laws and principles of phenomena so much more complex than those of chemistry as are presented by human society.

27. Certain conclusions more or less certain respecting the laws of social equilibrium and social movement we have nevertheless arrived at. The principles of political economy, for example, so far as they have been established by those who have prosecuted this department of inquiry during the last century, may be regarded as inductions or generalized expressions of social facts of a particular order —those relating to social wealth—and, as such, may rank as a solid contribution to our future body of historical truths. Some conclusions of other kinds from national statistics may also be included in the same body. Nor are we without some generalizations of a more extensive nature respecting the course of human history as a whole. For example, on referring to the sketch given above of the leading divisions of universal history, certain conclusions are so obviously implied in the facts themselves that they cannot fail to suggest themselves as facts too. One such fact is, that whereas the first theatre of true historical action was limited to a small portion of the earth's surface, the whole tendency of events has been to widen that theatre, so that now the whole globe of the earth almost presents the characteristics of social organization, and is capable of a certain approach to simultaneous consciousness and simultaneous purpose. Connected with this fact is the circumstance that the agency by which this gradual social conquest and tillage, so to speak, of the globe has been effected, has *hitherto* been chiefly in the hands of the so-called Caucasian portion of humanity, and, within that portion, perhaps chiefly in the hands of the Japetic or Indo-European nations. Connected with the same fact is the interesting circumstance that the geographical order of the process has been on the whole from East to West. First the primeval Oriental fermentation affected Western Asia as far as the shores of the Mediterranean; then the Persian dynasty extended the historic stage to the Ægean; after that the Greek or Græco-Macedonian supremacy extended it to the Adriatic; next the Romans extended it to the Atlantic. Against this barrier human energy, as it were, kept dashing itself for fifteen centuries, till at last the pent-up, westward-striving force found vent, and, like the flash from a surcharged cloud, the spirit of Columbus shot to a new hemisphere. Nor does the process seem yet at an end. The westward tendency of the Americans on their continent, and the Anglo-Saxon colonizations going on in the Pacific Islands, point to the ultimate completion by history of the great circle of the earth's circumference.

28. These, however, are but generalizations from the facts of the history of the race in its obvious external aspect. Our notions as to the nature of the internal movement or course of humanity are much more vague and conjectural. Many speculative minds have propounded what they have called a "formula" of history. Vico imagined that the course of humanity was cyclical—*i.e.*, that the world, after going through a certain number of stages returned to the same point or the same set of conditions as at first, and then went through the same stages over again; and he was disposed to regard all modern history, from the date of the dissolution of the Roman empire, as a repetition, Phœnix-like, of the history of the world up to that date. Abandoning this cyclical theory, most thinkers since have adopted, as more natural, the theory of continuous *evolution* or *developement*, until all the elements of humanity shall have been finally harmonized and co-ordinated. The popular form of this theory is that which expresses itself in the word "progress"—a term which, in so far as it implies a progress from worse to better, has come into use only since the French Revolution. Less exceptionable in some respects than this term, as it is generally understood, as not so much begging the question of the absolute *character* of the evolution, is the equally popular term "civilization." The historic process, it is said, has been one of the gradual "civilization" of the race. But in what does this "civilization" consist? In a gradual change in the mode of human thought, and consequently in the mode of human activity, say some—*i.e.*, in the gradual exchange of the superstitious mode of thought for the rational or scientific, and in a gradual exchange of the occupations of war and bloodshed for those of peaceful industry! In the gradual destruction of all that interferes with individual freedom, in a gradual tendency to civil and political, if not to social equality, say others! In the gradual preparation of the human species externally and internally, said Kant, for a certain cosmopolitical organization of state which shall supersede that of nations, empires, &c., and embrace them all! In all these speculations and prognostications we can discern at least fragments of the truth. We do recognise a certain change in the mental habits of the race, depending on the growth of scientific knowledge, during the past career of the world; and along with this a change of external manners and occupations. Peaceful industry does seem on the whole to be superseding war. We do see also a gradual diffusion of privileges of all kinds; a gradual tendency to the equalization of civil and political rights; a gradual evolution of freedom for the individual human being. The abolition of personal slavery is one form in this process; the extension of the rights of citizenship in modern states is another. Lastly, we do see, with Kant, a certain tendency of humanity within, keeping pace with its geographical extension and the increase of its means of locomotion and intercommunication externally, to a possible organization which may include the whole of it. But, on the whole, the body of such conclusions which we can rank among the ascertained and positive truths of history is very small; and though all the best minds of the world are now agreed that sound politics as an art can be founded only on the scientific study of history—in other words that politics is but applied history—the confusion of political doctrines and creeds which the present state of the world presents, proves how far we are from being able to turn this maxim to any efficient account.

II. HISTORY CONSIDERED AS A FORM OF LITERARY COMPOSITION.

Our remarks under this head, necessarily very brief, may be best presented in the shape of a view of some of the leading requisites of a historian, as distinct from a practitioner of other kinds of literature:—

1. First then, to success in historical literature, it is ne-

cessary that the writer should be a man of the historical cast of mind. This is, in some sort, a truism, but it is a truism worth attending to. We all know that there is such a thing as a poetical cast of mind, and that there is such a thing as a philosophical cast of mind; but we do not so often take account of the fact that there is also a historical cast of mind, and that, just as we speak generically of "the poet" and "the philosopher," so, in the same generic sense, we may speak of "the historian," as a being intellectually distinct from either. And what is the characteristic mental habit of the historian, as distinct from the philosopher and the poet? We have already conveyed the answer to this question in our preliminary definition of history. The historian is the man who tends by preference to fall into that mood of the total mind which we call memory or recollection, as distinct from that mood which we call reasoning, or that mood which we call imagination. Such men there are. There are men to whom it is a positive constitutional pleasure to recall the memory of concrete facts and circumstances amid which they have once been—to remember persons, places, incidents, costumes, physiognomies, and physical and social particulars of every description. They delight in reminiscence and anecdote absolutely for their own sake, and amuse themselves when alone, and others when in company, by rehearsing anecdotes and reminiscences. Generally, if there are opportunities, this taste, where it exists, is extended and heightened into a liking for the antique—a passion not only for the *contemporary*, but also for the *past* concrete. It becomes a delight to gaze at an old bridge or an old building, or a spot on a heath marked by a great stone, and to know that, at such and such a time, such and such an event occurred there. Sir Walter Scott was pre-eminently such a man; Herodotus also was pre-eminently such a man. Scott and Herodotus, therefore, may stand as types of the historical cast of mind; and it is all the better to take Scott as such a type, because in him the important fact is exhibited, that a man may have the historical habit of mind strongly developed, and yet may not be a man *exclusively* of this habit. In Scott, the historian and the poet existed in remarkable combination; he imagined while he remembered, and he remembered while he imagined; he has left us both histories and poems. A combination sometimes found, and no less interesting, is that of the philosopher or speculative thinker with the historian. Sir William Hamilton, for example, is a man of colossal erudition in the history of opinion, as well as of extraordinary power as an original philosopher; and no man is so fond of casting his disquisitions into the historical form, or of appending to his disquisitions their historical elucidations. Not a few cases, also, may be found in which men, though not primarily or specifically thinkers—not themselves inclined to propound or to advocate systems of doctrine—have yet such an interest in old modes of thinking simply as facts, that they will exercise their speculative faculties to any extent in mastering the most abstruse parts of Plato, or Aristotle, or Leibnitz, or Berkeley. Sometimes, indeed, a man's historical taste chiefly shows itself in his liking for facts of this order, and neglects such concrete antiquarian details as those of costume, physiognomy, and the like. And here, of course, it is to be noted that, though a relish for all orders of antique facts is desirable in the historian, yet it is well for his completeness as a historian that his relish for certain orders of facts should be in proportion to their degrees of historic value. History, in its typical sense, being the record of the public life of a community, the historian will be the more perfect, in proportion as the facts and circumstances in which his memory delights are those in which the public life of communities is best represented and embodied. What these are we have attempted to indicate. The typical historian ought at least to have a certain interest in *political* forms, and in the recollection of *political* events.

2. The historian ought, in the second place, to be a man of the strictest veracity. But there are two kinds of veracity. There is what may be called passive veracity, or that honourable disposition of mind which makes a man himself refrain from falsehood. This, of course, the historian, as well as every man, whatever be his calling, ought to possess; and whosoever does not possess it ought to be chased and hooted from the field of history. Misrepresentation for a purpose, or for the sake of effect, when at all conscious, is but a variety of the same deliberate lying. But many men who are passively veracious are not equally conspicuous for active veracity—that is, for the disposition to spare no labour of research in order to clear out falsehood from whatever story they are dealing with, and arrive at the truth. This disposition the historian must also possess. The very word ἱστορια implies active research. Writers of history differ very much in this respect. Some men, rather than set down a date falsely, will spend weeks in trying to ascertain it, and, if they fail, will say so; others are far less scrupulous. David Hume, with all his merits as a historian, is accused of extreme indolence in the matter of research; and a story is told of the French historical writer, Father Daniel, to the effect that he "declared the study of state papers to be a task more of fatigue than of use," and that, "being shewn in the Royal Library at Paris a vast collection of original manuscripts relating to the history of France from the reign of Louis XI., he spent a single hour in turning over the volumes, and then declared that he was fully satisfied." Perhaps the French sin, in this respect, more than the Germans; though there are many splendid exceptions. As regards our own historical literature, no one who has not a large acquaintance with it can know on what a small basis of truly original research the vast pile rests, and how many works there are enjoying some celebrity (and that not as honest compilations, but really as histories), which, if examined, would turn out to be but the fourth or fifth dilutions of previous works, themselves successive dilutions of some one work, the author of which did go to original authorities. But even in using what are called original authorities, the historian has room for the exercise of research. He has to guard against two sources of error—the wilful falsification of dishonest men near the fountain-head; and the operation in all states of society and in all companies and communities, but especially in early times, of what is called the mythical or legendary tendency in human nature—*i. e.*, the tendency to imagine incidents corresponding to feelings, and then to confound the incidents so imagined with actual fact. The practised historical sense or understanding, accustomed always to weigh evidence, is on its guard against both sources of falsehood. It is only in comparatively recent times, however, that the immense importance of attending to the second source of falsehood has been appreciated. Every one knows what a revolution in the accounts of the early histories of all nations has taken place since Niebuhr first applied the theory of the Mythus to the early history of Rome as believed by the Romans themselves and recorded by all their writers.

3. *The value of any history will be in proportion to the general depth and greatness and nobility of the historian's own nature as a whole.* This ought never to be forgotten, but it is very apt to be forgotten. Seeing that the business of the historian is to recover and narrate actual facts, it is sometimes hastily concluded that it is indifferent by what kind of mind, provided sufficient diligence is used, the process of recovery and narration is gone through. We have already virtually opposed this idea. Memory or recollection, we have said, is but a mood of the total mind; and hence the character of the memory or recollection will vary according to the entire constitution of the mind which remembers or recollects. As the imagination of the poet, as the understanding of the philosopher, follows in some subtle

way the law of the total personality—so that there are poets of grand, and poets of mean imaginations, thinkers of high, and thinkers of grovelling understandings, in like manner also the memory follows the law of the personality, and there are historians of superb and historians of petty memories. It depends on the total character of the historian, in the first place, what kinds of past facts will adhere to his memory, or interest him in his researches; and, in the second place, what intensity of meaning he can find in these facts, what breadth of significance he can impart to them. Even contemporary facts, respecting which no research is necessary, are not the same things to different minds. The death of the Russian Emperor, Nicholas, for example, was externally or *per se* the same identical event to all; and yet, as that intelligence was swept abroad over Europe, it became, so to speak, a thousand different "facts" simultaneously to the thousand different minds which it touched. And so, under more complex conditions, with the facts of past history. "The greatness of the historical literature of any period therefore" (if we may here repeat what we have said elsewhere), "or the greatness of any individual as a historical writer, depends ultimately on the general richness of the human nature which that period or that individual brings to the investigation of the past. A mass of facts, in themselves unalterable, is the material of every history, but it depends on the spirit which the historian breathes through the mass what the history shall be. Not only may history be, but necessarily every history is, saturated with the spirit of the historian in all its peculiarity. History is, and can be nothing else, than the past represented by the present; what the representation, therefore, in any case shall be, depends, no doubt, partly on the actual matters represented, but at the same time also on the power which represents them. History, accordingly, is a form of literature affording scope for genius, for high moral purpose, for original and inventive power, equally with any other. Herodotus, Thucydides, Tacitus, Voltaire, Gibbon, Hume, Robertson—do we not feel that in the hands of such men historical writing became, as much as any other could, a medium through which they could perform the whole function of their being, both in so far as it was good and in so far as it might be bad? Shut up a hundred different historians in as many different rooms, each with the same materials for an account of the same selected transaction; and then, necessarily, the hundred narratives that will be produced at the end of any given period, although all so far identical in substance, will each bear the stamp of the author's individuality—of his acquired knowledge, his prevalent habits of feeling, his whole philosophy of life." Applying these remarks, one might classify known historians according to certain broad differences of the human constitution generally. Some historians are poetic and pictorial, others are speculative and philosophical, others are stern and severely judicial; some are grave and earnest, others are light and satirical, in their manner. On the whole, the historical cast of mind may be associated with almost any conceivable combination of other mental habits and faculties; and almost all varieties of character and intellect may find congenial scope in history. The persons perhaps whom it would be most desirable to exclude from this department of literary exercise are men labouring under the influence of special polemical crotchets. Such men ought to write pamphlets, and take their illustrations from history, but ought not to write formal histories.

4. The historian is bound to be acquainted with all those general conclusions or inductions relating either to social life as it may be now observed, or to the order of social events in the past, which may be considered so far established as to constitute historical or political truths. The body of such truths, we have said, cannot yet be said to be numerous; but so far as they exist, they ought to be known to the historian, and to form part, so to speak, of his historical creed. Thus, if there are any generalizations that can be esteemed sound and valid as to the invariable course of nations, or as to the successive phases of human thought in the past, or as to the tendency of humanity as a whole, or as to the influence of climate and other physical causes on social and political conditions, these ought indubitably to be carried by the historian along with him, as so much fixed science, in his own particular researches. It is needless to point out how this applies to the truths of political economy, as one branch of social science, so far as these are accepted and agreed upon.

5. The historian, over and above the foregoing requisites, must have acquired for himself by study and practice a certain very complex *art of historical writing and arrangement.* The full illustration of this important matter is beyond our present limits. Suffice it to say, that, though there are many varieties of historical art—though the art of a Gibbon, for example, is very different from that of a Macaulay—yet the essence of all good historical art, in the case of what we have called the typical form of history, seems to lie in a distinct recognition by the historian of the fact that, in writing a history, he is writing the life of a nation. Just as, in biography, the essential notion is that of an original organism moved through certain sets of circumstances which act upon it and modify it, and just as the biographer has always to keep in mind this distinction between the man as he is at any moment, and the circumstances through which he is passing at that moment, so it is in history. Here, also, there is always a certain already existing organism—*i.e.*, the total social being and constitution of the nation up to the moment under notice; and there is, then, farther, the set of new conditions through which that organism is about to pass. Translate this into the language of practical art, and it may be said that the historian has at every point to keep the balance fair between the two processes of description and narration—description being the process which takes account of facts as they exist contemporaneously, and narration the process which follows facts in their sequence. In other words, good historical art consists of a judicious blending of descriptive surveys of social states with narrative accounts of social transactions. (1.) *Historical description.*—It has always been accounted part of the business of a historian to give broad descriptive surveys of what are called "states of society," "states of civilization," and the like. Perhaps, however, it might be to the advantage of history if a greater proportion of the whole duty of the historian were accomplished by means of this art of contemporaneous surveys. For example, there is no method according to which, as we conceive, the history of England could be better written, than some method by which a great part of the vast work might be achieved in a series of "cross-sections," or broad contemporaneous surveys of the whole life and civilization of the English nation at important and well-selected epochs of its progressive existence; the intervening periods between these "cross-sections" being filled up by the plan of narration. In general, historians confine themselves too much, and especially when treating of remote periods, to the narrative plan. As examples of the other plan of contemporaneous description, we may refer to Mr James Mill's elaborate account of the civilization of the Hindus in his *History of British India*; and to Mr Macaulay's well-known survey, on such different principles, of the state of British society prior to the Revolution of 1688. In such cases as these, historians, of course, proceed on a certain instinct, teaching them what orders of facts ought to be included in such a survey to render it complete. Mr Mill's instinct in this case was founded on his previous habits of political criticism and analysis; Mr Macaulay's was more purely artistic. Science, however, might here come to the assistance of art. It would be possible, we

think, once for all, to draw up, so to speak, a schedule of the essential particulars that ought to be known about any nation, in order to complete the survey of its civilization, and to arrange these particulars in their proper order, commencing say with the geographical and geological features of the country which the nation inhabited, and proceeding on to the most intricate parts of the national polity; and then, the best historical artist would be the one that, purposely or instinctively, should best fill up the schedule, or comply with its requisitions. (2.) *Historical Narration.*—Not to mention other matters under this head, we would only point to the importance in every narration of regularly *beating time*—*i. e.*, not only accurately inserting dates, but distinctly keeping the flight of time, day by day, month by month, and year by year, present in the imagination of the reader. Historians differ very much in this respect. Some are so lax that the reader hardly knows, until he makes the calculation for himself, how long the war he is reading about has already lasted, or what is the age of the general.

6. It only remains now to pass our eye along the course of universal literature, so as to enumerate those who, according to the general judgment of their own and of other nations, have distinguished themselves most in the department of history, and may therefore take their places in the list of the chief historians of the world:—

I. Primeval Historians.—Here the sacred historians of the Old Testament stand alone; and it is from them, in conjunction with the retrospective narratives of some of the Greek historians, especially Herodotus, and in conjunction also with archæological research, as in the investigation of the monuments of Egypt, and of those recently disinterred at Nineveh (and probably the same process may be yet applied to many others of the famous sites of ancient oriental civilization), that all our historical knowledge of primeval times is to be derived.

II. Classical Historians.—(1.) *Greek Historical Writers.*—This list is headed by Herodotus, the "Father of History," and a man whose name the whole human race is bound to hold in reverence, as that of one of the truest men of genius that ever lived. Then come, in order, Thucydides, Xenophon, Polybius, Dionysius of Halicarnassus, Diodorus Siculus, Arrian, and Plutarch; to whom may be added the Jewish historian Josephus, and the ecclesiastical historian Eusebius. (2.) *Latin Historical Writers.*—The most illustrious names in this list are those of Sallust, Julius Cæsar, Livy, Suetonius, and Tacitus; but other minor names might be added. Livy and Tacitus are pre-eminently the Roman historians.

III. Mediæval Historians.—(1.) *Latin Historians of the Western Nations.*—A vast proportion of the mediæval history of the western nations is buried in the legends or lives of the saints; but each nation had its independent chroniclers of political and ecclesiastical events, some of whom rose to the dignity of historians. Among these Gregory of Tours, who lived in the Merovingian times of the Frankish monarchy, and wrote an *Ecclesiastical History of the Franks*, deserves mention. There were also some notable chroniclers and biographical writers in the age of Charlemagne; and France produced some good contemporary historians of the Crusades. No country, however, was richer in historical writers during the middle ages than England. The venerable Bede, in the eighth century, was a man of true historical genius; and to the twelfth, thirteenth, fourteenth, and fifteenth centuries, belonged a series of able Latin chroniclers, of whom the most distinguished are Geoffrey of Monmouth, William of Malmesbury, Matthew Paris, Higden, Knighton, and Walsingham. The Scottish historian Fordun belongs to the fifteenth century. (2.) *Byzantine Historians.*—Under this name is included a considerable series of rather petty writers, natives of the Greek or Eastern Empire, from its separation from the West to its final destruction by the Turks. Among these were Procopius, Agathius, Menander, John of Epiphania, Theophylactus Simocatta, and the well-known Anna Comnena, daughter of the Emperor Alexius Comnenus. (3.) *Oriental Historians.*—In the remarkable development of the literary genius of the Arabs, consequent upon the impulse given to the race by Mohammed, history was not neglected. The Spanish Arabs had their special historians; and Turkish and Persian historians of the middle ages are also mentioned. Of Indian and Chinese historians we can say nothing, though these were not wanting.

IV. Modern Historians.—Since the rise of the vernacular literatures of the various modern nations of Europe, we are able to count a number of distinguished men in each, who have devoted themselves, some exclusively, others in part, to historical writing, and have there won their literary laurels. (1.) *English Historical Writers.*—Among these, passing over such valuable early chroniclers as Holingshed and Stow, and such metrical historians as Barbour and Wyntoun, may be mentioned—Knollys; Sir Walter Raleigh, in virtue of his *History of the World;* Bacon, in virtue of his *History of the Reign of Henry VII.;* and Shakspeare himself, in virtue of his historical plays, called, by himself and his contemporaries, *Histories.* Next (passing over minor names) may be mentioned the party-historians Clarendon and Burnet; succeeded by the splendid series of British historical writers of the eighteenth century—Swift, Defoe, Hume, Smollett, Warton, Lord Lyttelton, Lord Hailes, Dr Henry, Dr Robertson, and Edward Gibbon. All in all, Gibbon, in virtue both of the immensity of his task, and of the admirable industry and art with which it was executed, has the highest place assigned to him among British writers of history; and he is in many respects, though not in all, the type of a great historian. After the time of Gibbon no man had a more powerful influence on the historical literature, not of Britain alone but of all Europe, than Sir Walter Scott; all the efforts of whose genius were, in a sense, historical, and some of whose works, though not his best, were expressly histories. Historical writers contemporary with Scott, and each having characteristic excellences, were James Mill, and Mackintosh; and, coming down to our own generation, what a constellation in our historical literature (we shall not attempt to classify the stars according to their magnitudes) is represented by the names of Tytler, and Arnold, and Alison, and Napier, and Macaulay, and Carlyle, and Thirlwall, and Grote. Belonging to the same constellation, in virtue of the language in which they write, are the American historians, Washington Irving, Bancroft, and Prescott. (2.) *French Historical Writers.*—In this list, which may be considered to begin with De Ville Hardouin and De Joinville in the thirteenth century, the greatest names in times anterior to the Revolution are those of the vivid and and picturesque Froissart, Philip De Comines, Thuanus (who, however, wrote in Latin), D'Aubigné, Brantome, Perefixe, Sully, the Jesuit Daniel, Vertot, Rollin, the illustrious Bossuet, Basnage, Fleury, Rapin, St Simon, Du Cange, Voltaire, Montesquieu, Raynal, and Rulhières; to whom, since the Revolution, have been added, besides many of inferior note, such men as Sismondi, Barante, Guizot, Capefigue, the two Thierrys, Mignet, Michaud, Thiers, Michelet, Merimee, Lamartine, and Louis Blanc. In no department of literature has France recently been so prolific as in history; and perhaps, on the whole, no other country has such a cluster of eminent living historians. At the head of what is perhaps the most characteristic school of French historians—*i. e.*, those who are distinguished by their passion for historical generalization, as well as their mere powers of narration—stands M. Guizot. (3.) *Italian Historical Writers.*—Of these the chief are, in the sixteenth century, Macchiavelli and Guicciardini, with some lesser men, such as Varchi, Bembo, Sarpi, and Davanzati; and in more recent times, Davila, Maffei, Muratori, Tiraboschi, Botta, Micali, Bossi, Colletta, and Pignotti. (4.) *German Historical Writers.*—Passing the Magdeburg centuriators and other ecclesiastical historians of the sixteenth century, who wrote in Latin, we have to come down to the eighteenth century for any German historical writers of importance. To that century belong Heyne, Schwekh, and other contributors to a *Universal History* then published; to whom have succeeded such men as Eichhorn, Müller, the great Niebuhr, Heeren, Schlosser, Rotteck, Menzel, Lappenburg, Von Hammer, Raumer, Neander, Ranke, and Bunsen. In "learned" history, and in patient research, the Germans are unparalleled. (5.) *Spanish Historical Writers.*—Among their chief historians the Spaniards reckon Palencia, Bernal Diaz, Pedro Martyr, and Valera, in the sixteenth century; Morales, Mendosa, Mariana, Herrera, La Puente, and De Solis, in the seventeenth; since which time Spain has produced as little in history as in other kinds of literature. (6.) *Historical Writers of the Scandinavian Countries.*—The Danes count among their eminent historians Gram, Holberg, Malling, Moller, and Grundtvig; the Swedes count among theirs Tegel, Dalin, Botin, and Silferstolpe. (7.) *Slavonian Historical Writers.*—Among the most celebrated *Russian* historians, after Nestor, a monk of the twelfth century, are Tatischeff and Karamsin. The *Poles* have had not a few eminent historians; and Palacky is the greatest historian of the *Bohemians.* (8.) *Greek Historical Writers.*—Of modern Greek historical writers the most distinguished is Tricoupi. (D. M—N.)

HIT, the ancient *Is*, a town of Asiatic Turkey, pashalic of Baghdad, on the W. bank of the Euphrates, in N. Lat. 33. 43., E. Long. 42. 27. It contains about 1500 houses, chiefly of clay, one or two storeys in height. The streets are narrow, dirty, and frequently steep, rising one above another along the side of the hill on which the town stands. A graceful minaret and some tombs are the only structures worthy of notice. The never-failing fountains of bitumen still produce that substance as plentifully as when old Babylon was built. The inhabitants are employed in boat-building, and in the preparing of wool, bitumen, naphtha, and salt.

HITCHIN, a market-town of Hertfordshire, 14 miles N.W. of Hertford. The parish church is a handsome building, with a fine porch, and an altar-piece by Rubens. It has a free grammar-school, an infirmary, mechanics' institute, and savings bank. Malting is extensively carried on, and straw-plaiting affords employment to many persons. There are also several breweries and a silk mill. Market-day, Tuesday. Pop. (1851) 5258.

HITTITES, the children or descendants of Heth, formed one of the tribes of Canaanites which occupied Palestine before the Israelites. They lived in the mountains of Judea round Hebron, and retained their nationality even after the return of the Israelites from exile. The "kings of the Hittites" are often mentioned in connection with the kings of Syria; and in the days of Joram their alliance with the Egyptians was an object of dread to the besieged inhabitants of Samaria.

HIVITES, one of the tribes who occupied Canaan previous to the subjugation of the country by the Israelites. They occupied the N. and N.E. of the land.

HOADLEY, BENJAMIN, was born at Westerham in Kent in 1676. He was made bishop of Bangor in 1715, of Hereford in 1721, of Salisbury in 1723, and of Winchester in 1734. He died at Chelsea in 1761.

He attracted attention at first by his controversy with Bishop Atterbury in 1709. At this time the Tory party, which he opposed, were in favour at court, so that no patronage was to be expected from them; and he owed the rectory of Streatham to private favour. The House of Commons, however, were so pleased with the manner in which he defended himself against the Tory Atterbury, that Hoadley's name was mentioned in the address to the Queen as a champion of liberty, both civil and religious. He developed his principles in his tract on the *Measure of Obedience to the Civil Magistrate.* But in 1714 Queen Anne was succeeded by George I., and a revolution now took place in the court politics. In 1715 Hoadley was raised to the bishopric of Bangor; and in 1717 the celebrated *Bangorian Controversy* arose. It began by Hoadley's publication of his views on the text, "My kingdom is not of this world;" in regard to which he maintained that Christ had left behind him no such authority as that claimed by churches, and that this was the best way of answering the arrogant pretensions of the Church of Rome. These views gave great offence both to High Churchmen and Dissenters. He was attacked from all quarters. William Law is considered his ablest antagonist. The controversy raged for three years without any immediate result. From his *Discourses on the Terms of Acceptance*, it is obvious that he rejects the five points of Calvinism. He has been regarded as the leader of the Rational divines of the Church of England, and as verging towards Unitarianism. He was a friend of Dr Samuel Clarke, of whose life, writings, and character he wrote an account. He also wrote an account of the *Nature and End of the Sacrament*, and a *Letter to Clement Chevalier.*

HOANGHO. See YELLOW RIVER.

HOBAL, the name of the sun-god of the Arabians, generally depicted in Arabic mythology as surrounded by the gods of the 360 days.

HOBART-TOWN, the capital of Tasmania or Van Diemen's Land, is situated in the southern part of that island, on the right bank of the estuary of the Derwent, about 20 miles from the sea, in N. Lat. 42. 53., E. Long. 147. 21. Hobart-Town was founded and made the seat of government by lieutenant-governor Collins in 1804, and was named after Lord Hobart, then secretary of state for the colonies. It is regularly and neatly built on gently rising ground, inclosed by an amphitheatre of lofty and well-wooded hills. A small rivulet, called Hobart-Town Creek, flows through the town. The buildings are of brick, or a dark-coloured freestone, abundant in the neighbourhood. Many of the public buildings are handsome edifices, especially some of the churches. The government house is a large and irregular pile of building, originally built on a small scale, and enlarged as necessity required; but a new one is in course of erection, if not now finished. Among its other buildings are the custom-house, court-house, female house of correction, new market-house, and military and prisoners' barracks. There are also a magnetic observatory, high school, mechanics' institute, and several literary and scientific societies. One of the great advantages of Hobart-Town is its fine harbour, where ships of any burden may lie in safety close to the shore. Large quays and basins have been constructed; and along the water-side are ship and boat building yards. Pop. (1847) 21,419.

HOBBEMA, MINDERHOUT, or MINARD, a famous landscape painter of the Flemish school, was born in Antwerp about the beginning of the seventeenth century. His personal history is a total blank. The only fact in it that can be relied on as even approximately true is that he died at a very advanced age in 1699. His landscapes, which are now rather rare, are extremely simple in their structure; but his management of perspective, and his conduct of chiar-oscuro, enable him to express vast distances in a few square feet of canvas, and to imprint a distinctive and marked character on the homeliest scenes. His execution is wonderfully careful, yet so well harmonized, and so light and graceful, that each separate piece is in itself a perfect gem of art. His style bears so strong a resemblance to that of Ruysdael that many of his pieces pass under that artist's name. The figures in many of Hobbema's pieces were supplied by Teniers and Ostade, which has contributed greatly to enhance their value. Some of his *chef d'œuvres* are in this country, his best authentic pieces being in the galleries of the Peel family.

HOBBES, THOMAS, the philosopher of Malmesbury, was born 5th April 1588. While merely at school, he translated the *Medea* into Latin verse. At the age of fourteen he went to Oxford, where, for five years, he studied logic and the Aristotelian philosophy. After this he superintended the education of the son of the Earl of Devonshire. The friendship formed between Hobbes and this noble family continued through life. Travelling with his charge in France and Italy, he became acquainted with the most eminent philosophers, and greatly enlarged the field of his observations. Returning to England, he formed a friendship with Bacon. In 1628 he published his translation of Thucydides. It had a political object in view, being intended to warn his countrymen against the vices of democratic government. By this time he had lost both patron and pupil by death, and his second visit to France and Italy was along with the son of Sir Gervase Clifton. He now applied his vigorous intellect to mathematics. Returning to England he was entrusted, in 1631, by the dowager Countess of Devonshire, with the charge of another son, with whom he made a third visit to the continent. It was during this visit that he formed an intimacy with Father Mersenne, Gassendi, and Galileo. In 1634 he republished his translation of Thucydides, with a dedication to the young Earl of Devonshire. In 1637, upon returning to England, the violent commotions which were agitating the country increased his dislike of democracy. In 1640 he thought it prudent to escape from the impending storm in his own country, and retired again to France. Through his friend Mersenne, he became acquainted with Descartes. These two philosophers, however, did not altogether agree. In 1642, impressions of his famous work *De Cive*, which he had been preparing for some time, were distributed amongst his friends. It was published in Holland six years afterwards, with a French translation. The principles promulgated in this work could not fail of gaining him many enemies. In 1645 he entered into a mathematical controversy about the quadrature of the circle, and such was his renown, that he was appointed, in 1647, mathematical tutor to the Prince of Wales, who was at that time in exile at Paris. In 1650 he published in London his able treatise on *Human Nature*, and *De Corpore Politico*. In 1651 he published his celebrated work *Leviathan*. Under the emblem of the great sea-monster, he represented the body politic. This work exhibits the combination of Hobbes' principles in politics, morals, and religion. He was attacked by all denominations of religionists. He had greatly offended the Popish party, by the exposure of priestcraft, which occurs in *Leviathan;* and, in consequence, thought it prudent to quit France and return to England. Spending the year 1652 in England, he became acquainted with Harvey, who discovered the circulation of the blood; with Selden, and with Cowley, who wrote a Pindaric ode in his praise. In 1655, his great mathematical war commenced with Wallis; and shortly after he answered Bishop Bramhall on *Liberty and Necessity in Human Actions.* Bramhall, however, had written ten years before, and was now dead. In 1660, upon the restoration of Charles II., Hobbes, who had been his mathematical preceptor in Paris, was received into favour, assured of protection, and had L.100 a-year from the king. He applied himself now with increased vigour to the study of mathematics. The storm against his *Leviathan* and *De Cive* began again to rage. These books were censured by parliament in 1666; and upon the bringing in of a bill to punish atheism, he became apprehensive for his personal safety. However, the storm passed over, and he thought of publishing a new and magnificent edition of his works, which, however, he was obliged to do abroad. So great was his fame, that foreign ambassadors were anxious to see the man whose name was spread throughout Europe. Cosmo de' Medici, Prince of Tuscany, received from Hobbes a collection of his works, together with his portrait, to take to Florence. At the advanced age of eighty-six, Hobbes translated part of Homer's *Odyssey.* The translation was so successful, that he proceeded with the remainder, and in 1675 published a translation of both *Odyssey* and *Iliad.* He died in Derbyshire on the 4th December 1679, in the 92d year of his age.

Hobbes was one of those remarkable men, who, in critical times, have their little as well as their great qualities brought out very prominently. His egotism appears in numerous passages of his metrical autobiography, written at the age of eighty-four. He mentions the circumstance of his being prematurely born, owing to the fright taken by his mother upon hearing of the Spanish Armada approaching the coast. However, his premature birth did not prevent him from living to the great age of ninety-two. The day of his birth happened to be Good Friday, and his admirers did not hesitate to compare him to Jesus Christ, who left the world on the same day that Hobbes came into it,—and both for the same purpose,—the salvation of mankind! He had no pleasant recollection of the drill to which he had to submit in learning the moods and figures of the logicians; he says he learned them slowly—did learn them however, and then cast them away. He mentions, quite complacently, that he was ranked amongst philosophers, and freely speaks about his work *De Cive*, "It pleased the learned, and was entirely new. I was translated into various languages and read with applause. I was known by name afar among the nations." He complains of being misrepresented to the king, whose presence he had been forbidden; and calling to mind the fate of Dorislaus and Ascham, he says he felt the terrors of proscription. His life was in a great measure spent in fear, which he himself admits: for speaking of his birth, he says his mother brought forth twins—himself and Fear,—

> "Meque metumque simul."

Atterbury declares, that these terrors were terrors of conscience. Hobbes gives his own opinion of *Leviathan.* After saying that it had been attacked, he adds, "It stood all the firmer, and my hope is, that it will stand through every age, defended by its own strength."

Morose and impatient as Hobbes was of contradiction, he had not a little to endure which would have disturbed the equanimity of sweeter tempers than his. He saw his writings misunderstood, and then misrepresented by large masses of men, and the transition was easy from misrepresentation of his writings to gross aspersions of his personal character. Amongst his detractors, Bishop Fell was guilty of the most dishonourable procedure. Antony Wood, the friend of Hobbes, had published in English a work in 2 vols., containing an account of Oxford, as to its antiquities, and the eminent men who had been connected with it. In this work was a very favourable notice of Hobbes. Bishop Fell translated the work into Latin, but the complimentary epithets applied to Hobbes were struck out, and abusive ones placed in their stead. In several cases whole sentences of a eulogistic character were altogether expunged. Hobbes points out these alterations and erasures; and considering the injury done to Wood, to say nothing of himself ("fama enim mea, qualiscunque est, jamdudum pennata evolavit irrevocabilis"), he contemplates, for a moment, the propriety of raising an action against Fell: "Nulla ergo causa est ut publice cum eo litigem." But the little public sympathy to be expected in a matter where squabbling scholars are concerned, decided him against it.

Bold and original as Hobbes was in announcing his dogmas, yet when persecution on account of them came near him, he betook himself to unmanly subterfuges. He even defends himself for writing ambiguously in certain cases. His political system being one of expediency, enabled him to shift his ground, and in doing so, the subtlety of his metaphysical intellect was more than a match for the majority of those who endeavoured to detect and expose inconsistency. Yet it is remarkable, that with his clear and subtle intellect, it was from a misconception of some of the most elementary truths of mathematics, that he kept up his great war with Dr Wallis, professor of mathematics at Oxford. Numerous answers were written on both sides, and the virulence with which the fighting was carried on, extended even to the titles of the books. Thus, the *Six Lessons to the Professors of Mathematics in Oxford*, of Hobbes, was answered by the *Due Correction for Mr Hobbes, or School Discipline for not saying his Lessons Right*, of Wallis.

As to his deportment and manners, they are thus described by Dr White Kennet, in his Memoirs of the Cavendish family. "The Earl of Devonshire," says he, "for his whole life entertained Mr Hobbes in his family, as his old tutor rather than as his friend or confidant. He let him live under his roof in ease and plenty, and in his own way, without making use of him in any public, or so much as domestic affairs. He would frequently put off the mention of his name, and say, 'He was a humorist, and nobody could account for him.' There is a tradition in the family, of the manners and customs of Mr Hobbes, somewhat observable. His professed rule of health was to dedicate the morning to his exercise, and the afternoon to his studies. And therefore, at his first rising, he walked out, and climbed any hill within his reach; or, if the weather was not dry, he fatigued himself within doors by some exercise or other, to be in a sweat; recommending that practice upon this opinion, that an old man had more moisture than heat, and therefore by such motion heat was to be acquired and moisture expelled. After this, he took a comfortable breakfast; and then went round the lodgings to wait upon the earl, the countess, and the children, and any considerable strangers, paying some short addresses to all of them. He kept these rounds till about twelve o'clock, when he had a little dinner provided for him, which he ate always by himself without ceremony. Soon after dinner he retired to his study, and had his candle, with ten or twelve pipes of tobacco, laid by him; then shutting his door, he fell to smoking, thinking, and writing for several hours. He retained a friend or two at court, and especially the Lord Arlington, to protect him if occasion should require. He used to say, that it was lawful to make use of ill instruments to do ourselves good. 'If I were cast,' says he, 'into a deep pit, and the devil should put down his cloven foot, I would take hold of it to be drawn out by it.' After the Restoration, he watched all opportunities to ingratiate himself with the king and his prime ministers; and looked upon his pension to be more valuable as an earnest of favour and protection, than upon any other account. His future course of life was to be free from danger. He could not endure to be left in an empty house. Whenever the earl removed he would go along with him, even to his last stage, from Chatsworth to Hardwick. When he was in a very weak condition, he dared not to be left behind, but made his way upon a feather-bed in a coach, though he survived the journey but a few days. He could not bear any discourse of death, and seemed to cast off all thoughts of it. He delighted to reckon upon longer life. The winter before he died, he made a warm coat, which he said must last him three years, and then he would have such another. In his last sickness his frequent questions were, Whether his disease was curable? and when intimations were given that he might have ease, but no remedy, he used this expression, 'I shall be glad to find a hole to creep out of the world at;' which are reported to have been his last sensible words; and his lying some days following in a silent stupefaction, did seem owing to his mind more than to his body."

For an analysis of Hobbes's philosophy and its influence on English thought and speculative science generally, see Sir James Mackintosh's Preliminary Dissertation prefixed to this work.

HOBGOBLIN, a term in the fairy mythology. According to Skinner it is equivalent to rob-goblin, Hob being a familiar name for Rob or Robin; but Wallis and Ennius derive it from the Anglo-Saxon *hoppan*, to hop; because the fairies seemed to hop on one foot rather than walk.

HOBLERS, or Hobilers, *Hobelarii*, in England, feudal tenants bound to serve as light-horsemen in times of invasion.

HOB-NOB (Saxon *habban, næbban*, to have, not to have), a colloquial expression signifying "hit or miss," and originally applied to anything that depended on chance. It hence came to be used as an invitation to reciprocal drinking.

HOCHE, Lazare, one of the noblest spirits and ablest generals of the French Republic, was born of humble parents in 1768 at Montreuil, near Versailles. At the age of sixteen he enlisted, and his republican zeal, aided by his genuine military skill and knowledge, raised him so rapidly through the lower grades of the service, that at the early age of twenty-four he was entrusted with the command-in-chief of the army of the Moselle. He justified the high hopes he had inspired by defeating the Austrians in several engagements, and driving them out of Alsace. Incurring the suspicions of Robespierre, he was recalled from the frontiers and thrown into prison, and was only saved from the guillotine by the timely fall of that redoubted leader on the 9th Thermidor 1794. Released by the Convocation, he was sent into La Vendée to bring to a close the bloody war which the republic was then waging with the royalist peasantry of western France. By the noble chivalry and generosity of his character, as much as by strategic skill, he succeeded in pacifying La Vendée and Brittany. After accomplishing this task, in which the noblest blood of France had flowed like water, he was appointed to head the army of invasion which the French were organizing for the conquest of Ireland; but the fleet in which he embarked was destroyed or dispersed by storms, and Hoche was himself with difficulty saved. In the following year he was sent to the eastern frontier to act against Austria; and by a series of masterly manœuvres he hemmed in the Austrian general Kray, and would have taken him and his whole army prisoners of war had not peace been declared. Soon after this he died suddenly at Wetzlar, not without suspicion of poison. This suspicion was very generally believed at the time, but nothing has ever transpired to give a colour to it; and it is quite unlikely that if there had been any real grounds for it, it would not, by this time, have been proved beyond a doubt. His death was regarded by his countrymen as a great national calamity; but they only understood the full import of the calamity when, as Napoleon's star rose higher and higher on the ascendant, they found that they had lost the only man in whom that great soldier had to fear an equal.

HOCUS-POCUS, a term applied to conjuror's tricks. According to Turner it was the name of an Anglo-Saxon magician; but others regard the two words as a corruption of the *hoc est corpus* used by priests in the mass.

HOCK-DAY, Hokeday, or Hock-Tuesday, a holiday formerly kept in England on the second Tuesday after Easter to commemorate the expulsion of the Danes in the time of King Ethelred. Along with Michaelmas this festival was at one time used as a term for the payment of rents; and in the accounts of Magdalen College, Oxford, there occur several yearly allowances *pro mulieribus hockantibus. Hocking* consisted in stopping the highway with ropes, and demanding a gratuity from passengers before they were permitted to pass.

HODMAN, a cant term formerly used for a young scholar admitted from Westminster School to be student in Christ Church in Oxford.

HODY, Humphry, an eminent English divine, was born in 1659 at Oldcombe in Somersetshire. In 1676 he entered Wadham College, Oxford, of which he was chosen fellow in 1684, and in which, in after life, he founded ten scholarships to promote the study of Greek and Hebrew. At the age of twenty-one he published his Dissertation against the *History of the Seventy-two Interpreters* by Aristeas. In this production Hody shows that the story told by Aristeas as to the occasion of the Septuagint translation is the invention of some Hellenist Jew; that it is full of blunders and anachronisms; and that it was originally circulated on purpose to recommend the Greek version of the Old Testament. This dissertation was received with much approbation by the learned, excepting Isaac Vossius, who published an angry and scurrilous reply to it in the appendix to his *Observations on Pomponius Mela.* In 1704 Hody published his four books, *De Bibliorum textis originalibus, versionibus Græcis, et Latina Vulgata;* the first containing his dissertation on Aristeas's history, the second treating of the true authors of the Greek version called the Septuagint; the third comprising a history of the Hebrew text, the Septuagint version, and the Latin Vulgate; and the fourth giving an account of the other Greek versions—namely, those of Symmachus, Aquila, and Theodotion, with the *Hexapla* of Origen, and other ancient editions. In 1689 Hody wrote the Prolegomena to the *Chronicle of John Malela,* printed at Oxford; and in 1690 he was made chaplain to Stillingfleet, bishop of Worcester. The deprivation of the nonjuring bishops involved him in a controversy with Mr Dodwell, and gave occasion to a number of polemical pieces, which have long ceased to possess any interest. His support of the ruling party of the church in this controversy recommended him to Tillotson, archbishop of Canterbury, who appointed him his domestic chaplain, an office which he continued to hold under Dr Tenison. In 1698 he was appointed regius professor of Greek in the University of Oxford, and in 1704 he was instituted to the archdeaconry of the same place. Hody died Jan. 20, 1705. He left behind him in manuscript a valuable work, published in 1742 by Dr Jebb, under the title of *De Græcis Illustribus linguæ Græcæ literarumque humaniorum Instauratoribus, eorum vitis, scriptis, et elogiis libri duo.* Prefixed to it is an account in Latin of the author's life, extracted from a manuscript in English left by himself.

HOF, a town of Bavaria, circle of Upper Franconia, on the Saale, 30 miles N.N.E. of Bayreuth. It is surrounded with walls, and has 4 churches, a gymnasium with an extensive library, an orphan asylum and several other charitable institutions. Its manufactures comprise linen, woollen and cotton stuffs, leather, and paper. There are iron mines and marble quarries wrought in the vicinity. Pop., including the two suburbs, about 8000.

HOFER, Andrew, the hero of the Tyrol, was born in 1767 at St Leonard in the valley of Passeyr. Till his forty-second year he had been merely known as an industrious and thriving innkeeper, of great intelligence and probity of character. When the treaty of Presburg transferred the Tyrol from Austria to Bavaria, the Tyrolese had every variety of insult and outrage to endure from the Bavarians and their French allies. The consequence was, that when war again broke out in 1809 between France and Austria, the Tyrolese rose to a man in the cause of the House of Hapsburg; and, putting themselves under the command of Hofer, defeated the allied French and Bavarians in repeated engagements, and at length drove them out of the Tyrol. Till the close of the war Hofer administered the internal government of his native country with much ability and integrity. When the fortune of war again laid Austria prostrate at the feet of Napoleon, the Tyrol was once more made over to the Bavarians; but it was only after the most heroic resistance on the part of the mountaineers that they were able to make good their footing in the country. Hofer was obliged to fly, and a price was set upon his head; but though he contrived to elude the search of his enemies for some time, he was at length taken, January 27, 1810. He was sent to Mantua for trial by court-martial, and was condemned and ordered for execution within twenty-four hours. He died, as he had lived, a hero; and the spot where he fell is still visited by his countrymen as a sacred spot. The Austrian Emperor Francis testified his gratitude to Hofer by ennobling his family, and erecting a splendid monument to his memory in the church of Innspruck.

HOFFMANN, Ernst Theodor Wilhelm, a German writer and artist of brilliant but wild and unregulated genius, was born at Königsberg in Prussia, Jan. 24, 1776. His misfortunes may be considered to have begun in his early childhood, for, when he was a mere infant, his father—a man of talent and high social standing, but of bad temper, and perhaps bad habits—separated himself from his wife, and never again took the least interest in her or any of her children. The charge of Young Hoffmann's education was undertaken by his uncle, a rigid methodical man, who lived by rule and square, and who wasted many hours in trying to train his frolicsome nephew to a clockwork life like his own. At a fitting age he was sent to the public school of Königsberg, where he displayed little aptitude for the classics, but much for music and drawing. From the school he passed to the university, where he listened to the lectures of Kant without understanding or profiting by them. Yet he wrought hard at his law studies, occupying his spare time in giving lessons in his favourite arts of music and drawing; and, after graduation, was appointed assessor of the court of Posen. In the gay society of this town, where his time was only half-occupied, he contracted those habits of dissipation which afterwards brought about his ruin. The abundant field for satire tempted him to use too freely that dangerous gift, and he found it convenient to retire for a time to Plozk, which, two years later, he was allowed to exchange for Warsaw. In the Polish capital he turned to profitable account his taste for music, and was beginning to prosper in the world, when the arrival of Napoleon and his legions once more threw him upon his wits. Failing in his attempt to support himself by any of the forms of art of which he was master, he became a stage director; and, when that resource failed, a miscellaneous writer. It was now that he began that series of essays after collected and published under the title of *Fantasie-Stücke in Callot's Manier* (Fancy-Pieces in the manner of Jacques Callot). The brilliancy and originality of these fancy pieces, which turned chiefly on music, soon made Hoffmann's name known, and procured him abundance of literary and other employment; but his life was still uncertain and chequered by the strangest vicissitudes, arising out of the French war, which in these years was devastating Germany. When peace was restored to that country on the overthrow of Napoleon, Hoffmann was reinstated in his legal appointments, and soon after published his *Elixiere des Teufels,* a two-volume novel, which enhanced his rapidly growing fame. But his success turned his head. He had always been vain, and now he became transcendently so; and as he had no sympathy with the dull conventions of society, he made himself a host of enemies by fierce and frequent defiance of them. In disgust he retired to the wine-house, where, in the company of outcasts like himself, he sought to drown his cares in the wildest orgies. "Strangers," says his most eloquent biographer, "came to Berlin to see him in the tavern. The tavern was his study, his pulpit, and his throne. Here his wit flashed and flamed like an *aurora borealis*, and the table was forever in a roar; and thus, amid tobacco smoke and over coarse earthly liquor, was Hoffmann wasting faculties which might have seasoned the nectar of the gods." In 1817 he published his *Nacht-Stücke* (Night-Pieces); and between 1819 and 1821, his *Serapions-Brüder*, comprising most of his minor tales and fugitive pieces. In 1820 and the following year appeared his *Lebens-Aussichten des Kater Murr* (Tom-Cat Murr's Philosophy of Life), his masterpiece, but which he did not live to finish. He died of a sort of paralysis, Jan. 24, 1822.

Hoffmann's natural powers were all but of the highest order, and, had they been under due control and guidance, might have done great things. He thought he had found his sphere in the poetry of art, which he loved with a deep though hardly with a pure love, as a source of refined enjoyment rather than as a fountain of beauty. Failing to find in it the heavenly peace which he longed for, he prostituted it to the purposes of an earthly excitement. Hence it is that his philosophy degenerates into bombast, and his magnanimity into levity; and his character equally with his writings became tawdry, false, and theatrical. His humour and his fancy, naturally racy and rich, became forced and grotesque; and all his other fine gifts were stultified besides by the incredible rapidity with which, for the most part, he was compelled to write. See Hoffmann's *Life and Remains*, published shortly after his death; and Carlyle's *Miscellanies*, vol. iii., p. 362.

HOFFMANN, *Frederick*, a celebrated physician of the University of Halle in Saxony, was born in that city in 1660. He received his early education in his native town, and made great progress in the mathematics, to which he partly ascribed the success which followed his medical studies. At the age of fifteen he lost both his father and his mother during the prevalence of an epidemical distemper. In 1680 he established himself at Erfurdt, there to study chemistry under Gaspar Cramer; and the following year he received the degree of doctor of physic at Jena. In 1682 he published an essay *De Cinnabari Antimonii*, which was reprinted at Leyden in 1685, 12mo, and laid the foundation of his reputation as an able chemist, which he afterwards increased by professing chemistry in the schools of Jena. It is to him we are indebted for the preparation known by the name of the Anodyne Liquor of Hoffmann, which is considered still as a useful sedative. Frederick III., Elector of Brandenburg, having founded the university of Halle in 1693, Hoffmann was appointed primarius professor, and alone prepared the statutes of the faculty of medicine. His fame soon spread throughout all Germany, and thence into foreign parts; and several learned bodies, including the academies of Berlin and Petersburg, and the Royal Society of London, enrolled him among their members. During his residence at Halle he divided his time between instruction, practice, and study; but more than once he interrupted his pursuits by visits to the different courts of Germany where his professional successes procured him honours, titles, and rewards. He was solicited by the king of Prussia to fix his residence at Berlin; but he preferred remaining in his native country, where he died on the 12th of November 1742. At the age of sixty Hoffmann undertook his great work entitled *Medicina Rationalis Systematica*, Halle, 1730, in 9 vols. 4to, of which Bruhier d'Ablaincourt has given a translation, under the title of *Médécine Raisonnée d'Hoffmann*, 1739, in 9 vols. 12mo. The same physician has also translated from the Latin of Hoffmann a *Treatise on Fevers*, Paris, 1746, in 3 vols. 12mo; the *Politics of Medicine*, ibid., 1751, in 12mo; and *Observations on the Cure of Gout and Rheumatism*. A complete edition of his works has been published, with a life of the author, under the title of *Hoffmanni Opera omnia Medico-physica cum Supplementis*, Geneva, 1740, 1755, 11 parts, in folio. The writings of Hoffmann contain a great mass of practical matter of considerable value, partly compiled from preceding writers, and partly the result of his own observation; but they are also deformed by trifling remarks, hypothetical conjectures, and frequent prolixity and repetition in the details. As a theorist, his suggestions proved of great importance, and contributed to introduce that revolution in the science of medicine which subsequent observation has extended and confirmed. His doctrine of atony and spasm in the living solid, according to which all internal disorders were referred to some preternatural affection of the nervous system, rather than to the morbid derangements of the fluids, first turned the attention of physicians from the mere mechanical and chemical operations of the body, to those of the primary moving powers of the living system. Hoffmann pursued with considerable ardour the study of practical chemistry, and improved the department of pharmacy by the addition of some mineral preparations. But, upon the whole, his practice was cautious, especially in his latter years; and he trusted much to vegetable simples. "I affirm solemnly," said he, "that, though in my youth I ran much after chemical remedies, yet in my age I became convinced that very few remedies, well selected, and derived from substances in appearance the most worthless, afford more prompt and efficacious relief to the sick than the rarest and most elaborate chemical preparations." (J. B—E.)

HOG. See index to MAMMALIA.

HOGARTH, WILLIAM, the greatest of all satirical painters, was born, according to the most probable conjecture, in 1698, in the parish of St Martin, London. His father (whose name, as written and pronounced in these days, was Hogart) was the son of a Westmoreland yeoman, and had removed to London, where he supported himself by teaching and writing. His circumstances were anything but prosperous. In the words of his son (*Hogarth's Anecdotes of Himself*, ed. 1833)—"My father's pen, like that of many other authors, did not enable him to do more for me than put me in a way of shifting for myself. As I had naturally a good eye and a fondness for drawing, shows of all sorts gave me uncommon pleasure when an infant; and mimicry, common to all children, was remarkable in me. An early access to a neighbouring painter drew my attention from play, and I was at every possible opportunity employed in making drawings. I picked up an acquaintance of the same turn, and soon learned to draw the alphabet with great correctness. My exercises when at school were more remarkable for the ornaments which adorned them than for the exercise itself. In the former I soon found that blockheads with better memories could much surpass me; but for the latter I was particularly distinguished."

At the proper age Hogarth was apprenticed to a silversmith, Ellis Gamble by name; but long before he had served out his time he was heartily tired of carving crests and heraldic devices on silver, and longed to begin engraving on copper. To obtain the requisite knowledge of drawing, he began, immediately on the expiry of his apprenticeship, to attend the lectures of Sir James Thornhill, serjeant-painter to the king, but, if the testimony of Horace Walpole may be believed, without attaining any great excellence in drawing from the life. He says himself, however, that frontispieces to books, such as prints to *Hudibras*, &c., soon brought him into the way; but he complains grievously that he was robbed of the legitimate reward of his labours by the printsellers. "The first plate which I published," he says, called *The Taste of the Town*, in which the reigning follies were lashed, "no sooner began to take a run, than I found copies of it in the print-shops, vending at half-price, while the original prints were returned to me again, and I was thus obliged to sell the plate for whatever these pirates pleased to give me, as there was no place of sale but at their shops." Amid these difficulties he struggled on to his thirtieth year, when he made "a stolen union" with the daughter of Sir James Thornhill, his former teacher. Sir James, a man high in station, refused at first to open his eyes to the genius of his son-in-law, and for two years believed that his daughter had disgraced herself and degraded her family by her marriage. At the end of that period, however, he "became both reconciled and generous to the young couple." Up to the time of his marriage, Hogarth had been, in his own phrase, "a punctual paymaster;" and now, to meet his increased expenditure, he "commenced painter of small Conversation Pieces, from 12 to 15 inches high; which, being a novelty, succeeded for a few years." He eked out his income by painting portraits; and though he always spoke with vehement contempt of this branch of art, his extant pieces show that he might easily have attained eminence in it. Before fairly committing himself to these new walks, he had entertained great hopes of succeeding as a historical painter, and, as he himself says, "painted two Scripture stories—*The Pool of Bethesda* and *The Good Samaritan*, with features 7 feet high." Like Molière, who believed to the day of his death that his true calling was the acting and writing of tragedy, Hogarth persisted to the last in declaring high art as his real vocation. His attempts in that walk were never, in his opinion, appreciated as they deserved; and among his friends his delight was to thump the table and snap his fingers, and say—"Historical painters, be hanged! here's the man that will paint against any of them for a hundred pounds. Correggio's *Sigismunda!* look at Bill Hogarth's *Sigismunda;* look at my altar-piece of St Mary Redcliffe, Bristol; look at my *Paul before Felix*, and see whether I'm not as good as the best of them." On one occasion a Mr Freke had asserted that Greene, the composer, was as great a musician as Handel. "That fellow Freke," remarked Hogarth, "is always shooting his bolt absurdly one way or another. Handel is a giant in music; Greene only a light Florimel kind of composer." "Aye," said the artist's companion, "but Mr Freke declared that you were as good a portrait painter as Vandyke." "There he was right," said Hogarth; "and so, by G—, I am; give me my time, and let me choose my subject." So overweeningly confident was Hogarth of his own powers, and so little did he know of the conditions of historical painting, that he did not even deem a special training at all necessary for success in it. But, whatever his genius for high art, he soon found that, if he devoted himself to it alone, he would starve. Necessity compelled him to revert to that style which he had already begun to strike out for himself, and which, as afterwards perfected by him, led him on to fortune and immortal fame. His oil paintings themselves never sold very well; but he made a point of engraving them all, and from the sale of these engravings he realized a handsome fortune. Here, again, his old enemies, the printsellers, interposed between him and the public, and for a time pirated each plate as it appeared, and intercepted the artist's profits. In 1735 Hogarth sent in a petition to parliament, drawing attention to this flagrant outrage upon justice, and the result was a law securing to the artist a copyright of fourteen years in every plate from the date of publication. In 1753 Hogarth published his *Analysis of Beauty*, in which he endeavours to prove that the foundation of all beauty is a waving line curved somewhat like an S; while a less pronounced curve is the line of grace. This idea, and the curious illustrations brought forward in support of it, drew down upon its propounder's head a perfect shower of pamphlets and criticisms, all hostile, and nearly all sarcastic in their tone. One of the most amusing quarrels that resulted out of this publication was that with Wilkes and Churchill. Both of these persons, formerly Hogarth's friends, joined in the outcry against him—the first in his newspaper (the *North Briton*), the other in his poetical epistle. Hogarth had his revenge. Churchill descends to posterity as a bear hugging a post inscribed with an ascending scale of lies. Of Wilkes' famous portrait, Hogarth himself says—"This renowned patriot's portrait, drawn like as I could as to features, and marked with some indications of his mind, fully answered my purpose. The ridiculous was apparent to every eye! A Brutus! a saviour of his country! with such an aspect, was so arrant a farce, that, though it drew much laughter from the lookers on, galled both him and his adherents to the bone." As Hogarth advanced in years his health began rapidly to give way, but his powers of mind remained unimpaired to the end. He died October 26, 1764, and was buried in the churchyard of Chiswick, near London. His wife, who never bore him any children, survived him for fifteen years, and on her death, in 1789, was buried by his side.

Johnson's famous lines on Hogarth are equally true and pleasing:—

> "The hand of him here torpid lies,
> That drew the essential forms of grace;
> Here closed in death the attentive eyes,
> That saw the manners in the face."

As a man, Hogarth is one of the most interesting and characteristic types of the true English race. Under a somewhat rough exterior lay one of the most generous, open, and honest souls that England had to boast of in all the eighteenth century. Born and brought up in London, from the shadow of whose smoke he hardly ever emerged except for an occasional holiday, he imbibed many of the prejudices and little narrownesses incident to such a mode of life. But in his case, as in Dr Johnson's, the knots and excrescences that disfigured the oak also marked its strength. No man of that century, not the great lexicographer himself, fought a nobler battle against great odds, or gained in the end a nobler victory. As a satirist, Hogarth, like all satirists, had foes numerous and malignant. But, though these often assailed him ungenerously and unjustly, he scorned to take a mean advantage over them, or to glory in his triumph when the scale turned in his favour. The very last sentence in his memorial of himself runs thus:—"This I may safely assert, that in the course of my life I have done my best to make those about me tolerably happy, and my greatest enemy cannot say that I ever did an intentional injury."

To assign Hogarth his rank among painters, is no difficult task. In the class to which he belongs he has had few imitators and no rivals, either in our own or in any other country. Of all English painters, Hogarth's chances of immortality are the best; and it has been well said that our chances of another Hogarth are as precarious as our chances of another Shakspeare. To the student of history his works are invaluable for their complete and sternly truthful pictures of the manners and even the thoughts of the eighteenth century. In the words of Thackeray—"We look, and we see pass before us the England of a hundred years ago. The peer in his drawing-room, the lady of fashion in her apartment, foreign singers surrounding her, and the chamber filled with gew-gaws in the mode of that day; the church, with its quaint florid architecture and singing congregation; the parson with his great wig, and the beadle with his cane; all these are represented before us, and we are sure of the truth of the portrait. We see how the lord mayor dines in state; how the prodigal drinks and sports at the bagnio; how the poor girl beats hemp in Bridewell; how the thief divides his booty and drinks his punch at the night-cellar, and how he finishes his career at the gibbet. We may depend upon the perfect accuracy of these strange and varied portraits of the bye-gone generation. We see one of Walpole's members of parliament chaired after his election, and the lieges celebrating the event, and drinking confusion to the Pretender; we see the grenadiers and trainbands of the city marching out to meet the enemy; and have before us, with sword and firelock, and white Hanoverian horse embroidered on the cap, the very figures of the men who ran away with Johnny Cope, and who conquered at Culloden. The Yorkshire waggon rolls into the inn-yard; the country parson, in his jack-boots and his bands and short cassock, comes trotting into town, and we fancy it is Parson Adams with his sermons in his pocket. The Salisbury fly sets forth from the old Angel; you see the passengers entering the great heavy vehicle up the wooden steps, their hats tied down with handkerchiefs over their faces, and under their arms, sword, hanger, and case-bottle; the landlady, apoplectic with the liquors in her own bar, is tugging at the bell; the hunch-backed postilion (he may have ridden the leaders to Humphrey Clinker) is begging a gratuity; the miser is grumbling at the bill; Jack of the Centurion lies on the top of the clumsy vehicle, with a soldier by his side —it may be Smollet's Jack Hatchway—it has a likeness to Lesmahagow. You see the suburban fair, and the strolling company of actors; the pretty milk-maid singing under the windows of the enraged French musician—it is such a girl as Steele charmingly described in the *Guardian*, a few years before this date, singing under Mr Ironside's window in Shire Lane her pleasant carol of a 'May Morning.' You see noblemen and blacklegs bawling and betting in the Cock-pit; you see Garrick as he was arrayed in *King Richard;* Macheath and Polly in the dresses which they wore when they charmed our ancestors, and when noblemen in blue ribbons sat on the stage and heard their delightful singing. You see the ragged French soldiery in their white coats and cockades at Calais gate; they are of the regiment, very likely, which friend Roderick Random joined before he was rescued by his preserver, Monsieur de Strap, and with whom he fought on the famous day of Dettingen. You see the judges on the bench; the audience laughing in the pit; the student in the Oxford theatre; the citizen in his country walk. You see Broughton, the boxer; Sarah Malcolm, the murdress; Simon Lovat, the traitor; John Wilkes, the demagogue, leering at you with that squint of his which has become historical, and with that face which, ugly as it was, he said he could make as captivating to woman as the face of the handsomest beau in town." These subjects are treated for the most part in the satirical vein; but Hogarth's satire is never an end to itself, it is generally a means towards the teaching of some valuable lesson of practical morality. Sometimes, like Juvenal, the painter dissects with a hideous minuteness the follies and vices of his day, which in various guises are the follies and vices of all time. Like Swift, revelling in the morbid anatomy of the human heart, he sometimes (as in his *Four Stages of Cruelty*) depicts scenes that in themselves shock and repel the observer, but are yet made interesting by their wonderful power and truth to nature; while, on the other hand, he is not surpassed by De Foe himself in the number, homeliness, and graphic force of his details. So great, indeed, is Hogarth in these respects, that the criticism of Charles Lamb becomes literally true when he says that "his graphic representations are indeed *books;* they have the teeming, fruitful, suggestive meaning of words. Other pictures we look at; his prints we read." It was fashionable among some of Hogarth's contemporary critics to settle his claims to posthumous fame by describing him as a *caricaturist*, and by ridiculing the technical execution of his works. On the first head it is only necessary to repeat what has been already said, that "the quantity of thought which he crowds into every picture would almost unvulgarize every subject which he might choose," and that consequently he can scarcely be classed among caricaturists at all, as that term is now understood. On the second head, small wits of the last century were misled by the verdict of Horace Walpole, who said that Hogarth had but little merit as a painter. Posterity, however, has reversed this sentence of the captious critic; and indeed it must be plain to all who have seen Hogarth's pictures that, except in the matter of colouring, their technical merits are not only great, but remarkable. As a draughtsman, indeed, he has been surpassed by many of his countrymen; but his power of composition is such as few English painters have ever shown at all. Even his colouring, which is confessedly his weak point, may be defended to some extent, as having been laid on in dead tints chiefly that the eye of the spectator might not be distracted by gaudy hues from the action and moral of the various pieces; yet there are many individual pieces of painting in Hogarth's pictures which show that, if he had not had special reasons for persevering in the style he originally adopted, he might have ranked high among English colourists. This much, however, is certain, that, whatever Hogarth's technical merits or defects may be, so long as man shall continue to be man's proper study, so long will Hogarth's pictures, in virtue of the human interest they possess, continue to find students and admirers.

(Hogarth's *Memoirs of Himself;* Allan Cunningham's *Life;* Ireland's *Life;* Hogarth's *Works*, by Nichols and Steevens; Charles Lamb's *Essay on Hogarth;* Thackeray's *Lectures on the English Humorists;* Walpole's *Anecdotes;* and Waagen's *Arts and Artists of England*, where an able and elaborate defence and analysis of Hogarth will be found.)

HOGG, JAMES, a Scottish poet and miscellaneous writer, best known by his pastoral and poetical title of the *Ettrick Shepherd.* He was born in the humble rank of a shepherd, and his early lot was full of hardship, but his situation had its redeeming and compensatory features. He was not, like Burns, condemned to severe and irksome labour, forced to do the work of a man when a mere stripling. He had not, like Bloomfield or Gifford, to undergo the close, monotonous, and depressing confinement of a workshop. He had the free range of the mountain and glen in a picturesque district famous for its historical and poetic associations, and he was familiar from infancy with the heroic and legendary lore and ballad strains of the Border. When his great contemporary Scott wondered at his untaught minstrelsy, the Shepherd could say—

> "He little weened a parent's tongue
> Such strains had o'er my cradle sung."

By the maternal side Hogg was descended from a long line of shepherds, noted for their fidelity, skill, and devoted attachment to their masters. His mother, Margaret Laidlaw, was a great collector and reciter of ancient ballads and Border history, and a woman of remarkable liveliness, humour, and spirit. Her cottage was the favourite resort of all the young shepherds of Ettrick and Yarrow. His father, Robert Hogg, was, mentally and morally, a much inferior person. He had also been a shepherd, but he subsequently embarked in the business of a store-farmer and drover, frequenting the English and Scotch markets, and he soon wrecked the humble fortunes and prospects of the family. James was the second of four sons, born in a cottage at Ettrick Hall, near the parish church and school. In the various accounts of his own life which he wrote from time to time, Hogg gave 1772 as the year of his birth. At first he said he was born in the latter end of that year, but subsequently he claimed to be born on the anniversary of Burns' birth-day, the 25th of January. The parish register, however, records his baptism as having taken place on the 9th of December 1770. About seven years after this time Robert Hogg's affairs became desperate, his effects were sold, and in the distress and poverty of the family James was put out to service in the neighbourhood as a cow-herd, which he considered to be the lowest and worst occupation in that part of the country. It is, however, the usual commencement of the life of an ordinary shepherd until he has attained his fifteenth or sixteenth year, when he is considered fit to be trusted with a *hirsel* or flock of sheep. Previous to entering upon service, Hogg had attended the parish school, and was, as he tells us, at the head of a class of young scholars, who read the Shorter Catechism and Proverbs of Solomon. This could hardly have been attained in less than a twelvemonth, and in the following year he was placed by his parents for four months under a private teacher, with whom he was instructed in the Bible, and learned to write imperfectly. The Shepherd's statements as to the amount of his school education are vague and contradictory. In one he says that the whole did not cost ten shillings; in another, that he was about six months at school; and in a third (his farewell address to the readers of the *Spy*) he boldly affirms that he was never at school. The probability is that he had the same amount of education as other children in the district of the same age, but that from his lively rambling disposition and love of out-door sports, he was a careless and irregular scholar. In his fourteenth year he had saved five shillings, with which he bought an old violin, on which he practised at nights in the stables and cow-houses where he was forced to make his bed. He had access to few books, he says, except theological works, until, in his eighteenth year, he got a perusal of the *Metrical History of Wallace*, and Ramsay's *Gentle Shepherd* (which he wished had been in prose or in the metre of the Psalms), and Burnet's *Theory of the Earth*, which he says had nearly overturned his brain. Chance newspapers also fell in his way, which he read through, but was often "no wiser than when he began." In attempting to write he found he had forgotten several of the letters, and had to copy them from a printed book, or "patch up the words in the best way he could without them." This picture of intellectual stagnation on the part of one afterwards remarkable for mental activity and ambition, and happening in the midst of a body of intelligent shepherds and farmers, who were all readers, as he relates, and delighting in poetry and music, has been pronounced incredible. It is clearly exaggerated, but Hogg's genius was slow in manifesting itself; his fancy flowered late. Favourable circumstances, however, were now at hand. After serving a number of masters, first as cow-herd and afterwards as shepherd, he was engaged in the latter capacity by Mr Laidlaw, tenant of Blackhouse, a farm on the Douglas Burn, in Yarrow. From Whitsunday 1790 to Whitsunday 1799, Hogg continued in the service of Mr Laidlaw. He was treated with affectionate kindness, and had the use of a considerable collection of books, which he soon exhausted, and then subscribed to a circulating library in Peebles. About the year 1793 he obtained a glimpse of the wilder scenery of the West Highlands, being despatched by his master with a flock of sheep to the head of Strathfillan, in Perthshire. This period of nine years, from his twentieth to his twenty-ninth year, was perhaps the happiest of Hogg's life. He was buoyant and vigorous, the envy of the shepherds for his swiftness and agility, and the delight of the country maidens for his gay fancy, music, and handsome appearance. He soon added the recommendation of being a poet. Two months in every year formed a sort of poetical carnival in his shepherd's life. From the middle of July to the middle of September his only duty was what was called "summering the lambs." The young flock was committed to his care, and all he had to do was to move them from place to place. There was no toil or fatigue in the occupation, his dog may be said to have done the whole; and, carrying his books with him, the Shepherd had ample leisure among the green hills and quiet waters for study and contemplation. In the little library at Blackhouse were the *Spectator*, the works of Milton, Pope, Thomson, and Young, with some books of travels and treatises of "sound divines," all of which, with others, Hogg eagerly perused. He may be said to have made the whole circle of standard English literature, and he was not without worthy and congenial associates. His own brother William was a man of strong sense and literary tastes, who contributed to several periodicals; another shepherd, Alexander Laidlaw, was equally accomplished in his humble sphere; and the eldest son of his master was that Mr William Laidlaw afterwards known as the confidential friend and manager of Sir Walter Scott at Abbotsford, the author of the beautiful ballad of *Lucy's Flittin'*, and in all respects a most amiable, ingenious, and accomplished man. Laidlaw was ten years younger than Hogg, but their acquaintance soon ripened into a tender friendship, and Laidlaw seized every opportunity of bringing forward the talents of his friend, and aiding in their development. The first dawnings of such a mind, and the successive steps by which the poet overcame the difficulties of his situation would, if faithfully narrated, form an interesting record. Burns has told us how love and poetry began with him in his early obscurity; and Hogg's first attempts consisted of songs and ballads to be sung by the country girls in chorus. "The first time," he says, "that I attempted to write verses was in the spring of the year 1796—the first time I ever heard of Burns was in 1797, the year after he died." A man recited to him *Tam O'Shanter*. "This," he adds, "formed a new epoch of my life. Every day I pondered on the genius and fate of Burns. I wept, and always thought with myself—what is to hinder me from succeeding Burns. I, too, was *born on the 25th of January*, and I have much more time to read and compose than any ploughman could have, and can sing more old songs than ever ploughman could in the world. But then I wept again because I could not write." The poet's memory, or his desire to appear a poetical prodigy, the "last infirmity" of literary ambition, has here completely misled him. He had written and published verses, and imitated Burns, three years before 1797. His first printed piece was a short tale in the measure and style of Burns's *Holy Fair*, entitled *The Mistakes of a Night*. It is a coarse but humorous effusion of eleven stanzas, and was printed in the *Scots Magazine* for October 1794, with a note appended to it calculated to sober the vanity of the writer. The editor said he was disposed to give the verses a place, to "encourage a young poet," who, he hoped, *would improve*, and be at more pains to "make his rhymes answer," and to "attend to grammatical accuracy."

After quitting Blackhouse, Hogg removed to Ettrick, to a small farm rented by his brother William, who had married and resigned the lease of the farm in favour of the poet and his father. He looked about for some more promising situation as overseer or manager; and in June 1800 took a tour to the Highlands, proceeding to the sources of the Dee. To William Laidlaw he wrote from Blairgowrie, "I must enter amongst the bens and glens of the Grampians —these sovereigns of the north I see towering their ancient tops, specked with the snows of the last century, and aspiring to bid 'good morrow' to the sun." On his return he committed what he afterwards considered—and justly considered—a great folly. He had gone to Edinburgh market, he says, and whilst waiting there from Monday to Wednesday, he suddenly resolved on writing out some of his poems from memory, and having them printed. The volume appeared in January 1801, and was entitled *Scots Pastorals, Poems, Songs, &c., mostly written in the dialect of the south, by James Hogg, tenant in Ettrick.* In one of his autobiographies Hogg says this volume was full of errors and imperfections; he had left the manuscript with the printer (one Taylor, in the Grassmarket), and seen no more of his poems until he received word that a thousand copies were thrown off. This must not be taken literally. He had seen the proof sheets, but he was soon ashamed of the publication, which produced nothing but mortification. His friends in the Forest complained that he had styled himself a tenant in Ettrick, the farm being really held by his brother; but he replied that he had given no such order, and that in the proof sheet which he received to which the title-page was annexed, there was no such designation. In one of the pieces he had reflected on Lord Napier, an extensive proprietor in Ettrick. "I see my error," he writes to Laidlaw, "but what ailed both you and Clarkson, who had both perused the MS., that you had not told me that sooner? It is madness to talk of losing the whole impression; to do that, you know, is entirely out of my power; *I wish I had the one paid that is printed*, and other things which are more pressing at present. It is a great mortification to my gay heart, which fondly imagined the whole world were my friends; d—n it, I'll proceed no farther with this reflection." And then the poor bard changes his tone, and alludes jocularly to the chance of Lord Napier sending him a challenge! He, the Shepherd, as the party challenged, would, of course, have the choice of distance and weapons; and he would select one of his lordship's hill sides in Ettrick; his weapon would be fragments of rock, and hurling these down on the peer, he would make him for once a *fugæ*. Such was Hogg on his first publication—rash, blundering, and improvident—and such he continued to the last.

In the autumn of 1802, Sir Walter, then Mr Scott, "the Shirra," made a raid into Yarrow for the purpose of collecting materials for a third volume of the *Minstrelsy of the Scottish Border*. He was accompanied by John Leyden, and he carried an introduction from another poetical Borderer, Andrew Mercer, to William Laidlaw at Blackhouse. Laidlaw had received from Hogg a copy of an ancient ballad, called *Auld Maitland*, which the Shepherd had written down from the recitation of his mother and uncle—the latter a shrewd old shepherd named "Will of Phawhope." The relic was deemed invaluable; and Scott, before he left the district, took a note of Hogg's address that he might correspond with him. The Shepherd was then absent in the north. Affairs had gone ill at Ettrick, and he had tried another journey to see if anything could be done in the Highlands "in the farming line," but returned unsuccessful.

Scott never lost sight of his poetical brother in the Forest. He corresponded with him, and becoming more and more curious to meet with one who had interested him so strongly, he made another visit to Blackhouse, with the intention of getting Mr William Laidlaw to guide him to Ettrick. They went by Dryhope and St Mary's Loch over the high green solitary hills that separate the head of Yarrow from her sister stream; and arriving in the valley of Ettrick put up their horses at Ramsay-cleuch, a farm occupied by some relatives of Laidlaw. A cordial welcome and a Dandie Dinmont dinner awaited the Sheriff and his friend, and in the evening Hogg was sent for to *come to tea*. "For at that time," says Laidlaw, "the good Shepherd retained all his original simplicity of character, and he brought with him a MS. of some size—enough at least to show his industry—filled with ballads and fragments. Mr Scott's meeting with Hogg was like that of an elder brother meeting a younger that he had not seen for years, and whose talents and acquirements were far beyond his hopes and expectations." The incident formed a grand era in the history of the Shepherd. Scott became his model as a poet, his judicious counsellor, and his indefatigable friend. No outbreaks of waywardness, caprice, or jealousy on the part of the irritable and impulsive bard of Ettrick, could damp the zeal or lessen the generosity of his first and greatest patron.

Hogg made two more Highland expeditions, of which he published some account in a series of letters in the *Scots Magazine*. The narrative shows considerable facility in prose composition, with touches of poetical feeling; but his attention was chiefly directed to the rural economy of the north. One of these tours was extended to the Hebrides, which he thought highly favourable for the extension of sheep farming, though then chiefly occupied in the rearing of black cattle. He got a neighbour in Ettrick to join him in taking a farm in the Island of Harris; lambs were purchased for stocking the farm in the summer of 1804; the poet had written his *Farewell to Ettrick*, and both parties had set off for Harris, when he learned, he says, about the middle of July, that he could not enter into possession—"that the tacksman's right to the subject was called in question, and a plea entered at the Court of Session accordingly." He gave up all intention of proceeding to the island, and went off to the north of England, among the lakes of Cumberland, for some time, "in order to avoid a great many disagreeable questions and explanations." His friend, the Ettrick farmer, who had proceeded with his stock part of the way, was a considerable loser by the poet's mismanagement; and Hogg says that he himself "lost all the money he had made by a regular and industrious life." He had saved about L.200 while a shepherd at Blackhouse. The affair altogether was supposed to leave a stain on the poet's moral character as well as sagacity; and it was long ere he regained the countenance or regard of his early friends in the Forest. He did not rejoin them at this time, but engaged himself as a shepherd in Nithsdale.

The second publication of Hogg was made in 1807. He had corresponded with Scott, and was encouraged by him to collect and publish a volume of legendary ballads and songs under the title of the *Mountain Bard*. The poems evinced decided talent; Scott heralded the volume with a brief but kind prefatory notice; the Shepherd told the story of his life and misfortunes, and public interest being thus excited, the work was well received. By its sale, and by a *Treatise on the Diseases on Sheep*, published the same year, he realized about L.300. With this money the Shepherd unfortunately embarked in farming in Dumfries-shire, and in three years was utterly ruined, abandoning all his effects to his creditors. He returned to Ettrick, and there found only cold and estranged looks. He could not even obtain employment as a shepherd; so, wrapping his plaid around him, he set off, in February 1810, to push his fortune in Edinburgh as a literary adventurer.

No vicissitude could abate Hogg's self-reliance, or diminish what he honestly called his vanity. He would have fared ill, however, but for a generous Border admirer, Mr John Grieve, established in business in Edinburgh, who opened his house to him as Thrale did to Johnson, and for years suffered him to want for nothing. From the noble family of Buccleuch he seems also to have received assistance. In 1810 he published a collection of songs, which being dedicated to the Countess of Dalkeith, and recommended to her notice by Scott, was rewarded with a present of a hundred guineas. He then commenced a weekly periodical, *The Spy*, which he continued from the 1st of September 1810 to the 17th of August 1811. Several friends contributed essays to this work, but its general strain was coarse and indelicate. His poetical genius had in the meantime been gradually purifying itself, and his *Queen's Wake*, published in 1813, established his reputation as one of the first poets of the age. This was followed by *Mador of the Moor*, a Highland story in the Spenserian stanza, of improbable plot, but highly effective in its descriptive scenes. He next published *The Pilgrims of the Sun*, a wild mystical poem in blank verse; and *The Poetic Mirror*, a successful imitation of the style of some of the living poets. This work was aided by contributions from poetical friends.

Scott had been applied to, but refused in a curt and decided letter, which gave such offence to the now elated Shepherd, that he replied to him in wrath, addressing him as "D—d sir," "yours in disgust," &c. For this atrocity he afterwards apologized, and Scott bade him "think no more of the business, and come to breakfast next morning." The Duchess of Buccleuch, on her deathbed in 1814, had made a request of the Duke that he would do something for the Ettrick bard, and the Duke gave him a lease for life of the farm of Altrive in Yarrow, consisting of about seventy acres of moorland, on which the poet built a house and spent the last years of his life. He took possession of it in 1817, but his literary exertions were never relaxed. Before 1820 he had written *The Brownie of Bodsbeck*, a tale of the Covenanters, and two volumes of *Winter Evening Tales*, besides collecting, editing, and writing part of two volumes of *Jacobite Relics*, and contributing largely to *Blackwood's Magazine.* In 1820 he married an amiable lady of a good Annandale family, and found himself possessed of about L.1000, a good house, and a well-stocked farm. Fortune seemed at last to be propitious—he was the most prosperous as he was the most celebrated man in the Forest. So intent was he on his home felicity, and his reputation as a store-farmer in Yarrow, that he declined a flattering invitation from Sir Walter Scott to accompany him to London to witness the coronation of George IV. The Shepherd preferred attending the great sheep fair at St Boswell's! This new-born virtue of prudence, however, soon forsook him; he became a candidate for a large farm on the Buccleuch estate. On the 29th of November 1821 he wrote to Laidlaw, "The farms will be decided to-day, and we will soon see what has been allotted to me. I have made no movement one way or another; no doubt I could have Mount Benger for the asking, but I did not know whether it was to be lowered or not, and had hopes that they might have some better one in their eye for me." Mount Benger was to be his destiny. It adjoined Altrive, and he took it on lease for nine years. He stocked it and conducted it expensively, as his neighbours alleged—having double the number of horses that was required, and treble the number of work-people. His hospitality was also profuse. To meet his new engagements he wrote several novels, republished his poems, and gave to the world a second metrical romance, *Queen Hynde*, which contains many fine passages, but is deficient in poetical colouring and interest. He had realized nearly L.1000 by these various literary labours.

Hogg's connection with *Blackwood's Magazine* kept him still more familiarly before the public. The wit and mischief of some of his literary friends made free with his name, and represented him in ludicrous and grotesque aspects, but the effect of the whole was favourable to his popularity. His appearances in the *Noctes Ambrosianæ* gave an erroneous impression of his habits, and so far prejudiced him in the estimation of the graver portion of his friends and the public, but they unquestionably elevated his reputation as a man of genius and of rare colloquial powers. For some time he winced keenly under the monthly infliction, but at length came to relish the poetical exaggeration of his friend Wilson, and predicted that the magazine would sink whenever his name was withdrawn from it. For much of the *éclat* and brilliancy of his latter years, relieving and gilding days of adversity, he was indebted to these celebrated and unique dialogues.[1] By the end of his nine years' lease of Mount Benger the poet was again a ruined man. He made a visit to London in the winter of 1831, and was fêted and feasted by the nobility, literati, and public men of the metropolis. He was engaged to banquets weeks in advance, and often engaged to three places in one day. On his return a public dinner was given him in Peebles—Professor Wilson in the chair—and he acknowledged that he had at last "found fame." His health, however, was seriously impaired. In November 1833 he writes to a private friend, "Though plump and fair, I am plagued with an asthmatic cough and *wheezing* which renders me quite useless, and disables me from hunting, fishing, &c., without which you know I cannot subsist." In the same letter he mentions that his domestic memoir of Sir Walter Scott had been published in Albany—its circulation being confined (which, of course, was found impossible) to the United States. "I had an offer for it," he remarks, "which I did not find myself in circumstances to refuse." The publication of this *brochure* drew down upon Hogg the keen resentment of Mr Lockhart. It is, however, a candid and just representation of his illustrious friend; though, like all Hogg's reminiscences, it is confused and inaccurate in details. With his pen in his hand to the last, the Shepherd in 1834 published a volume of *Lay Sermons;* and in 1835 two volumes of *Montrose Tales.* By the latter end of this year his illness assumed the form of dropsy, and after a short confinement, and three days of calm and motionless insensibility, he died on the 21st of November, having nearly completed his sixty-fifth year. He was buried in his native churchyard of Ettrick. Wordsworth and many lesser bards mourned his death; and among his own hills and dales the loss was felt to be great and irreparable. His fame seemed to fill the whole district, and was brightest at its close; his presence was associated with all the Border sports and festivities, and as a man James Hogg was ever frank, joyous, kind, and charitable.

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[1] Before the commencement of the *Noctes*, letters, poems, &c., were printed in *Blackwood* in Hogg's name, which he never wrote, and which wanted the geniality and humour of Wilson's personations; of these he complained grievously. The following is part of an unpublished letter, addressed to Sir Walter Scott, and dated "Altrive Lake, October 3, 1821:"—

"My dear Sir Walter,—Like every other vassal, whose situation with his chief is perfectly understood, though never once mentioned, I always sit wisely still, unless either called upon by you to some great weaponshaw; or when I find marauders and freebooters encroaching on my own privileges. In this last case I am never behind, viz., in asking indemnities, although in the former one (as in the late coronation affair) I sometimes show a little obstinacy to budge. I am fairly in Jamie Telfer's situation, and therefore I come lang eight miles barefoot to Abbot's Ha' in hopes to have a rise in my favour. I allude to the beastly usage of me by Blackwood, and some new cronies of his. I know not what to do with that wretch. He will neither answer a letter nor regard me one way or another; and though I have a written promise, dated nineteen months back, 'that my name should never be mentioned in this way without my own consent,' yet you see how it is kept, and how I am again misrepresented to the world. I am neither a drunkard, nor an idiot, nor a monster of nature, nor am I so imbecile as never to have written a word of grammar in my life. I would not mind their vulgar injurious ribaldry so much on my own account, but there are other feelings now that I am bound to regard above my own, where the wounds inflicted by such assassins rankle with so keen a smart, that I am unable to allay them, and this part of the business I cannot endure. I am assailed by letters from every quarter, urging me to do something in my own defence, which I am very willing to do if I wist what to do; but I am so apt to run wrong that I dare not trust myself without asking your advice. Shall I answer him in print—pursue him at law (to which it will soon come if I answer him)—or knock out his brains? I must do something, for I am told there never was a man so ill-used in Britain; and truly I do not think there ever was. . . . . Will you suffer your liege yeoman to be guided this way, and advise him to take all patiently? You were angry at me the last time I went to law, and, as a small arlepenny, made me pay the piper damnably; and though I am burning for a mischief again, I shall [not] be free of entering on it this time without advice. Now, dear Sir Walter, though I have written this in bed for sheer amusement, I want a serious line from you what you think on the subject. I am lying sick of the measles, and not like to get readily free of the distemper, else I would have been down seeing Laidlaw, Lockhart, and yourself this week, which has for several years been the one I always paid my yearly homage. Yours, ever most affectionately, James Hogg."

We have left out some remarks by Hogg about Blackwood and pecuniary affairs. He quarrelled with most of his publishers, and generally had the wrong side of the quarrel. About a year after the date of the above letter, Professor Wilson commenced his *Noctes*—the Shepherd being the prime interlocutor; they were continued till 1832, then stopt for two years, and resumed in 1834, by the voluntary act (as appears from Mr Rogers' *Modern Minstrel*) of Professor Wilson, who remitted to the Shepherd a *solatium* of five guineas a sheet.

The collected works of this self-taught genius and remarkable man are comprised in eleven volumes—five of poetry and six of prose. His tales are more popular in America than in this country. They contain true and affecting transcripts of nature, but often run into exaggeration, coarseness, and indelicacy. His *Shepherd's Calendar* is the best of his prose works, and must always be interesting for its genuine representation of pastoral life. His shepherds and shepherds' dogs are as faithfully delineated and as distinctly marked as those on the canvas of Landseer. As a poet Hogg is not only the best imitator of Scott, but has a vein of wild imagination peculiarly original. Nothing can be more exquisite than some of his lyrics and minor poems—his *Skylark; When the Kye Comes Hame;* his verses on the *Comet* and *Evening Star;* and his *Address to Lady Ann Scott*, the last combining the most beautiful and touching description of cottage life among the solitary hills, with a certain solemnity of feudal homage and religious feeling tinged with the lights of a poetical superstition. The *Queen's Wake* unites his characteristic excellences—his command of the old romantic ballad style, his graceful fairy mythology, and his aerial flights of imagination. The story of Kilmeny stands by universal consent at the head of all our fairy tales: it is inimitable for its scenes of visionary splendour, purity, and bliss, linked to the fairest objects of earthly interest, sympathy, and affection. In such compositions Hogg seems completely transformed; he is absorbed in the ideal and supernatural, and might have claimed, over all his contemporaries, the Delphic laurel for direct and immediate inspiration. (R. C—S.)

HOGSHEAD, a measure of capacity, containing 63 old wine gallons, or 52½ imperial gallons. The English hogshead was 51 gallons; but the London hogshead of beer was 3 gallons more, and of ale 3 gallons less. All these measures, however, are now superseded.

HOGUE, or HAGUE, CAPE DE LA, a bold headland of France, forming the N.W. extremity of the department of Manche, 16 miles N. by W. of Cherbourg. Off this point the combined English and Dutch fleets defeated the French 22d May, 1692.

HOHENLINDEN, a village of Bavaria, circle of Upper Bavaria, 18 miles E. of Munich, celebrated for a victory gained by the French and Bavarians over the Austrians, 3d December, 1800.

HOHENZOLLERN-HECHINGEN and HOHENZOLLERN-SIGMARINGEN were two sovereign principalities of Germany, of which the capitals were Hechingen and Sigmaringen. The territories are contiguous, and are completely inclosed by Wirtemberg and Baden. H.-Hechingen, the more northern of the two, has an area of 116 square miles, and contained in 1850, 20,471 inhabitants. H.-Sigmaringen has an area of 433 square miles, and in 1850 had 41,141 inhabitants. By treaty of 7th December, 1849, the reigning princes ceded all sovereign rights over their respective principalities to the king of Prussia, in return for the payment to the prince of H.-Hechingen of an annual rent of 10,000 thalers (L.1450), and of half that sum to his legitimate heir; and to the prince of H.-Sigmaringen, and his heirs in succession, of an annual rent of 25,000 thalers (L.3750), the princes still retaining possession of their estates. By a family compact, dated 3d February, 1850, and executed 10th May, 1850, the prince of H.-Hechingen made over all his hereditary possessions to Prince Antony of H.-Sigmaringen. By royal decree of 20th March, 1850, the title of highness was conferred on the two princes, with the prerogatives of younger princes of the royal house.

HOLBACH, PAUL THYRY, BARON D', a French *philosophe* of the eighteenth century, was born in 1723 at Heidelsheim, in the Palatinate. He was brought up in Paris, spent the greater part of his life in that city, and died there in 1789. His name has been saved from oblivion more from his connection with the French encyclopædists, and his judicious patronage of rising literary merit, than from the intrinsic merit of his own works, though these are very numerous. His house in Paris was the rendezvous of those spirits whom Mme. Geoffrin had found too daring to receive at her philosophical dinners, and for forty years was the centre and hot-bed of the new philosophy of which Diderot, Helvetius, and Grimm were the chief apostles. D'Holbach was a man of considerable means, of which, he expended no small part on the pleasures of the table; and it was believed that the good cheer of the baron's board was quite as attractive to his guests as his own conversation. The baron himself was a freethinker of the lowest type, and as much an atheist as a man can be. Like most persons of that stamp he was superstitious, and as credulous as a child. His materialism was of so gross a kind that some of the finer spirits of the age eschewed his society altogether. The discreet D'Alembert shunned him; Buffon maintained a haughty reserve; and J. J. Rousseau openly quarrelled with him. Much interesting gossip about the baron and his connection with the new opinions is to be found in Grimm's *Correspondence.* Besides contributing largely to Diderot's *Encyclopédie*, D'Holbach wrote a *Système de la Nature*, which Voltaire condemned, and with good reason, as "bad in diction, absurd in philosophy, and execrable in morals." The work is indeed villainous in its purport, and one of the most unblushing and flagrant attacks ever made on morality; but it is so excessively pointless, diffuse, and ill-argued as to be comparatively harmless. Still worse, if possible, is his *Christianisme Dévoilé* (Christianity unmasked), the object and the ultimate fate of which were nearly the same as those of the work already mentioned. All these works are now happily forgotten.

HOLBEACH, a market-town of Lincolnshire, 37 miles S.S.E. of Lincoln. The church is a large and beautiful structure, with a tower surmounted by an elegant octagonal spire. It has a well-endowed free grammar school, an hospital for fourteen poor old men, and a public library and news-room. The inhabitants are chiefly engaged in agriculture, the land in the neighbourhood being very fertile. Market-day, Thursday. Pop. (1851) 2245.

HOLBEIN, HANS or JOHN, the greatest of the old German masters after Albert Dürer, is generally described as a native of Basle. The fact, however, is that neither the place nor the date of his birth is known with certainty. The people of Augsburg claim him as their townsman, as do also, and on better grounds, those of Grünstadt. The common accounts assign his birth to the year 1498; recent researches place it three years earlier. His father was an artist of some note, but his fame was soon lost in that of his son. While studying at Basle, Holbein made acquaintance with Erasmus, of whom he painted many portraits, and who often seriously warned him against the consequences of his fondness for drinking and low company. By the advice of this monitor he removed to England, where his introduction to Sir Thomas More opened up to him the path of wealth and fame. For three years this generous patron entertained him in his house, and at the end of that period introduced him to the king, Henry VIII., who took the artist into his service, and made it a fashion among his courtiers and great nobles to have their portraits taken by his hand. The demands on Holbein's time were soon so great that he had to abandon altogether the higher branches of his art, for which he had discovered a decided genius before leaving Switzerland. His historical pieces are consequently very few in number, but his portraits bear so decidedly the imprint of genius that his name still ranks high among the best portrait-painters of the world. Holbein died at London of the plague in 1554.

Holbein was one of the few artists on record who used his left hand in painting. His extensive practice enabled him to excel pre-eminently in portraits; but he painted with equal ease in fresco, water-colours, and miniature; and his boundless fancy showed itself in the countless designs which he drew for statuaries, engravers, and goldsmiths. It is not fair to judge of Holbein's merits by the pieces which pass in thousands under his name in England. His masterpieces, which are chiefly confined to that country, are known to have been multiplied in copies of every degree of merit, and these copies are frequently palmed off on the picture-fancier as originals. A genuine Holbein ought to be characterized by a very bold relief, the most exquisite finish, the highest clearness and delicacy of tone, and a remarkable force of conception. A selection of his portraits, to the number of 84, was engraved and published by Bartolozzi, in London, 1792–1800, with biographical notes by John Chamberlain. The well-known work entitled the *Dance of Death*, which passes under Holbein's name, is not his at all, though it is true that he drew a series of designs on this subject, which are now in St Petersburg.

HOLBERG, Baron Ludwig, the father of modern Danish literature, was born at Bergen, Nov. 6, 1684. He was born of poor parents, and had long to struggle against poverty. His father, indeed, rose to be a colonel, but he rose from the ranks, and died while his son was but a child. Young Holberg was at first destined for the army, but he preferred study. Having studied theology at Copenhagen, he became successively tutor in several families. We find him teaching French at Christiansand, to which he had proceeded after being attacked by fever in Holland. Shortly after this he made his way to Oxford, where he remained fifteen months teaching music and studying history. Having obtained the tutorship of a family of some importance at Copenhagen, Holberg next visited Germany in company with his charge. After visiting Rome he returned to Denmark. Here he was appointed successively to the chairs of metaphysics and eloquence. Hitherto his life had been one of considerable hardship, but now ease, emolument, and fame, were in his path. In his own interesting account of himself, he mentions that it was not till he was upwards of thirty years of age that he was suddenly seized with the desire of composing in verse. In a short while his *Peder Paars* appeared, and was received with great applause. A national theatre was now founded in Copenhagen, for which Holberg wrote extensively. But the theatricals patronized by Frederick IV. were discouraged by Christian VI. Holberg accordingly turned his attention from comedy to history. Here also he excelled. He wrote the *History and Geography of the Danish Monarchy*; *Ecclesiastical History*; and *Jewish History*. His brethren in the university, who had looked upon the effusions of his comic muse as beneath the dignity of a professor, were now proud of him. He was made rector and treasurer in 1735 and 1737 successively. In 1746 Christian VI. died, and Holberg was henceforth free to devote himself to comedy, which, indeed, he had never altogether lost sight of.

He wrote upwards of 30 comedies. The *Pewterer* was a burlesque on the eagerness of political tradesmen for trying their skill in government on the strength of having read a few pamphlets. It was received with great applause; and has been frequently imitated as well as translated. *The Idle Business, or the Man who has no Time*, is considered by the Danes to be Holberg's masterpiece. He is supposed to have taken the idea of the piece from an English comedy called *The Busy Body*. His piece called *Honourable Ambition* is regarded as very nearly placing the author on a par with Molière. Having travelled in Holland, Germany, France, and Italy, as well as having risen from poverty to high station, Holberg had large experience of men and manners, which he turned to good account. His imagination was rich and original, his estimate of character accurate, his humour always diverting, and the management of his plots ingenious. His expressions, however, are at times coarse, he occasionally exhibits carelessness in minutiæ, and renders his burlesque sometimes extravagant.

Besides comedy and history, he wrote poems. *Peder Paars* has been already noticed. *The Subterranean Journey of Nicolas Klim* has been translated into most European languages, and although a satirical piece, it is said to have been gravely quoted as history by a German naturalist. The revenue which arose from his writings was very considerable. Though he lived frugally, he was liberal in largely endowing an academy, and an institution for poor girls. He was lean and delicate, and abstemious. He disliked and satirized pedantry. He was fond of the society of ladies, amongst whom he had only small talk and tea to encounter. His religious convictions regarding Christianity were by no means deep. He was created baron on the 6th March 1747, and died 27th January 1754, at the age of seventy. His character as a comic writer is drawn by Professor Rahbeck, who published the select works of Holberg in 21 vols. 8vo, Copenhagen, 1806–1814.

HOLINSHED, or Holingshed, Raphael, author of the *Chronicles of England, Scotland, and Ireland*, flourished in the sixteenth century. He seems to have been educated at one or other of the greater universities, and to have taken orders in the church; but the only fact in his history known with tolerable certainty is that he died in 1580. In the chronicle called by his name he bore a leading, but not an undivided share, as he received important aid from Stow, the antiquary; Harrison, a clergyman; Hooker, an uncle of the divine of that name; and Francis Boteville, a man of great learning, especially in antiquarian matters. Holinshed's share in the work comprised the history of England up to the date of the Norman Conquest, and from the Norman Conquest down to the year 1577, at which date the first edition of the *Chronicle* was published. The notice of Elizabeth's reign contained matter so offensive to her and her court that in the second edition, which appeared in 1587, some of the sheets were cancelled altogether. In subsequent reprints, however, these have been restored. The history of Scotland, incorporated by Holinshed in his *Chronicle*, is for the most part a translation from the Latin of Hector Boece, and is interesting as having furnished Shakspeare with the groundwork of his tragedy of *Macbeth*. The *Chronicle*, from being the work of so many different hands, presents, of course, great varieties of literary quality. Its real value depends on its learning and research, which have made it an invaluable aid to all who have since undertaken to illustrate the early annals of England.

HOLKAR, the name of three Mahratta chiefs, who at various times made themselves formidable to the British empire in India. See Hindustan.

HOLLAND.

HOLLAND is an European kingdom, formed in part of islands, but chiefly of that part of the Continent where the mouths of the Rhine are divided into several branches before it enters the German Ocean. This district is said to have owed the ancient name of Batavia, by which it was known to the Romans, to one Bato; but at what period he flourished is unknown; and the name is now scarcely used excepting amongst the poets of the district. By accounts collected from the works of Cæsar and Tacitus, we learn that the ancient tribes who inhabited this portion of Europe had been able to maintain their independence in spite of the attempts made to subdue them by the Teutones, the Cimbri, and other nations, who had conquered the rest of what was then called Gaul. The Batavians, says the last of these historians, excelled all the other people on the Rhine in military spirit. When subdued by the Romans they paid their tribute in soldiers; and from them was formed a cavalry, which composed the most efficient part of the Roman armies. They astonished the Dacians by the dexterity and bravery with which, completely armed, they swam their horses across the Danube to attack those people; and for a long period they formed the guard of the Roman emperors. A body of Batavians accompanied Agricola on his expedition into Britain, and were of great assistance in securing his conquests in the island.

Although the Romans at length overcame the Batavians, it was after a strenuous resistance. The last that submitted was the tribe of the Frisons, who inhabited the marshes. Drusus, the Roman commander, constructed a canal between the Rhine and the Zuyder Zee, and thus opened a way into the German Ocean to the Ems and the Weser, by which he was enabled to penetrate into the heart of Germany, and to subdue that country. During four centuries the Batavians formed part of the Roman legions; but amongst these, after the reign of the Emperor Honorius, their name is no longer to be found.

After that period the islands were overrun by the Franks; and the transactions relating to them have been mixed up with those of the adjoining Belgians. The Frieslanders, however, opposed and broke through the armies of the Franks, and made their appearance as a free, and in some measure a victorious people, on the left bank of the Rhine; and there, adhering to their ancient customs, upon which had been engrafted many of the principles introduced by the Romans, they long maintained their independence. These people had suffered the least from the invasion of foreigners, and retained through several centuries distinct traces of their ancient constitution, their national spirit, and their national manners.

In the fifth and sixth centuries the kingdom of the Franks, which had arisen out of the ruins of the Roman power, gradually extended itself, and in the seventh had subdued the last of the Batavian people, the long resisting Frisons. Under Charles Martel the last conquest was achieved, and a way opened by his sword for the introduction of the Christian religion.

When Charlemagne had obtained his extensive dominion, and the feudal system was introduced, and continued under his successors, the powerful vassals of the crown, to whom the lands were granted, by degrees acquired a sort of mitigated sovereignty; but being unable to maintain themselves without the assistance of their under feudatories, they were compelled, in order to secure their fidelity, to grant them advantageous conditions of tenure. The clergy, too, by pious usurpations or pious donations, became a powerful and independent corporate body. Thus, during the tenth, eleventh, twelfth, and thirteenth centuries, the whole of Belgium and of Batavia was split into several small dominions, the princes of which acknowledged a limited allegiance, some of them to the German empire, and others to the kings of the Franks. During this period Brabant, and afterwards Luxembourg, Limburg, and Gueldres, obtained the name of dukedoms; Flanders, Holland, Zealand, Hennegau, Artois, Namur, and Zutphen, were ranked as Graafschappen or countships. Utrecht was a bishopric, the prelate of which exercised civil authority also in Overyssel and Groningen. Amongst all these chiefs the Count of Flanders was the most powerful; and as, in 1383, that countship fell to the then more powerful house of Burgundy, the prince of that family, partly by intermarriages, partly by force, and partly by voluntary or purchased submission, obtained supreme authority over the whole of what became the seventeen provinces of the Netherlands.

This appears to have been the most flourishing period of these provinces. Agriculture was carried on with spirit, skill, and abundant results. Manufactures of linen, and especially of woollen goods, gave occupation to an increasing population; and foreign commerce was extensive and profitable. The commodities of India brought to the Italian cities were transmitted to Antwerp, Bruges, and some other places, where extensive depôts were established for foreign and domestic goods, and where, at the periodical fairs, the merchants of the northern kingdoms of Europe resorted, and transacted their commercial affairs.

The government of the Dukes of Burgundy was tempered by the privileges enjoyed by the cities, and by the nobility who possessed the land; and, though contests frequently arose between the sovereign and the states, they rarely came to open hostilities. When disturbances occurred, they were not of such duration, or so extensive, as to interrupt in any great degree the rapid growth of general wealth and progressive improvement.

Charles the Bold, the last of the Dukes of Burgundy, lost his life in a battle with the cantons of Switzerland in 1477. His eldest daughter Maria married Maximilian, duke of Austria, and received the Netherlands as her portion; and her grandson, born at Ghent, afterwards Charles V., emperor of Germany, thus became sovereign of those countries and of the kingdom of Spain from the moment of his birth. Before the marriage of Maria, and also under Maximilian, when he had become emperor and guardian of his son, attempts were made to lessen the influence of the states. But these were powerfully resisted by some of the cities, and especially by Bruges, in 1487, and by Sluys about the same time. Bruges was sufficiently strong to resist the encroachments; but Maximilian, in despite of its privileges, blocked up the port of Sluys for ten years, which caused the foreign ships that before crowded to that place to repair to Antwerp and Amsterdam; and these cities from that period became the two principal seats of foreign commerce.

The Netherlands, at the end of the fifteenth century, became the great school for the fine arts. These had been introduced from Italy; and the artists of the Low Countries were soon successful rivals of their masters of Florence, Bologna, and Venice, in painting, in statuary, in architecture, and in engraving. The art of printing, if not invented, was first made known at Haerlem, and was soon practised in other cities of the Netherland provinces.

At the accession of Charles V. the situation of the Netherlands became widely changed. Instead of a paternal government, the chief of which in a great measure depended on the prosperity of these provinces, they were converted into a dependent, and, though rich and populous, an insignificant part of a large empire, to the promotion of whose greatness, whether for good or for evil to themselves, they must in future be almost wholly subservient.

Between the Flemings and the Spaniards an excessive distaste was mutually felt, which soon attained to the most inveterate hatred. This originated in the difference of genius, of manners, customs, and mode of government, and was quickly increased by the regret natural to a powerful people, such as those of the Netherlands deemed themselves, at being incorporated, and thereby almost swallowed up, by another nation. Steps were early taken by Charles, under the pretence of introducing unity in his territories, that had a tendency to undermine the privileges which the Netherland states had zealously defended and long maintained. Before his accession a legal tribunal had been established at Mechlin, to which appeals might be made from all the legal tribunals of the confederate states; and as none but natives were judges, and their decisions were guided by the ancient laws, it was looked up to with confidence, and considered as a security to their constitutions. This tribunal was, however, nullified by being placed under an imperial court, established at Brussels, several of the members of which were foreigners, and all of whom were dependent on the royal favour alone. This imperial court was naturally viewed with a jealous eye, and was ill adapted for the protection of those rights to which the people were attached.

The growing expenses of the hostile operations of Charles in other parts of his extended dominions, made his demands on his Netherland subjects much heavier. In spite of their ancient right of levying taxes, he imposed some that were new, and increased others. The history of this reign contains constant repetitions of subsidies required, which were at first rejected or deferred, but at length yielded, though with reluctance and discontent.

Another subject of murmuring was the introduction of foreign troops, that is, forces belonging to the other dominions of the emperor, as well as recruiting his armies in the Netherlands without the consent of the states; circumstances which, besides being contrary to the constitution, involved them in wars to which they were indifferent or repugnant, and which were injurious to their interest as a commercial people.

Charles felt that the commerce of his subjects could alone enable him to extract from them those pecuniary supplies which his general government needed; and so far he protected their manufactures and mercantile affairs, and in some cases even recalled edicts, at the requisition of his Flemish subjects, which he would have without hesitation enforced at Madrid. The most influential of all the causes which arose in the reign of Charles V. was the religious reformation which had commenced in Germany, had spread in France, and from both these countries had been introduced into the Netherlands, chiefly in the trading cities, and in them had gained numerous adherents. The full effect of this, and of the other causes which have been here noticed, did not appear until the abdication of the emperor had elevated his son Philip II. to the extensive dominions of his father.

The religious excitement gave some uneasiness to Charles, and measures were feebly applied to check the progress of the new opinions, to which, when not actuated by political views, he at one time seemed not to be strenuously inimical. Had the emperor been disposed to severity towards the professors of the Protestant tenets, any measure of that nature would have affected the interests of commerce, and have tended to diminish the revenues he drew from that source. The foreign merchants who had establishments, or frequented the fairs, in the Netherlands, brought with them from Germany, England, France, and other countries, the doctrines and the writings of the Protestants. These were diffused amongst the natives, and made a great impression; and any attempts to destroy their intercourse, or to punish them for their opinions, would have driven commerce, as it did a few years later under Philip II., to the other markets of Europe, where greater religious freedom was enjoyed.

Towards the close of his reign, Charles issued indeed some most severe laws against those who professed the new religion. These were in some cases applied with unfeeling cruelty, though they tended but little to diminish the progress of the dissident principles. He had resolved, after the successful issue of his wars in Germany, to reduce his Netherland subjects to uniform obedience to the Roman Catholic religion, and for that purpose he designed to have introduced the Inquisition. The fear alone of that dreaded tribunal in Antwerp suspended immediately all commerce, and the most eminent foreigners made instant preparations to remove. There were neither buyers nor sellers to be seen, the value of the buildings was destroyed, and all the operative labourers were discharged. Money totally disappeared, and no taxes could be collected. At the earnest recommendation of the Duchess of Parma, as vice-regent, this edict was suspended. The common tribunals were directed to practise no molestation on the foreign merchants; and, instead of the Inquisition, a milder court, at least in name, was framed, and called the ecclesiastical tribunal. In the other provinces, however, much severity was beginning to be practised, not long before the abdication of Charles; but, severe as these were, the remembrance of them was speedily obliterated by the more savage cruelties practised under the reign of his son.

The reign of Charles was, upon the whole, beneficial to the United Netherland Provinces, and he left that division of his dominions in a most flourishing condition; so that for its extent it was by far the most considerable state in Europe. Their taxes were by no means heavy, though their trade was most extensive; and the mechanical genius and persevering industry of the inhabitants had rendered the Low Countries the workshop of Europe. When the emperor, at his solemn abdication, delivered over these provinces to the rule of his son, they are reported to have contained three hundred and fifty cities, and six thousand three hundred towns and large villages, besides numerous hamlets, farm-houses, and castles. These comprehended the four dukedoms of Brabant, Limburg, Luxembourg, and Guelderland; the seven countships of Artois, Hennegau, Flanders, Namur, Zutphen, Holland, and Zealand; the margravate of Antwerp; and the baronies of Friesland, Mechlin, Utrecht, Overyssel, and Groningen. Statistical researches were not much practised at that period, and no accurate views can be obtained of the extent of the population; but there is good reason to conclude, that, though at present the Netherlands are the most densely peopled of any part of Europe, the numbers then were more than equal to what they are now. The seven provinces which afterwards formed the republic were probably less populous; but the other divisions, where manufactures were more generally carried on, were, from all accounts, proportionally more crowded. Philip II. ascended the throne on the abdication of his father in October 1555. He had been educated in Spain, and had imbibed the retired and stately manners of that country. He spoke no other language but Spanish, and, except the short time he had passed in England after his marriage with Queen Mary, he had scarcely ever left the peninsula. He was most zealously attached to the Roman Catholic religion, and not less so to the unrestricted exercise of arbitrary power. He was distrustful of those who administered public affairs, was nearly invisible to his subjects, and the few who had access to his presence were commonly disgusted both with his manners and with the punctilious formalities with which their introduction was attended. He was deemed insensible to human sufferings, and was equivocating, if not insincere, in the replies he made to the petitions of his subjects.

He remained in the Netherlands from his accession in 1555 till August 1559, when he embarked for Spain, and never afterwards returned. The measures he introduced during his stay, his repulsive manners, and the humours he displayed at his departure, all tended to strengthen that aversion, mingled with suspicion, which had begun to manifest itself during the reign of his imperial predecessor.

The most obnoxious measures to the people were, first, a design to abolish several of the monastic establishments, in order that their estates might be converted into revenues for new bishoprics, the incumbents of which were to be the instruments of introducing the Inquisition into the provinces. That institution was held in such abhorrence, that it encountered every obstruction which could be opposed to it, both by the Catholics and the Protestants. It had met also, at the court of Rome, some obstacles which caused delay, so that the arrangement was not completed when the king departed for Spain. The second cause of complaint was the retention of foreign forces within the states. When the king came to the throne, a war was carried on with France; but the French having been signally defeated at the battle of St Quentin in 1557, a peace was, after long negotiations, completed at Chateau-Cambresis. The withdrawing of the troops, consisting both of the Spanish infantry and of some German auxiliaries, was eagerly looked for by all the inhabitants. The latter were disbanded and sent home, but the former were retained, and proved dreadfully oppressive to the country. Vander Vynckt, the faithful historian of Flanders, says, "the Spaniards were so elevated with their late successes against the French, that they thought the ransom or the pillage of the whole of the Netherlands would be an insufficient recompense for the actions they had performed. They lived at free quarters on the country, and trampled upon the people without pity." In fact, receiving little or no pay, or that pay being much in arrears, they were of necessity instigated to all kinds of disorders, and led to practise the most abominable oppressions. The remonstrances of the states were coldly received, and though assurances were given that the grievance should be removed, and the period for it was fixed, it was delayed from time to time, and ultimately consented to in appearance only, as they remained on the frontiers, ready to re-enter when the ulterior measures which were in preparation should require their assistance. As one means of delaying the departure of these troops, two legions were proposed to be placed under the command of the Prince of Orange and Count Egmont, two of the most patriotic and popular of the nobility. But their integrity resisted the temptation; they declined the command, and this rendered the continuance of the troops the more obnoxious.

A third cause of complaint was, a violation of the ancient constitution of the states, by introducing into the higher executive and judicial offices persons of foreign birth. When Philip left the Netherlands, the government was conferred on the Duchess of Parma, a natural daughter of the Emperor Charles V. She was to be assisted by a council of state, composed of the Prince of Orange, the Counts Egmont and Horn, Granvelt bishop of Arras, Count Barlaimont, and Vigilius de Quichem. But by secret orders, but which soon transpired, a committee of this council, consisting of the three last named, was empowered in most cases to communicate alone with the duchess, and in all cases to decide on the advice which was to be given to her. Thus the Prince of Orange and the two counts were mere ciphers, and rarely attended the council. Barlaimont was a mere creature of Granvelt, who attended only to the finances, of which he was chief, and was commonly absent when other affairs were under consideration; Vigilius was a man of profound scholastic learning, very politic, and very yielding; so that, in fact, the whole power was conceded to Granvelt. He was a native of France, and had distinguished himself by his learning, but more by his subservience to the rigour and the caprices of Philip. By these means, from the low condition of a parish priest, he was raised to the episcopal rank, and finally to the dignity of a cardinal. His being a foreigner was the pretext, but his arbitrary disposition and intolerant rigour the causes, of general aversion; and the firmest and most pointed representations of the assemblies of the several states were solely but unavailingly directed towards him. He alone conducted all affairs, and to him the secret orders of the king were conveyed.

The three members of the council who had been named on account of the estimation in which they were held among the natives of the Netherlands, though they were utterly inefficient as members of the board, should not be passed over without short notices of their rank and character, on account of the vast interest which has been excited by the events they directed, and the fates they experienced.

William of Nassau, prince of Orange, was one of the greatest men of his own or any other age. He had in his youth been brought up in Germany, his native country, amongst Protestants, whose creed his father had adopted. Being of an illustrious house, he was early introduced to the Emperor Charles, whose favour and confidence he obtained, and he was employed by him in some most honourable commissions and embassies. He came to the possession of the family inheritance on the death of an uncle and a cousin, consisting of extensive estates in Burgundy and the Netherlands, and thus was by far the richest of all the nobles of the country. By his wealth he was enabled to live magnificently when ambassador in France and in England, and afterwards at home when governor of the provinces of Holland and Zealand. He was as highly estimated in foreign countries as in the Netherlands, and had formed numerous alliances and friendships in England and France, and others still more considerable in Germany. He was a man of penetration, courage, and resolution, with enlarged and accurate political views. His measures were maturely considered, but when once determined upon, nothing could shake them. In the greatest adversity he was firm and tranquil, and he possessed in his mind inexhaustible resources. He was remarkable for his taciturnity, from which circumstance he was sometimes distinguished by the name of William the Silent. An Italian proverb has appropriately described him, *Tacendo parla, parlando incanta.*

Lamoral count Egmont was also a nobleman of the first rank, of a family originating in Holland, some members of which had in former times been the sovereign Dukes of Guelderland. His mother, the heiress of the house of Luxembourg-Fiennes, had brought to the family of Egmont estates in Flanders of vast extent and riches. He was adored by the inhabitants of Flanders and Artois, of which provinces he was the governor, and was generally considered as the fittest person to have filled the dignity held by the Duchess of Parma. He was generous, frank, disinterested, and open hearted. He was besides a good general, possessing intrepid courage, and had distinguished himself in the war with France. He was less adroit than the Prince of Orange, and had less of foresight, but he was as eminent in the field as the other was in the cabinet. These men were at one time rivals for power, but a common interest closely united them. Philip de Montmorenci, count Horn, was an admiral, and in his command of the naval forces had displayed the most intrepid courage, and had rendered great service to the Spanish government. He had been governor of the provinces of Zutphen and Gelderland, and by the management of Granvelt had been suspended and sent into Spain, where he is said to have acquired a thorough knowledge of the operations intended against the liberties of his country, and communicated them to the Prince of Orange. He was reported also to have then had some intercourse with Don Carlos, the heir to the throne of Spain, who himself was supposed to feel differently on the affairs of the Netherlands from his father King Philip.

With these three leaders were connected others of rank nearly equal, the whole of the inferior nobility, and a very large majority of the burghers, merchants, and manufacturers of the cities and towns; and in particular almost the whole of those people who were connected with maritime transactions, either as owners or navigators of vessels.

We return now to the causes of complaint which were made in the Netherlands. The fourth of them was, the omitting to call together the general assembly of the states. Though under the reign of the Emperor Charles the power of that body had been much curtailed, they were yet the organ of the opinions and feelings of the more respectable part of the nation. Their views and complaints were freely communicated to the government, and exercised influence on its decisions. One of the last and most decisive instructions given by Philip to the Duchess of Parma, before his departure for Spain, forbade the assembling of this body.

The chief points upon which the subjects felt aggrieved are only here noticed, though there were many others, some of a minor and some of a local nature, all which, combined with the general disgust felt towards Spain and the Spanish monarch, tended to shake the authority of the king, by indisposing the civil tribunals from following up with zeal the ordonnances which from time to time were issued by the sovereign.

These complaints had at a very early period excited secret associations amongst the nobility and gentry which were in opposition to the extension of the severe penal laws. One of these associations was formed as early as 1556, by Martiner baron of St Aldegonde in Breda, a confidential friend of the Prince of Orange. He, with ten or twelve others of equal rank, drew up a declaration, then known by the name of the *Compromise.* It contained execrations against the Inquisition, which it painted in the most horrible colours. It accused foreigners of having seduced the king to refuse the abolition of his rigid ordonnances, that they might be enabled to gratify their ambition and their avarice; and it concluded with declaring, that they were united to assist the oppressed, to resist violence, and, above all things, never to submit to the establishment of the Inquisition. When this compromise had been signed at Breda, numerous copies of it were made and circulated throughout all the provinces, from Artois to Friesland. It was signed with avidity by all classes, from the highest nobility to the lowest artisans. This association at length became so extensive and bold as to determine on an application to the regent, for which purpose the leaders requested an audience, that they might lay their complaints before her. This request, after much hesitation and with some symptoms of alarm on the part of the government, was at length granted. The nobles assembled at Brussels, attended, according to the custom of the age, by their numerous followers, and, marching to the palace in a long train in regular order, were admitted to an audience. The address was read by Brederode count of Utrecht. It contained strong professions of obedience and loyalty, and asserted that the associates were innocent of the charge of which they had been calumniated, of having entered into engagements with foreign powers. In conclusion, a convocation of the states-general was requested, and in the mean time a provisional suspension of all inquisitorial measures and proclamations, until a reply could be received from the king, who was then in Spain. An equivocal reply was given, the substance of which was merely that more temperate measures would be pursued till the orders of the king were received.

This assembling of the nobles gave to the associates a name which was assumed and long continued as a mark of distinction. During the audience at the palace, the duchess appeared somewhat alarmed at the great number of persons which composed the deputation. Count Barlaimont, one of her suite, in order to calm her disquietude, whispered, but sufficiently loud to be heard by those who were nearest, that they were nothing more than *un ramas de gueux,* a crowd of beggars. On this being reported at a convivial meeting of the nobles, one of them, as a toast, gave *vivent les gueux,* which was received with acclamation, and the name afterwards adopted; and their clothing and ornaments were so worn as to exhibit emblems like those in use amongst conventual mendicants and other beggars, one of the most distinguishing of which was a sack thrown over the shoulders, on which was frequently painted the motto of the association, *Fidèle au roi jusqu'à la besace.*

The exhibition of strength on the part of the associates led to a series of negotiations between the vice-regent and the party, which at length was terminated on the 23d of August 1566, by the duchess provisionally, till orders could be received from Spain, agreeing to suspend the introduction of the Inquisition, and in the mean time to submit her other measures to the revision of the states-general.

Even this kind of truce was only conceded in consequence of some tumultuous and outrageous assemblages, partly excited by the Protestant preachers, but of which they soon ceased to have any power of direction or control. The assemblies first collected by field preachers were composed of those who had imbibed the Protestant opinions, and were held on the frontiers of Liège, about St Trond. They were soon joined, out of curiosity, by numbers anxious to hear the new doctrines, but speedily afterwards by all the wandering tribes of outlaws, vagabonds, and plunderers; and at length they became so numerous that no resistance could be made to them in the open country, or even in the cities which were not fortified and well garrisoned. The Catholic writers of the period represent these assemblages as being composed principally of the sectarians of Germany and the Calvinists of France, joined to the Anabaptists of Leyden and other parts of Holland. It seems evident, however, that these were very early outnumbered by others whose chief objects were plunder and destruction. Their first operations were to attack and rob the monasteries in the open country; they then seized on the churches, and destroyed all the images and other appendages of the Catholic worship, carrying away with them whatever was portable and valuable. The peaceable inhabitants appeared everywhere panic-struck, and the desolating power thus let loose was opposed by no obstacles; so that at length all the cities except Brussels were more or less subject to the depredators. Ypres, Tournay, Valenciennes, and Oudenarde suffered the most. At Antwerp the Prince of Orange suspended the destruction as long as he remained there, but after his removal the insurgents gained the superiority, and were enabled to destroy the images and ornaments of the cathedral, as well as those of the other churches and monasteries, in that city. This devastation was like a hurricane, and though the storm passed over in a short space of time, its effects were frightful, and its destructive operations extensive.

The duchess, though about to leave Brussels, and seek safety in Mons, was persuaded by her council to remain in the capital, where intimidations on one side, and proposals to treat with the insurgents on the other, were urged with vehemence. To the latter she at length yielded, and authorized the Prince of Orange, with the Counts Egmont and Horn, to treat with the chiefs of the insurgents, who still continued in St Trond. This measure was so far successful for the time, that, after the provisional agreement already noticed, a treaty was concluded with the leaders at St Trond, and signed on the 25th of August. It was agreed that the preachers might continue their religious practices in the places where they actually did exercise them, that the people might attend them, but unarmed, and cause no trouble to the Catholics. The nobles were to renounce the confederation, and all were to lay down their arms, and assist in restoring and re-establishing the estates, the churches, the monasteries, and the hospitals that had been plundered, and indemnify those who had suffered.

A temporary lull was thus procured, though frequently interrupted by local explosions. All were waiting with impatience for intelligence from Madrid, whither couriers were immediately forwarded after the pacification, with despatches from the duchess to King Philip. The letters to Spain were expressed in the most melancholy strain. The duchess confessed that she had granted to the insurgents terms that were degrading to herself, and which she could not relate without shame and grief. She affirmed that she had long resisted, but, weakened by fever and sleepless nights, had at length yielded; that with anguish of mind and bodily pain, and the fear of greater evils, she had granted pardon to the rebels, and had acceded to their demands, but that she had done nothing in the name of the king, but only in her own; and that he might disavow and undo what she had done, as his majesty was no party to the acts. The despatch concluded with an earnest solicitation that his majesty would not delay his journey to the Low Countries till the spring, but come immediately to Brussels.

Philip received the despatches at Segovia, where he was confined by sickness; and though he read and remarked upon them, no answer was returned till he was enabled to remove to Madrid and assemble his council. In that council it was seen that the vice-regent had in no way committed his majesty, and the answers were dictated under that assumption. Two despatches were drawn, one of them ostensible and the other secret. They are to be found at length in Strada, and the substance of them may be thus abridged. The first or public letter announced the birth of an infanta, and that the king had removed to Madrid to make the necessary preparations for his journey to Flanders; that a convocation of the states would be no remedy for the existing evils, but an injury to the honour and the conscience of the king; and that the best measure, in case of necessity, would be to repel force by force, in which circumstances she might securely count on the aid of the well disposed people. The secret despatch was more laconic. It enjoined attention to former orders, and to the public letter, on what related to the convocation of the states-general; and if any force was exercised towards the government, to trust to God and his providence, but to do nothing that should appear, either directly or indirectly, to have proceeded from the opinion of the king.

It was the policy of the court of Spain at this period to keep every thing in the Netherlands in a state of total suspense. For this purpose rumours were spread of the king's intended journey. The time was fixed, the preparations were made, the route was determined, and the attendants were named. It was however only a kind of grimace, though, to give it more the appearance of reality, application was made to the king of France for permission to pass, and also the Duke of Savoy was consulted respecting the fittest passage over the Alps, in case the king should proceed to Italy by sea. These measures satisfied almost the whole of the inhabitants that their sovereign would speedily appear amongst them. The Prince of Orange alone was not deceived. He had emissaries of talent in Madrid, in Rome, and in Vienna, and indeed wherever important intelligence could be obtained. In 1565 Catherine de' Medicis, with her son Charles IX., had a meeting at Bayonne, to which King Philip and his queen, a daughter of Medicis, were to have repaired. The king, however, did not join them, but the queen did. It was represented as a mere family party, at which the ambassadors of other states were not expected to attend. At the meeting the females concocted a treaty between the two kings, which was to be kept secret from all but themselves. It engaged to extirpate all heresy and heretics, not only from their own dominions, but from all the other parts of Europe in which Protestantism had already been embraced. The secret was well kept, and the meeting was attributed to some projected family marriages, which Philip represented to his ministers as a matter which would be best arranged by the females. Walsingham, the ambassador at Paris of Queen Elizabeth, within little more than a year gained the particulars of the treaty, and communicated them to his court, and thence the knowledge of it was conveyed to the Prince of Orange, who maintained the most profound secrecy till the most useful moment for its being made known had arrived.

It was generally believed that the prince had the most complete knowledge of what passed in the cabinet of King Philip, though it is now unknown if, as some suspected, he had the intelligence from his son Don Carlos, or, as others imagined, from one of his secretaries. It is said, that from his perfect knowledge of the transactions and opinions of the French court, and of what had passed at Bayonne, he had predicted the massacre of Saint Bartholomew, and had informed the Admiral de Coligny of the plot, putting him on his guard against the caresses and the treachery of the court, but which, unfortunately for the illustrious victim, did not save him from the miserable fate which he at length suffered. The Prince of Orange was possessed of large estates in Germany, and, by blood as well as by marriage, was closely connected with many of the smaller sovereigns of that country, who had embraced and introduced into their dominions the doctrine and the worship of the Protestants. Even the emperor, though a firm adherent of the Roman Catholic church, was in some measure influenced by him. He was induced to write to King Philip, expressing his good will, but pointed out to him that he was engaged in a war with the Turks, that a great part of Germany interested itself in the fate of the Netherlands, and that those who had adopted the confession of Augsburg would never allow the inhabitants of these provinces to be oppressed. He therefore recommended a negotiation with Orange, Egmont, and Horn, and offered his mediation to accommodate the differences. The court of Spain rejected this interference between the king and his Flemish subjects; but the knowledge of this correspondence served to strengthen the purpose of the Prince of Orange, who soon became acquainted with it, to adopt the precautionary measures which his situation required.

The Prince of Orange having learned, by his emissaries at the court of Madrid, that the preparations for the king's journey to the Netherlands were merely adopted to quiet and mislead the public, and that, on the contrary, it had been determined to pursue the most rigid measures, and intrust them to the Duke of Alba, determined on his course of action. He immediately resigned all the offices he held in the Netherlands, and withdrew himself and his family to his territories in the duchy of Nassau in Germany.

The Duke of Alba was reputed in that age to be cruel, crafty, proud, and avaricious; and his name was held in abhorrence throughout the Netherlands. Although it was resolved that he should have the sole power, yet the purpose was concealed even from the regent herself. Philip continued to assure her that he was resolved to come as soon as possible, and that the Duke of Alba only preceded him, to smooth the way, and so arrange affairs that he might on his arrival the more easily restore tranquillity; that in the mean time the duke would command the army, and attend to the fortifications, and the security of the country, but still in subordination to the authority of her highness. The knowledge of this appointment could not be long kept secret, and its disclosure produced universal consternation. The great nobles, such as the Prince of Orange, the Counts Calembourg, de Bergh, Brederode, and others, had early sold parts of their estates, and raised money by mortgages on the other portions of them. All that could, prepared for their removal. The inferior nobility, the rich merchants of Antwerp, the wealthy burghers of all the cities, resolved to expatriate themselves and their families. Soon after the mission of Alba was publicly made known, the duchess wrote to the king to say, that already more than one hundred thousand persons had abandoned their domicils and their country. The Low Countries were at that period at the height of prosperity. The cities were opulent and contiguous, the towns, villages, and hamlets, resembled the cities of other countries, and almost touched each other. It was most densely peopled, and so cultivated that no waste land was to be seen. The commerce was active, and the inhabitants, from industry, were easy in their circumstances, well fed and well clothed. They were the objects of envy to strangers, and viewed with peculiar jealousy by the Spaniards, who saw their condition, and compared it with that of their own country.

The emigrations caused by the first intelligence of the approach of Alba alarmed the duchess, who issued edicts designed to tranquillise the people, and these had some effect; but they were disavowed by orders of the king, and some who had been induced to return were subsequently the victims of their confidence. Afterwards, when the severities of Alba began to be exercised, the emigrations were increased; and though orders were issued to prevent it, and intrusted to the Spanish troops to execute, they came too late. A great number of families had expatriated themselves, and taken with them whatever of their property they could save. Those who were left were chiefly artisans, who could find no employment when their masters had forsaken them, and were thus compelled to seek the means of subsistence elsewhere. A great part of such as were capable of bearing arms joined the Prince of Orange, or enlisted in the armies which the princes of Germany created. Others of them sought an asylum in the imperial cities, and there exercised their trades. Some threw themselves into the Walloon country and into Picardy, for the interior of France was then in greater commotion than even Flanders itself.

The greatest removals however were to England, where, by the orders of Elizabeth, all the ports were open to them, where their property was protected, and where they introduced new fabrics of various kinds, and established those manufactures which have become in process of time the foundation of the commerce and the wealth of our country.

The Duke of Alba, in 1567, embarked with his army at Barcelona, and landed at Genoa. After some stay at Milan, he passed the Alps by Mount Cenis, and proceeded to Franche Comté by the frontiers of Burgundy and Lorraine, and arrived in the beginning of August at Luxembourg, whence he proceeded to Brussels, and entered that city on the 22d of the same month. At his first appearance his conduct convinced the duchess that he was come to exercise supreme power, and in a short time she withdrew from the government. He conducted himself in a most caressing manner to Horn and Egmont, consulted them on military subjects, and especially in constructing fortresses at Valenciennes, Antwerp, and Groningen; but suddenly at the council arrested them, consigned them to separate prisons, seized all their papers, and obtained possession of their money, jewels, and other valuable effects.

When the duchess had quitted Flanders, Alba proceeded with his more violent measures. In January 1568 he erected a judicial tribunal, well known in the annals of the country by the Flemish name of *Bloet-Raet*, or sanguinary council. Alba was himself president, and Vargas, a Spaniard, vice-president. The other members were neither of the privy council nor of the council of Brabant, but, with the exception of two persons who never took their seats, consisted of individuals on whose concurrence Alba could securely rely.

This tribunal commenced by citing before it all the nobles and the citizens, whether absent or present, whether living or dead, who had signed the compromise, such as the Prince of Orange, the Counts of Nassau his brothers, the Counts Hoogstraten, Calembourg, and Brederode, and even the Marquis of Berghes, who was deceased. The Prince of Orange, who had decided on his part, replied in terms of defiance. He asserted that he was a member of the German empire, and as such answerable before none other than the emperor himself; and that, as one of the Spanish order of the golden fleece, he could only be judged by the king when holding a chapter of that order. The others made replies rejecting the authority of the new tribunal, and avowed their junction with the forces which the Prince of Orange was collecting.

The citations were numerous, but the most detailed account is that preserved at Ghent. One hundred and fifty persons, consisting of nobles, patricians, and burghers, were summoned on fixed days to appear at Brussels. Of that number only eighteen presented themselves, the others having emigrated or being concealed. These, conscious of their innocence, were allowed to defend themselves before the tribunal, and were then bound two and two together, and thus marched to prison. The process was not long deferred; they were condemned to death, and perished on the scaffold, some by the sword, others by the halter, according to their respective ranks. Numerous other prosecutions, which terminated in death and confiscations, were carried on towards persons in Ghent; and if the number executed in the whole of the country were in the same proportion to those in that city, it may be true which Alba is said to have boasted on his return to Spain, that more than eight thousand persons had perished on the scaffold during his government of the Netherlands.

The executions of the Counts Egmont and Horn were deferred till June, when, by a process not to be justified by any law, they were condemned to suffer death. They were brought from their confinement in the prison of Ghent, surrounded by two thousand Spanish troops, and decapitated in the Place de Sablons, at Brussels, on the 5th of June 1568. The illegality of these executions was loudly complained of, and produced a great effect over the whole of Europe. Even the emperor and the other Catholic princes loudly condemned the proceeding, whilst many of the Protestant princes were induced by it to lend their aid to the confederation which the Prince of Orange was forming to avenge his friends, and to rescue the country from the miseries it endured.

The army which Alba brought with him from Spain, with some additions on the way, amounted to 20,000 men, one half of which consisted of Spanish infantry, who were in that day considered as the best troops in Europe. They were well disciplined and well commanded, but were much disposed to mutiny, especially when, as was often the case, their pay was in arrear; and this disposition was afterwards often displayed in the most critical circumstances, to the great injury of the service in which they were employed. The desolation of the provinces, and the horrid cruelties which had been perpetrated, at length gave birth to that ruinous and obstinate civil war, which continued so long that none of those who commenced it lived to see its termination.

When the Prince of Orange retired into Germany, he had wished to have collected a force which might have harassed the army of Alba during the march from Italy to the Netherlands; but the princes of Germany were not so alarmed at the prospect of the danger which threatened them, as to assist him to such an extent as he deemed necessary for his purpose, and Alba with his army entered without molestation. The prince had time in his retirement to form his plans deliberately, to calculate on future probabilities, and to be ready to act when the moment for action should arrive. The first cruelties of Alba made a deep impression on all the Protestant princes of Germany, and this impression Orange was skilful enough to turn to his advantage. By the deaths of Horn and Egmont such indignation and resolution were excited in them, that they offered to Orange their wishes, their councils, their troops, and, what is almost incredible, their treasures. Amongst the most prominent of these was the Prince Palatine, with whom the Prince of Orange held a secret meeting at Strasburg, at which some of the leaders of the Huguenots in France were present. Even the Catholic princes were so inflamed at the treatment of Horn and Egmont, that, if they did not assist, they did nothing to impede Orange in his negotiations. The assistance thus obtained, with the aid of a pecuniary nature from Queen Elizabeth of England, and recruits from the Protestants of France, enabled Orange to take the field.

The prince was straitened for money; and his army, though numerous, was badly composed. The Germans and the French were new levies, hastily raised, eager for booty, and in general ill disciplined. Though they were not subject to his sole command, he could not safely disgust them, nor could he allow them to plunder. He knew, too, that at the end of the campaign these succours would quit him, because he was not in a situation to maintain so numerous a body. The greater part of the fugitives from Flanders were destitute, and the prince foresaw that these must soon become a charge which he would be unable to bear.

With forces of such motley composition, Orange determined on a bold and sudden attempt to enter the country on one side or the other, and to sound the tocsin over the whole of the Netherlands. On this plan he formed four bodies, to enter the country at different points. The first of them was to penetrate on the side of Liège, and to enter Gelderland. It was commanded by Count Hoogstraten, the only nobleman of distinguished rank who had been so fortunate as to escape from the fangs of the Duke of Alba. The second corps consisted of the French Huguenots, commanded by De Cocqueville, and they entered into Artois. Neither of these corps were strong, nor do they appear during the whole campaign to have effected any other object than, by skirmishing, to have distracted the attention of the enemy, and thus kept him from strengthening the more important points. The third corps was better composed and more numerous. It was commanded by Prince Louis of Nassau, brother of the Prince of Orange. It commenced the war by entering Friesland, where he was opposed by the king's army under the Count Arenburg, whose force was augmented by Spanish infantry and cavalry. When in presence of the enemy, he was forced to give battle, by the taunts of the Spaniards, who accused him, from his being a Fleming, of favouring the party of Orange. He led his troops to the combat, and fell in the attack. His army was completely defeated and dispersed, with the loss of its cannon, baggage, and a large sum of money which was destined to pay his troops, as well as others then in Groningen. The Frisian peasantry put to death the fugitive Spaniards; but the Germans and Flemings, who were mixed with them, were either liberated or joined the victorious troops.

The Duke of Alba was at Brussels when this disastrous event happened; and instantly, after venting his rage by numerous judicial assassinations, he repaired, with what troops he could collect, to Groningen, where he was joined by the garrison of that city. The troops of Prince Louis amounted to 12,000 or 14,000 men, and that of Alba was nearly of equal number; but the army of the latter was well trained and well disciplined, whereas that of the former was a mass of strangers, difficult to restrain, with little experience and less discipline, disposed to mutiny for want of their pay, and ready to desert their colours after any reverse. Prince Louis found it necessary to retreat from Winschotten, where he had gained his victory, and remove into the German province of East Friesland. He took up a position defended on one side by the river Ems, and on the other by that bay of the Zuyder Zee called the Dollart, and having at his back the city of Embden. He threw up intrenchments mounted with cannon in his front, and with better disciplined troops might have maintained himself till his brother the prince, who was advancing with a numerous force, could arrive to his relief. Alba pressed eagerly forward, and, at his approach, the troops of Nassau broke out into mutiny; and though it was partially quelled, a body of auxiliary troops who had joined it from Oldenburg, instead of waiting the attack within the lines, rushed out without orders, and threw themselves upon the Spaniards, by whom they were cut to pieces, and the opening thus made was entered by the enemy. The route became complete, and the Spaniards were amply revenged for the late disaster at Winschotten. Many of Nassau's troops were killed, more were drowned in the Ems, the cannon, colours, and baggage were captured, and the prince with a few of his followers threw themselves into the city of Embden, whence, from their knowledge of the country, they succeeded in making good their retreat.

Whilst these transactions were passing on the eastern side, the Prince of Orange had been collecting his fourth and principal army on the western side, and mustered, about Aix-la-Chapelle and Liège, a body of nearly 28,000 men, which in that age was a large army. Being much superior in number to the army under Alba, the Prince of Orange was desirous of a battle, and made all possible attempts to bring it on. But the Duke of Alba, knowing the nature of his enemy's forces, and that it was beyond his power to keep together so large a body from one season to another, acted purely on the defensive. This course he adhered to with firmness, though often urged by his officers and troops to lead them to battle. The campaign was thus passed with no other operations than occasional skirmishes or advances and retreats. The prince was compelled to dismiss the greater part of his forces, and to retire, with the few left to him, into winter quarters, when Alba did the same, and both were actively employed during the winter in the necessary preparations for the following spring.

The events which caused and accompanied the commencement of the troubles in the Netherlands have been related in a more circumstantial and detailed manner than our limits will allow to the subsequent proceedings. After the first indecisive campaign, there was a kind of suspension of hostilities, from the exhaustion of the opposing parties. Alba was employed in extorting money from the public bodies, and from individuals, to an unheard-of extent, and with intolerable severity. One demand was called the tenth denier, by which one tenth of the amount of all sales were to be paid; a tax which served to impoverish the country, to suspend all industry in trade, and which ultimately tended to exasperate the inhabitants, and throw them into the arms of the insurgent party. The Prince of Orange, on the other hand, was occupied in negotiating treaties with the German princes, who assured him of succours both of troops and treasures. He also visited France, where Admiral Coligny, the chief of the Protestant party, after promising his aid, suggested to him the idea of creating a naval force. This was instantly adopted, and a party of sailors, of those called Gueux-marins, seized upon Brielle, a town on the island of Hoorn, by which they secured an asylum for the shipping, and whence they gradually extended their conquests to the other towns and cities which command the entrance to the ocean, and secure those places from naval attack. This was the first step in the formation of that naval power by which the Hollanders became ultimately enabled to secure their independence. Seamen from all parts flocked to the maritime towns as rapidly as they declared for the Prince of Orange; and in Dort, Flushing, Rotterdam, and, indeed, all the places where there were no Spanish garrisons, they joined the prince. Fleets were equipped, which seized on all the Spanish vessels they met with, even in the British Channel, and kept open a communication with the ports of England, whence, by the proceeds of the captures, they could procure stores, arms, and ammunition, to carry on their warlike operations. The growth of the naval power was so rapid, that within three months after the capture of Flushing, no less than one hundred and fifty sail of armed vessels, well manned and equipped, were despatched from that place alone. The canals and rivers which intersect the country were filled with barges and gun-boats, which landed at the Spanish posts, and carried away arms and other effects from the very gates of Ghent and Bruges.

Alba, who was busied in extorting the tenth penny, looked with contempt on the seizure of Brielle; but soon awoke to the consequences, and began to draw together his troops to punish the Gueux-marins. His attention was, however, too powerfully drawn to another quarter, and they were left without molestation. The Prince of Orange, the moment he knew himself secure of the naval asylum, began his land operations. At the head of 20,000 men he entered Gelderland, seized Ruremonde, Tongres, St Trond, and Tirlemont, and entered Louvain by treaty, where he rested. His brother Louis, aided by 7000 French Protestants, chiefly cavalry, entered Hainault, and surprised the important city of Mons. Another corps under Count de Bergh entered the province of Overyssel, and seized Zutphen, Gorcum, and some smaller places. Alba was alarmed at these events, but more at the apprehension that it was not merely the French Protestants, but the French king, who had become the ally of Orange. He turned his attention, first of all, to the recapture of Mons, and after a siege of three months took it on capitulation, a division of the main army which was proceeding to raise the siege having been defeated. After the capture of Mons, Alba collected his forces, and led them to attack the city of Haerlem, in the province of Holland, as preparatory to the conquest of the other maritime positions. That place, defended chiefly by its citizens, made a noble resistance; but after a siege of seven months, in which the exertions and the sufferings of the inhabitants appear almost incredible, it surrendered, and was delivered over to the vengeance of the irritated and unfeeling Spaniards. In this siege, carried on in an aquatic district, and in the winter months, the besiegers suffered severely, especially as they were ill supplied with provisions. Their sufferings and their want of pay caused a mutiny after the capture, which paralyzed for a time the operations of Alba, whilst the Prince of Orange was carrying on the siege of Middleburg in Zealand, which was ably defended, and only surrendered after a siege of two years duration. The states of Holland and of Zealand had been assembled at Dort, where, notwithstanding the republican jealousy which prevailed, powers almost unlimited were conferred on the Prince of Orange, and a kind of government constructed to manage the affairs of these two provinces.

We have thus sketched the outline of events from the end of the year 1568 till the end of 1573, at which time the court of Spain had recalled Alba, who departed with enormous wealth, and the curses of all classes of the people, in January 1574. He was succeeded in the government by Don Louis de Zuniga of Requesens, but generally called by the latter name. When Requesens assumed the government, he found the affairs of it, in those parts still under the Spanish power, in a dreadful state of derangement. The people were universally disgusted, the army in a state of mutiny, and the finances absolutely exhausted. Though intrusted to adopt a milder system of government, and actually issuing an amnesty, he could not overcome the deep hatred to his country which the Flemings had conceived. He naturally followed the military plan which had been traced out by his predecessor. The Prince of Orange had carried on the siege of Middleburg nearly two years, and Requesens resolved to attempt its relief. His naval forces were collected, and a battle ensued, in which the Spanish fleet was defeated, and most of the ships taken, burned, or sunk. This occurred on the 19th of January 1574, and was followed by the capitulation of the city on the 19th of February. The garrison, the ecclesiastics, and such of the burghers as wished it, were allowed to proceed to Flanders. This treaty was the commencement of a milder treatment of prisoners on both sides, and henceforward the contest assumed a more humane form. The capture of Middleburg was important, as it decided the fate of the province of Zealand, which was soon rendered unassailable by the Spaniards, whose naval force was far inferior to that of the Prince of Orange. Requesens sent a corps of his army to attack a force under the command of Prince Henry of Nassau, over whom a victory was gained, on the 14th of April, near Nimeguen; but a mutiny immediately broke out amongst the Spaniards, and rendered the success of no value. When the mutinous spirit was somewhat allayed, the Spaniards besieged Alckmaer, but were received by the inhabitants with such resolution that they gave up the attack and concentrated their forces to besiege the city of Leyden. It was carried on with great vigour, and defended with skill and bravery; and after the besieged had for nearly six months endured all the horrors of famine and disease, by cutting some dikes the Spanish camp was covered with water, more than a thousand of the assailants were drowned, and on the 3d of October the siege was abandoned. This secured to the party of Orange the freedom of the province of Holland, as the capture of Middleburg had done that of Zealand. The Spaniards were thus expelled from every part of those states except the city of Amsterdam, of which they did not quit possession till four years afterwards.

After defeat or after victory the Spanish troops were equally accustomed to mutiny. The repulse before Leyden begot this spirit, which displayed itself by deposing their commander Don Sancho de Avila. They chose one of their own number as a leader, and carrying with them Don Sancho, bound hand and foot, proceeded towards Utrecht, where by plunder they boasted they would pay themselves the arrears owing to them, and they committed the greatest excesses on the small towns which they were able to seize upon. At length some money was paid to them, the mutiny was appeased, and Requesens led them to make attacks on some of those islands which compose the state of Zealand. These were all repulsed by Prince Louis; and Requesens, who had superintended the operations in person, at length abandoned all attempts. He was called to Brussels by a mutiny of the Spanish cavalry in that city; but on the day of his arrival he was attacked by a fever, which in a short time terminated in his death.

This brings the events down to the end of the year 1575, at which period an attempt at conciliation was made by the emperor of Germany. A congress was held at Breda, where an ambassador from his imperial majesty, the two brothers of the Prince of Orange, the pensioner of Holland, deputies from Zealand and Gelderland, and two ministers of the king of Spain, met; but nothing was agreed on, after three months spent in negotiation, as the preliminary question of religion could not be settled. The king would only admit of the Catholic faith, and the opposing parties as resolutely maintained that of the reformed church.

In 1576 the Prince of Orange succeeded in the plan he had long formed, of forming such a union between the two states of Holland and Zealand as should concentrate their efforts for the common defence, by placing in his hands, under the name of regent for the king, the whole executive power. This arrangement, concluded in April, was announced to all the cities, and accepted by them; and the prince having taken the oath of fidelity to the privileges of the states, assumed the government, and arranged the administration with judgment, despatch, and economy.

At the same time, within the provinces still belonging to Spain, the death of the governor created the greatest confusion and disturbance. The council of state, consisting chiefly of Flemings, assumed the administration, and, as soon as an answer to their communications could be received from Madrid, were confirmed in that power, but only *ad interim*, until Don Juan of Austria, who was named governor, should arrive. Though composed of only nine or ten members, this council soon became divided into factions, which thwarted each other; they were without pecuniary resources, and could take no measures to remove the difficulty. The consequence of this was, that the Spanish troops, being unpaid, broke into furious mutinies, and, with the pride of their nation, rejected the authority of the council, deposed their officers, chose one of their own number, who was called *Eletto*, indulged everywhere in the most unlimited plunder, and committed the most atrocious barbarities. The movements made by these troops alarmed all the inhabitants of the cities, so that even in Brussels itself the council could scarcely have been in safety without yielding to the impulse of indignation which was displayed by all orders of the citizens. The mutinous troops had taken by storm the fortified city of Alost, between Ghent and Brussels, when the council, on the 29th of July, issued a placard denouncing the Spaniards as rebels to their king and the country. They were depicted as mutinous traitors, and the people of the Netherlands were called upon to exterminate them wherever they were to be found; they were also forbidden to supply them with provisions, and commanded to remove out of their way all money and other valuable effects.

The insurgent army at Alost alarmed the city of Ghent, where the inhabitants had armed themselves; but the castle which commanded the town was held by some Spanish troops, who were in connection with the mutinous army. It was of importance to take the castle; and a party in that place, where the Prince of Orange had numerous secret friends, made application to him for assistance. He, who had foreseen the event and was prepared to meet it, despatched from Zealand eight bodies of infantry, amounting to about 3000 men, with seventeen pieces of artillery, under the command of Colonel Temple, an English officer in the service of the states, who entered the city on the 26th of September, and having formed the siege of the castle, caused it to surrender on the 11th of November.

The possession of Ghent was the signal for a general movement amongst the Flemings. In spite of the orders of the king positively forbidding it, the states assembled in each province, and the feeble and divided council gave way before them; and thus the power was vested in a body, who confined some, displaced others, of the council, and changed the government into that republican form which the seven provinces that ultimately obtained their independence afterwards adopted. The king's name was used, but his power was for the time abolished. The new government sent its envoys to the several courts to implore assistance. The emperor and some other princes answered with cordiality, and offered their mediation to effect a general pacification. The king of France (Henry III.) spoke plainly, and showed good will, but said that his opponents, the Leaguists, supported by the pope and the king of Spain, had so embarrassed his affairs as to deprive him of the power of rendering them any assistance. Queen Elizabeth of England received the envoy, Baron Sweveghau, with much distinction. She granted to the states a loan of one hundred thousand pounds sterling, of which forty thousand were immediately paid in uncoined silver, and the remainder was made payable at Brussels by her ambassador. The cities of Ghent, Bruges, and Nieuport were securities for the money; and the states agreed neither to make truce nor peace with Spain without England being comprehended in it. The other conditions were, that the English merchants should be restored to the privileges which they had enjoyed before the troubles, and that the subjects of England who had been banished should not be protected within the territories of the states.

A treaty was soon concluded at Ghent, and ratified at Brussels, between the states on one part, and the Prince of Orange in the name of the states of Holland and Zealand on the other. The chief stipulations were, that the contracting parties should unite to drive all Spaniards from their countries, and then assemble as in states-general before 1555, to regulate the affairs of religion, of the fortresses, and the ships of war; that no attempts should be made against the Catholic religion; that all the ordonnances issued by the Duke of Alba should be suspended till they were confirmed by the states; and that in the mean time the Prince of Orange should retain his power as stadtholder of Holland and Zealand. This treaty was signed in the name of the king, and in a short time was acceded to by those other provinces not represented in the states assembled at Brussels.

Whilst these transactions were in progress, the Spanish troops, though diminished in number by their own excesses and the vengeance of the country people, continued in the same mutinous condition. One division of them took Maestricht by storm, and there perpetrated the most abominable injuries to persons and property. Two other divisions, one from Alost and the other from Zealand, united to seize on the rich city of Antwerp; and with them joined the portion of the garrison of the citadel of Antwerp which had cut its way through the besieging army. The citadel was in possession of the Spaniards; and as soon as the rest of the mutineers had been received into it, they stormed the city, which, though bravely defended, was ultimately overcome, a great part of it being burned in the conflict, and what remained, as well as the persons of the inhabitants, became a prey to the infuriated and merciless mutineers. Destruction was thus inflicted on the most flourishing commercial city of Europe, from the effects of which it has never since recovered. The destruction of that city was, however, one of the causes, and not an inconsiderable one, of the rapid progress in foreign commerce which was made in Holland during the subsequent prosecution of the long protracted war, and supplied much of the pecuniary means by which that war was maintained.

Don Juan of Austria, who had been appointed to the government of the Netherlands on the death of Requesens, was a natural son of the Emperor Charles V. who had ordered him to be educated in secrecy, but suitably, according to a respectable station in life. The history of his birth had been concealed from him until he had arrived at maturity, when King Philip himself unexpectedly revealed it, and acknowledged him as his brother. At an early age he had been employed against the Moors of Granada, and had by his successful exertions gained great applause; but the chief ground of his high reputation arose from the naval victory of Lepanto gained over the Turks, when he commanded the united fleets of the Christian world.

When nominated to the command he was residing at Milan, but instantly departed from thence to Spain, where he received his instructions from the king. He was directed to treat the Netherlands with great mildness at first, but to commit himself to nothing definitive, and on no account to give up any of that unlimited power which the king was firmly resolved to exercise. It was commonly believed that the king gave him an assurance, if he succeeded in restoring the Netherlands to submission, that he should be supplied with forces to land in England, where he should release Mary Stuart from her prison, place her on the throne of Elizabeth, and by a marriage with her become monarch of the British islands. Don Juan rode post through France, at that time in a state of confusion, in the disguise of a servant to one of the nobles who accompanied him, and at length reached Luxembourg on the day on which the mutinous army of the Spaniards had stormed the city of Antwerp. On his arrival there, the disastrous state of the affairs of Spain, which has already been described, seems to have left him no other alternative, after announcing his arrival to the states, than that of acquiescence in the decisions of that body, conjointly with the Prince of Orange. He accordingly gave his assent to the pacification of Ghent, and to that article of it which stipulated the removal of all foreign troops from the country of the Netherlands. Some confidence was thus gained with the states-general, but none with the Prince of Orange, with whom Don Juan had opened a correspondence of an apparently amicable and confidential nature. The troops were in appearance disbanded, or marched away. The Spaniards moved slowly towards Italy, from whence they could be recruited. Some of the auxiliaries were said to have been lent to the Leaguists in France, so as to be within call when needed. In a few months, which were passed in conciliatory measures, Don Juan, rather by fraud than by force, obtained possession of the strong castle of Namur, in the month of July, and established his court in that city, where he soon began to collect troops. This caused an alarm in the states, and they also began to collect their forces. The Prince of Orange was invited to repair to Brussels, in order to concert with the states the measures requisite for the defence of their freedom. Negotiations were begun with insincerity on all sides, for neither could trust to the assurances and engagements of the other. The Prince of Orange, who had entered Brussels on the 23d of September, was consulted on these negotiations, and was in some sense a party to them; though he foresaw, from the very moment of Don Juan's arrival, that no secure treaty could be formed, and that the sword must decide the issue. The states, at the suggestion of the Prince of Orange, had decreed the demolition of those fortresses which commanded the cities, especially those of Antwerp, Ghent, Utrecht, Groningen, and Lisle. This was the signal for hostilities. Don Juan had recalled the troops on the march for Italy, and those lent to the party of the League in France. The Prince of Parma brought other reinforcements; and thus Don Juan found himself at the head of an army of nearly 20,000 at the end of the year. The army of the states consisted of nearly equal numbers. They were, however, inferior in discipline and in good officers to the forces opposed to them. The two armies were in presence of each other in December. The army of the Spaniards had been so secretly collected, that the states believed that their own troops much outnumbered them, and from this impression gave orders for the attack. On the 31st of January a bloody conflict took place at Gembloux, near to Namur, in which the Spanish force was victorious. The army of the states suffered very severely; their general, Goignies, with many of his men, were made prisoners, and the remnant retreated towards Brussels. The Prince of Orange and states removed from thence to Antwerp. Don Juan, instead of pursuing them, followed up his success by capturing the smaller fortified towns. In the course of the year 1778, he had taken Louvain, Tirlemont, Bovines, Diest, Nivelles, and some smaller places. These conquests were effected by detachments, whilst his main body was encamped near Namur. But he was taken ill in September, and died on the 1st of October 1578. The cause was probably a pestilential fever, but, according to the custom of that age, was most commonly attributed to poison. On his death-bed Don Juan nominated as his successor his nephew the Duke of Parma, who had recently joined him. He was a young man of highly-estimated talent, the son of that duchess who had long been the regent of the Netherlands, and under whom the troubles had commenced.

When the Prince of Orange had retired to Antwerp, he clearly perceived that, from the nature of the country, and the confidence placed in him by the people, he could preserve a secure asylum for liberty in Holland. His means did not extend to the other provinces of the Netherlands with the same commanding effect. He therefore turned his chief attention to that which, with a concentration of his means and exertions, could with most probability of success be attained.

As the ten provinces were at length all brought under subjection to Spain, and finally were transferred to the house of Austria, the transactions relating to them do not appropriately belong to the history of Holland, and will therefore be only so far noticed here as regards their connection with that country.

It was the policy of the Prince of Orange to keep alive the spirit of opposition which still existed in Flanders, because it gave employment to the troops of the Duke of Parma, and time to the inhabitants of the United Independent Provinces to prepare for that firm defence which must be the only means of securing their ultimate independence. Those states also gained much in another view. Holland was a secure asylum, and the inhabitants of the other ten provinces found refuge there, when neither tranquillity nor security could be enjoyed at home. At this period, many of the richest of the traders once more removed their families and their property to the cities and towns of Holland and Zealand. The ruins of the commerce of Antwerp were collected in Holland and Amsterdam, though the last place, from which the Spaniards had been driven out in 1578, received the greater share of it.

Whilst Flanders was torn to pieces by the contest between the troops of the Duke of Parma and those raised by the states, the United Provinces assumed in their temporary tranquillity a more imposing aspect. The important province of Utrecht joined the party of Holland, Zealand, and Friesland. The war had been carried on against the king of Spain without explicitly renouncing allegiance to him. But after the accession of Utrecht, the declaration of their independence of the authority of that monarch was promulgated. This gave confidence to the inhabitants, and admitted them to treat as sovereign states with any of the other governments of Europe. To these four provinces the three small ones of Zutphen, Overyssel, and Groningen were added, and thus formed a compact and easily defended district. They assumed for their arms a bundle of seven arrows, with the motto, *Concordia res parvæ crescunt, discordia maximæ dilabuntur.*

We pass over the endeavours made to establish the Duke of Anjou, brother of the king of France, as the governor, the wars subsequent upon it, and the attempts made to assassinate the Prince of Orange, because they belong rather to the history of Flanders than to that of Holland. It may, however, be proper to remark, that in the intercourse between that duke and the prince, the latter favoured the pretensions of the former; but he seems to have done it without any prospect, perhaps without any hope, that it would do more than operate as a diversion in favour of the seven United Provinces, to whom his chief regards were always directed.

From the death of Don Juan of Austria, at the end of the year 1578, to July 1584, the state of Flanders arrested all the efforts which Spain could make to attack Holland; and the inhabitants availed themselves of it to extend their commerce, to increase their ships, to economize their resources, to accumulate warlike stores, and to organize and discipline the whole of the male population. Spain was too much engaged with other objects to direct any strenuous operations against Holland, calculating that if she could subdue the ten larger and more populous provinces, the submission of the other seven would either necessarily follow, or might be easily enforced. Besides, she was at that time making preparations for the enormous naval force called the Armada, with which she calculated on conquering England, and thought that by that achievement Holland would fall under her power.

The intense personal hatred which existed between Philip of Spain and the Prince of Orange gave birth to the most virulent and threatening manifestoes, which were printed, diffused, and read throughout Europe; and the king even made it generally known, that whoever should succeed in assassinating the prince, should receive a reward of 80,000 ducats, be made a commander of the order of St Jago, and obtain patents of nobility. These offers, stimulated also by religious fanaticism, induced many individuals to arm themselves for the horrid deed. One of them, Geerardt, a Burgundian, gained access to the prince by means of letters from Count Mansfeldt, and, as he was passing from his dinner table to another apartment, shot him with a pistol concealed under his cloak, which discharged three balls into the breast of his victim. The prince fell, exclaiming, "I am wounded. Lord, have mercy on me, and on this poor people!" He then immediately expired. The assassin was taken and executed. The recompense for the detestable deed was subsequently made to his family; for, in the register of the court of Madrid of the 4th March 1589, patents of nobility are entered as conferred on his brothers and sisters, who are described as bearing that relation to Geerardt, a tyrannicide.

This tragical event occurred on the 10th of July 1584, at Delft, where the states of the seven provinces were then assembled. It inspired courage rather than despair among the patriots of Holland. The eldest son of the prince was a prisoner in Madrid, where he had been detained from the commencement of the troubles. His son Prince Maurice was instantly invested with all the power of his parent, though only eighteen years of age; and Count Hohenlohe was appointed with the character of his lieutenant.

The Dutch attempted to enter into negotiations with those powerful princes who were hostile to Spain. The application to France was made at a time when the power of the confederation of the League was so formidable as to preclude the prospect of any aid. Henry III. received the deputies with respect, but recommended them to make application to Elizabeth of England. Offers were made to her of the sovereignty of the Netherlands, which she declined; but she made a treaty stipulating to furnish six thousand troops to be maintained by her, and was to have Flushing, the Brielle, and the castle of Rammekins, as pledges. Leicester, her favourite, was appointed to the command, and was to have concurrent power with two members chosen by the states in all military affairs, but was not to intermeddle in the civil transactions.

The imprudence or ambition of Leicester gave much umbrage to the states, and his presence became rather injurious than beneficial to them. The threatening danger from the Spanish Armada, and some degree of disapproval of the conduct of Leicester, induced the queen to recall him and the greater part of the force. The conduct of Leicester had produced the loss of Zutphen and Deventer; but, after the defeat of the Armada, fresh troops were sent from England, and these having drawn the Spaniards towards Ostend, in which was an English garrison, Prince Maurice was enabled to recapture those places. The celebrated siege of Antwerp, though scarcely an operation in which the Dutch were engaged, may be here noticed. It was a long and heavy labour of seven months, carried on by the Duke of Parma in person. During its progress the most extraordinary bravery and skill was displayed by the assailants and the defenders; but the place finally surrendered, and the remains of its commerce were transferred to Amsterdam. After the recapture of Zutphen and Deventer, Prince Maurice, whose forces had been recruited, threatened Dunkirk and Nieuport, and, after a short but vigorous bombardment, captured the important city of Nimeguen, and other towns in that quarter; and these operations closed the campaign of 1592. The Duke of Parma had advanced with an army into France, and left the management of the war in the Netherlands to Count Mansfeldt.

In the beginning of 1593, Mansfeldt issued edicts forbidding all communication with the revolted and now *de facto* independent provinces, and declaring that no quarter would be given to any who did not join him. Such threats were however of no avail, for Prince Maurice having collected his forces, attacked the strong city of Gertruydenburg; and though Mansfeldt, at the head of 12,000 foot and 3000 horse, attempted to raise the siege, he was foiled. The place surrendered on the 23d of June, after suffering the extreme of famine.

The Spaniards were still in possession of the city of Groningen, where Verdugo, an Italian, commanded. The chief operations of the year 1594 were in that quarter. Much time was passed in able manœuvres between Prince Maurice and that general. But the prince having succeeded in cutting off the communication between Groningen and Germany, that city was compelled to surrender in July. The many repulses which the Spaniards had received, and the want of pay, produced a mutiny, and the soldiers threatened to indemnify themselves by the plunder of Brussels, and other towns in the ten provinces under the crown of Spain. The mutineers were in communication with Prince Maurice, but he declined taking them into his service, though the mutiny was turned by him to the benefit of his country.

In the year 1595 a general discontent against their Spanish masters spread itself in the ancient provinces. It was fomented by the Flemish nobility, who, in an assembly convened at Brussels, demanded peace. This affair turned out advantageous to the seven provinces, where Prince Maurice and the states-general were occupied in negotiations both with England and with France, with both of which countries treaties were concluded, in which the Hollanders engaged to supply them with naval forces, some of which assisted Sir Walter Raleigh in his successful attack upon Cadiz.

Philip of Spain, now advanced in years, having become disgusted with the cares of government, his Flemish provinces were placed under the management of the Archduke Albert of Austria. He had under his command an army of 30,000 men, with which he took Calais, and then rather turned his forces towards France than towards the new republicans. The Dutch had by this time grown up into a great naval power. They are said to have had on board of their shipping more than 70,000 seamen. The bloody wars in which they had been engaged seemed to have increased their wealth and their spirit of commercial enterprise. Even their enemy Philip connived at their carrying on a very beneficial trade with his subjects in Spain and Portugal, whilst their cruisers covered the seas, and made numerous captures of the trading ships of those very subjects.

The earnest desire to attain naval superiority which animated the Dutch, was accompanied with a correspondent neglect of their land forces. The arms of France, however, acted as a diversion in their favour, and enabled Prince Maurice in 1597 to defeat one of Albert's generals, and, in consequence thereof, to capture Turnhout, near Antwerp; and in the end of the year, several other towns in that quarter submitted to the states-general. In the same year, negotiations for peace were attempted, under the mediation of the emperor of Germany and the king of Denmark; but the states refused to treat till the king of Spain should acknowledge their independence. The peace of Vervins was concluded between Spain and Henry IV. of France, to the great disgust of Elizabeth and of the United States, who thereby were brought into more intimate alliance.

The commerce of the states was now much augmented. One of their citizens, Balthasar Monchuen, besides trading extensively to India, formed settlements upon the coast of Africa and upon the island of St Thomas. Other merchants sent their ships to the South Seas, through the Straits of Magellan, in the hope of discovering a passage to Japan and China. Companies were formed which sent large ships to the East and West Indies. The trade in the Mediterranean was extensive and lucrative; but, above all, their fisheries on the coasts of England became a mine of wealth.

Though with inadequate force, Prince Maurice, in the winter of 1599, surprised Emmerich on the Rhine, and projected the transference of the seat of war to Germany; whilst Mendoza, the Spanish general, was opposed to him, and invested Bommel; and, though an indecisive battle was fought, Maurice delivered that fortress from the besiegers, and secured his own conquest. After this, party-spirit appeared in Holland, with sufficient fervour to lead to the reduction of the army; but, fortunately for that country, the Spanish troops were so mutinously disposed, that they were unable to take advantage of this diminution.

About the end of 1600, the states were roused to make greater land preparations, and their army under Prince Maurice, in conjunction with an auxiliary English force under Sir Francis Vere, gained the decisive victory of Nieuport, in which the Spaniards lost 5000 men, whilst the loss of the allied army did not exceed 1500, of whom 800 were English. Though Nieuport was invested, Maurice was compelled to raise the siege, when the armies went into winter-quarters. About the end of 1601, some attempts at negotiations for peace were made, but, like those of the former years, they were soon suspended.

The chief military event of the three following years was the siege of Ostend, in which Vere had at first the command; but in the course of the long operations he was relieved, and joined the prince with his troops, who were replaced by the soldiers of the states. The whole attention of Europe was engrossed by the great display of military art in and before Ostend. Spinola the Spanish general was one of the first of the military geniuses of that age, and Vandernoot, who defended the place, was his equal. With an immense loss of life and expenditure of money, after a siege of more than three years' duration, the place was surrendered by capitulation on the 20th of September 1604.

The death of Queen Elizabeth in March 1603, and the accession of James to the throne of England, gave a new turn to affairs. The temper of that monarch was decidedly pacific, and though at first he in some degree adhered to the alliance with the states, his assistance was small, and in some of the transactions rather adverse. The war was continued between the armies commanded on one side by Prince Maurice and on the other by Spinola, but both were so cramped in their operations by the parsimony or the poverty of their respective governments, that no decisive event occurred. The naval war was more effective. The fleets of Spain from the East and West Indies were intercepted by the Dutch. Tremendous conflicts were carried on, by which some of the vessels loaded with treasure from the New World fell into the hands of the republicans; but a much larger portion of the vessels which contained it were either burned or sunk. The failure of remittances so impoverished the king of Spain that he became disposed to treat for peace. The negotiation began in the early part of the year 1607. At first the required acknowledgment of independence suspended it, but in the month of April 1607 Spain gave way, and a suspension of arms for eight months was agreed upon, without any communication of it having been made to the kings either of England or of France. When the eight months had expired, no treaty had been concluded; and, though no hostile movements were made by land, the captures of the Dutch at sea were continued during the prosecution of the treaty. At length a truce for twelve years was agreed to in April 1609. A general amnesty on both sides was stipulated, and a freedom of trade by sea and land, including both the Indies, was agreed to.

This treaty, though only concluded for a fixed period, was yet a termination of the war as between the king of Spain and the seven United Provinces. The states had no sooner attained peace and independence, than they intermeddled with the affairs of the other sovereign states of Europe, and became involved in hostilities with Germany, in which Prince Maurice, on a disputed succession to the duchies of Cleves and Juliers, took the latter city, and garrisoned it. But the Germans having soon afterwards taken Wesel, a termination was put to the contest by the mediation of England and France.

Almost as soon as the states had concluded a general peace, internal dissensions arose. These were maintained by the nature of their constitution, which conferred on each individual state an independent sovereign authority. The first occasion arose from a theological difference of opinion on a topic, of all others, the most inscrutable by the human faculties. The Protestants had imbibed their opinions from Calvin, and had generally adopted his doctrine of predestination. The professors of the universities had advocated that opinion, when Arminius, a native of Holland, was appointed to the divinity chair of Leyden, and taught the opposite opinion of the freedom of the human will. He thus became the head of one sect, whilst a Dr Gomarus, another professor, became the leader of the Calvinistic sect. Theological discussions soon created political parties. Prince Maurice had imbibed the opinions of Arminius, but finding the clergy and the great body of the common people attached to those of Gomarus, he, without regarding the private opinions he held, placed himself at the head of the Gomarists. Barneveldt, the chief civil man in the union, was in opinion a Calvinist; but seeing the nobility and the better educated part of the people supported the system of the Arminians, he became the chief of that party. The acrimony and bitterness with which the contest was carried on soon rendered it of a mixed character, combining religion and politics. Each city possessing within itself independent powers, punished or protected either the Arminians or the Gomarists. Those two eminent scholars Grotius and Vossius defended Arminianism, whilst the synod of Dort, assisted by King James of England and the Archbishop of Canterbury, for a short time maintained the opposite side in the controversy. Prince Maurice, by his influence with the common people, and from being at the head of the army, was enabled in many of the cities to change the magistrates; and when he could not effect that purpose, as at Utrecht, he called in the troops to their assistance. Barneveldt and his party proposed a general toleration of all opinions, and presented a remonstrance to that effect; a proceeding which changed the names, but not the characters, of the party. The Arminians were called Remonstrants, and the Calvinists Anti-Remonstrants, names which have been continued to this day. The party of Maurice, consisting chiefly of the populace of the cities, and their clergy, was ready to tolerate Jews, Mahommedans, and infidels, but would not consent to grant similar toleration to the Remonstrants.

It became evident that the prince was aiming at establishing for himself and his family an hereditary sovereignty over the states; whilst Barneveldt and the higher classes, on the other hand, eager to perpetuate the liberties of their country, formed connections with the court of France, and thence obtained the name of the Louvestein faction, which has been continued amongst the opposers of the absolute power of the house of Orange to the present time. But the Orange party acquired such superiority that Maurice was enabled to seize and imprison the venerable Barneveldt and the learned Grotius, the former of whom, after an infamous trial, when the judges were threatened with death if they did not pronounce the popular sentence, was condemned to death, and beheaded at the Hague on the 13th of May 1619. As the benefactor of his country, he died with the regret of the wise and good of his own time, and has been viewed by succeeding ages as one of the chief authors of the victories, the prosperity, and the liberties of his country. Grotius was still a prisoner, probably not a very strict one. He was allowed the use of books, which passed in a large chest unexamined, and in that chest he was concealed and carried away. He escaped to France, and passed the remainder of his days in an honourable, useful, and upright manner.

The truce was now drawing to a close. The interval which the Dutch had enjoyed had been employed by them, in spite of their internal dissensions, in the most profitable manner. They had prodigiously extended their maritime operations, having been much benefited by the languor of James I. of England, and the ruined state of the marine of Spain. Their ships gave laws from the Baltic to the Levant. They had forced a trade with the Spanish possessions in the western world and in the East Indies; and, besides some smaller acquisitions, they had founded Batavia in the island of Java, which soon became the emporium of the trade of the eastern world.

Philip of Spain died in 1621, just at the time when the truce between him and the Hollanders had expired. The greater progress the Dutch had made in prosperity and power, the more worthy objects of his ambition did he deem them, whom he still viewed as his rebellious subjects. He had instructed his ambassador to propose such terms of peace as were sure to be rejected, which in fact they were, in the most contemptuous manner. But Prince Maurice was not well supported by the states on land. The operations were not of great moment. The Spaniards under Spinola took Juliers, but were repulsed in an attack upon Haerlem. Maurice made an effort to seize upon Antwerp, which failed; and he returned to the Hague, where an attempt was made by a grandson of Barneveldt and some Arminians to assassinate him. This, though it failed, gave great strength and violence to the Gomarists, and they were most unrelenting in their cruel punishments. The rack and the axe were in constant employment, and to be known as an Arminian was deemed sufficient cause for their infliction. The war by land against the Dutch was continued by Spinola, on the side of Belgium; and though he could not prevent them from recapturing Juliers, and taking Cleves, he collected such a force as enabled him to besiege Breda, which was commanded by an English colonel, Morgan. It was an important place, strongly fortified, and of great interest to Prince Maurice, because it formed the centre of his patrimonial estates. It was ably defended, and during the ten months the siege lasted, the loss of the Spaniards was enormous. They however ultimately succeeded, and a capitulation was signed on the 6th of June 1625.

During these operations, Prince Maurice died in the eighty-eighth year of his age. Ambition alone, which had caused his severity towards the Arminians, prevented him from being the most amiable, as he was one of the ablest men of the age in which he lived. About the same period King James of England died, and was succeeded by the unfortunate Charles I. Prince Henry of Nassau was the successor of his brother, as governor of the states of Holland, Zealand, Guelderland, Utrecht, and Overyssel. He continued the military operations against Spinola, but, after the surrender of Breda neither party could boast of having gained much advnatage.

The naval operations in some degree compensated for the languor which prevailed on land. The Dutch sent an expedition to the South Sea, which attacked the Spanish settlements in Peru with much success; and at length they also conquered St Salvador and other parts of Brazil, but were soon afterwards obliged to abandon the acquisitions they had made. In the interior the religious dissensions began to revive. Henry prince of Orange was thought to be less rigid towards the Arminians, in other words, more favourable to them, than suited the principles of the Gomarists. This caused such a commotion as threatened a civil war, which was only prevented by the necessity of union against the common enemy. The Dutch fleet had joined that of France, with which power they were in alliance; and this united force was attacked by the ships of the French Protestants under Soubise. They were defeated, and the Dutch admiral's ship was blown up, with himself and his crew. This caused the greatest joy among the common people in Holland, who detested the conduct of their chiefs; and in the city of Amsterdam their houses were pillaged, and their persons grossly insulted.

The threatening appearance of the thirty years' war in Germany induced the states to increase their land forces in 1626; but during that and the following year only indecisive operations occurred, as the imperial general, Tilly, did not make the expected attack on their frontier towns. The Spaniards made Dunkirk the place for collecting a great number of privateers, by which the Dutch commerce was much annoyed, and many bankruptcies occasioned amongst the merchants of Amsterdam. This induced the Dutch to blockade that port so closely that the system was checked, and in 1628 their East and West India fleets all arrived in safety, loaded with valuable cargoes belonging to the two great commercial companies which had grown up in Holland.

During the same year the fleets of Holland were remarkably successful against Spain. Peter Adrien captured twelve of the largest West Indiamen in the Bay of Honduras. Admiral Heine had still greater success, having a larger force, and in the Bay of All Saints captured so many ships laden with sugar, that the quantity, when brought to Holland, lowered the price of that commodity in all parts of Europe. He then with thirty ships intercepted the Spanish plate fleet, and, after ravaging the coasts of Spain and Portugal, returned with prizes valued at more than fifteen millions of livres. But the state of Holland was far from being tranquil. Fresh umbrage was taken by the populace at the Prince of Orange, because he had appointed some of the Arminians as magistrates, and the people of Amsterdam refused to obey them. This, with tumults amongst the seamen on account of the inadequate distribution of the prize money, caused serious commotions, which were with difficulty and some sacrifices of life put down.

The successes of the Dutch at sea had a favourable influence on the land operations of the following year. Want of pay had produced mutiny in the Spanish army. The Dutch vigour was again awakened, and the Prince of Orange furnished with a powerful army. An active campaign, in which Turenne, Montecuculli, and some other of the most celebrated warriors of the age, bore a part, was closed, by the capture of Bois-le-Duc on one side, and of Wesel on the other frontier of Holland, in spite of all the efforts of the Spaniards to raise the sieges of these places. In the year 1630 the Spaniards renewed their efforts to defend the places they held on the German frontier, but were so unfortunate that, after fruitless attempts to organise a German Catholic confederacy against Holland, they were induced to enter into a negotiation for the conclusion of a truce during thirty-four years. But this negotiation was rendered ineffectual, principally by the intrigues and the influence of the French minister Richelieu, who had by this time formed a strong party in Holland, in opposition to that of the Prince of Orange; a party which continued up to the present age, and to the existence of which may be attributed the enmity displayed by the successive heads of that family to the French government. After the rupture of the negotiations, John of Nassau, with a force, aided by some of the German Catholic princes, of troops and water craft, made the attempt to separate Zealand from Holland. The expedition was met by the Dutch gun-boats; a terrible conflict ensued; the Spanish flotilla was either sunk or captured; and 5000 men were made prisoners, who entered immediately into the service of Holland. This blow was followed up by the Prince of Orange, with his whole force, augmented by the junction of 12,000 Swedes of the army of Gustavus Adolphus, with whom the states had made a treaty, by an attack upon Maestricht, which at length capitulated, as did also the fortified city of Rheneberg on the Rhine, by which Holland became secure from all invasion on the side of Germany. At this time attempts were again made towards negotiation; but the interference of the Austrian general Pappenheim, who had garrisoned some of the towns belonging to Spain, prevented, by his claims, any treaty from being brought to a pacific conclusion.

The Dutch army for the campaign of 1633 was more powerful than at any former period, and was thought sufficiently strong to have completed, with a general of such talents as the prince, the entire conquest of Spanish Brabant. He took the field for that purpose, but the excessive rains of that season, the great inundations, the sickness which prevailed in the army, the scarcity of provisions, and other inconveniences, compelled him to put his army into winter-quarters at a very early period, without having effected or scarcely attempted any object of importance. The year 1634 passed over with no memorable displays of hostile movements. The death of Gustavus Adolphus in the midst of the vast operations in Germany, of which he was the animating soul, caused so many and various negotiations, that the whole of Europe had its attention directed to diplomatic discussions. The war between the Spaniards and the Dutch languished in the Netherlands, though it was carried on at sea much to the benefit of the latter party. In this year, 1635, a partition treaty was entered into with France by the states, contrary to the will of the Prince of Orange, and their ally the king of England, by which the provinces of Luxembourg, Namur, Courtray, Hainault, Artois, and Flanders, were to be transferred to the king of France, and those of Brabant, Guelderland, and the districts of Waes, Mechlin, and the rest of Flanders, to the United States. In pursuance of the objects of this treaty, the fleets of France and Holland were united together; but preparations from England to place her marine in opposition induced them to return to their respective ports. The attempts by land were equally ineffectual. France marched an army of 20,000 foot and 7000 horse into Brabant, and the states had equipped one of nearly equal force. These united troops were to be commanded by the Prince of Orange; but whether that commander, from being averse to the service, neglected to accomplish its objects, or whether the arrogance and barbarities of the French disgusted their allies, such dissensions arose between the officers, that no movements proved beneficial, and the campaign was closed at an early period. The Dutch withdrew to their own country, and the French went into winter-quarters at Ruremond, where it is said more than 6000 of them died, from want and disease. Cardinal Richelieu and the Prince of Orange cherished a mutual animosity, which, though it neutralised their land operations, did not cause a rupture of the alliance that had been formed. The Dutch were successful by sea, where they defeated a Spanish squadron near Dunkirk; and having blockaded that port, secured a safe return to their numerous trading ships from the East and West Indies. In the same year they fitted out an expedition, with the design of extending their power in Brazil. This force, under the command of Prince Maurice of Nassau, consisted of thirty-two ships, with 2700 land forces, and arrived safely at its destination.

The year 1637 was distinguished by the efforts made to capture Breda, which was occupied by a Spanish force under Fourben, a brave and skilful officer. It was invested by the Prince of Orange, and several attempts to relieve it failed, so that after a long siege it capitulated, but not till the beginning of the year 1638. In that year a great project was formed by the Prince of Orange for the capture of Antwerp. It was well designed, but failed from unforeseen circumstances, such as often occur in operations combined of marine and of land forces.

The campaign of 1639 was planned by the Spaniards on a gigantic scheme, but was chiefly directed to naval objects. The Dutch admiral Van Tromp attacked a squadron of ten large men of war, near Gravelines, on the 18th of February. The fight was long and obstinate, but ended in the total defeat of the Spaniards. Their admiral, with three of the largest ships, was taken prisoner; the vice-admiral's ship was burned by the crew, and four of his division were captured; and their loss in men exceeded 2000. Notwithstanding this disaster, the Spaniards equipped a tremendous force under the command of D'Oquendo, consisting of eighty-seven large ships and numerous transports, with 20,000 land forces on board. A junction was formed of the two divisions, one from Cadiz and the other from Corunna. Van Tromp met and engaged this force, sunk the ship which bore the admiral's flag, and took four of the others, but was prevented by a fog from following up his success, whilst from the same cause the Spaniards took refuge in the Downs, where there was an English fleet to protect them. Van Tromp having received reinforcements under Evertzen, and, along with these, orders to renew the battle, desired the English fleet to withdraw; intimating, that if that request was not complied with, his orders were to fight both. Pennington, the English admiral, had doubts of the fidelity of his people, and no confidence in the Spaniards, who were ill disciplined and badly equipped. He therefore declared for a neutrality, but stated that he would join the fleet which should be attacked. D'Oquendo had been advised to withdraw, but it was no longer in his power to do so. Pennington, under pretence that the Spaniards had violated the neutrality, withdrew his protection. Van Tromp then began the attack, and the Spaniards were totally defeated. Fourteen Spanish ships of war were destroyed, amongst which was the Teresa of a hundred guns, with eight hundred men. The vice-admiral of Spain and the admiral of Galicia shared the same fate; sixteen large ships were taken, with 4500 prisoners; fourteen were wrecked between Boulogne and Calais, and the remainder were saved by the interposition of the English. Of the whole armament, only eight ships under D'Oquendo reached Dunkirk in safety. The Spanish loss in killed exceeded 8000 men. Whilst these naval triumphs were achieving in Europe, the Dutch were equally successful in the operations against the Spaniards in Brazil. Their admiral Count de la Torre had been dispatched from Spain with forty-six large ships and a numerous body of troops, many of whom died on the passage, and the others arrived in a sickly state. The Dutch fleet consisted only of forty-one ships, mostly inferior in size to those of their adversaries, but well disciplined, and commanded by two admirals of great bravery and skill, Loof and Huggins. The Spanish fleet previously in Brazil joined that under De la Torre, and they thus amounted to ninety-four ships. An action took place which lasted during several days. Loof was killed at the commencement, but Huggins at length gained a complete victory, in which the Spaniards lost twelve of their largest ships, and 4000 men, whilst the casualties in the Dutch fleet did not exceed one hundred. Disease still further reduced the Spanish force, and thus left Prince Maurice nearly master of that country. The prince then accomplished the conquest of Maranham, and despatched an expedition to the shores of Africa under Admiral Jol, who captured Congo, the island of St Thomas, and the other establishments which the Portuguese had formed on that coast.

At this period Portugal revolted from Spain, and, under the house of Braganza, declared itself an independent kingdom. The new king, John IV., concluded with the Dutch a treaty for a truce of ten years, in all the dominions of both countries, which, however, the latter are accused of having disregarded as far as related to Japan, whence they drove away the Portuguese, and secured for themselves the exclusive trade. The narrative of the transactions in Brazil is given in another part of this work, under that article; and, referring to it (vol. v. part i. page 191), we only add that it was finally abandoned by the Dutch in 1654.

The war between the states and their ally the king of France was continued, but with no great vigour. The jealousy of the Prince of Orange was increased by the discovery of the disinclination of Cardinal Mazarin, the successor of Richelieu, to his capture of Antwerp. He succeeded however in taking Hulst and Lillo, and thus secured a powerful barrier on the Flanders frontier. The negotiations for a general pacification were begun in 1642, and did not close till October 1648, when the celebrated treaty of Westphalia was signed at Munster and Osnaburg. In the first of these years, the treaty between France and Holland was renewed, but was scarcely in activity, as all the military operations of the several powers were in some measure, though not wholly, suspended, except that the Dutch availed themselves of the naval superiority they had acquired, by annoying the Spaniards in every quarter of the world.

Towards the close of the negotiations in Westphalia, the Prince of Orange died, in his sixty-seventh year, and was succeeded in his dignities by his son, William II. The states, regardless of their engagements with France, and in spite of the obstacles interposed by the French ambassador at Munster, entered into a separate treaty with Spain. This treaty was speedily ratified, and its terms formed a part of the general pacification of Europe. The king of Spain acknowledged the independence and sovereignty of the states, and a clause of *uti possidetis* in all parts of the world formed one of the articles. From the peace of Westphalia, the transactions of the United States, whose independence it had legalized, were so intermingled with those of the other European powers, that they form part of the general history of Europe. In continuing this narrative, many of the events which regarded the country here treated of, though important in themselves, must be slightly passed over, because they are to be found under the heads of ENGLAND, EUROPE, FRANCE, and GERMANY.

The conclusion of hostilities had found the nation in a condition of great poverty as related to the governments of the several states, but of great wealth as regarded numerous individuals. The states were deeply in debt, but their creditors were almost exclusively citizens, not to say subjects of the country. This produced what has been called the funding system, which has since been followed by other nations.

Disputes had arisen between the states of Holland on one hand, and the Prince of Orange and the smaller states on the other, respecting the diminution of the army and navy, and the conduct of the officers who had abandoned Brazil. These controversies were carried to such a height that the Prince of Orange would have besieged Amsterdam, towards which he had actually advanced, if he had not been prevented by the opening of the sluices, by which his army would have been drowned. This excited against the prince great unpopularity, when he was carried off by the small-pox, in the twenty-fourth year of his age, leaving no son, but his wife pregnant, who was delivered of a son, afterwards William III. king of England. The civil wars of England were favourable to the trade of the Dutch, though it involved them in war with the government which succeeded the death of Charles I. The several parties in Holland had carefully watched to maintain a neutrality between the monarchical and republican parties in England; but the intemperance of the royalist emigrants, displayed in the murder of Dorislaus, who had been accused of participation in the legal murder of Charles, and of some other rash proceedings, gave the republicans a pretext for commencing hostilities. This led to a naval battle in 1652, when Blake gained some advantage over Van Tromp, though his fleet was much inferior, at least in number of ships, if not in weight of metal. The Dutch instantly fitted out a still larger fleet under the command of De Ruyter, which was met by the English channel fleet under Sir George Ascough. They fought during three successive days, but parted, each claiming a victory. De Witt was then appointed commander in chief of the Dutch fleet, with De Ruyter as his second. Blake, who had sailed to the north after his former battle, collected his ships, and was reinforced by Admirals Penn and Bourn with their squadrons. The two fleets engaged on the 30th of October. The battle was most resolutely contested, but night terminated it before it was decided, and the next day the Dutch entered Goree, declining farther conflict. The fleet of Holland was quickly repaired and reinforced, and placed once more under the command of Van Tromp. Blake had not been furnished in as prompt a manner with reinforcements as his antagonist, and was thus inferior. A tremendous encounter took place on the 25th of November, in which the Dutch were victorious. In this action Blake's flag-ship was disabled, two others were taken, two burned, and one sunk, whilst Van Tromp lost but one of his ships, which was blown up by accident. The engagement lasted from eleven in the morning till six in the evening, when darkness favoured the escape of the shattered remains of the English armament.

In the early part of 1653, both the republics addressed their chief attention to the preparation of their fleets. Blake was enabled to muster sixty sail, with which he attempted to intercept a large convoy of merchant ships, protected by Van Tromp's more numerous, if not more weighty force. On the 18th of February the two contending fleets met, when there ensued an obstinate and bloody conflict, which lasted three days, at the end of which Van Tromp retreated with the loss of eleven ships. The English had lost but one, but the whole fleet was so shattered that they could not pursue. The loss in killed and wounded was nearly equal on both sides; and though the English gained the victory, Van Tromp, by his excellent seamanship, was enabled to convey in safety to the Dutch ports the numerous trading vessels which he had been sent to protect.

At this period Sweden discovered a disposition to join her fleets to those of England, but the diplomatic skill of the Dutch ambassador prevailed on her to agree to a neutrality; and the king of Denmark made a treaty, stipulating to furnish to the Dutch a fleet of twenty sail, to confiscate the English ships in the port of Copenhagen, and to exclude all English vessels from trading in the Baltic. The Danish ships never joined, but the treaty enabled the Dutch to obtain supplies of timber and other stores. Though secret negotiations for peace had been entertained between Cromwell, now master of England, and De Witt, recently appointed pensionary of Holland, yet, as they terminated in nothing, the most extraordinary preparations were made to continue the conflict. In the beginning of June, Van Tromp, seconded by De Witt and De Ruyter, appeared on the ocean with a fleet of ninety-eight men of war and seven fire-ships. They were speedily met by an English fleet of ninety-five sail and five fire-ships, commanded by Blake, Monk, and Dean. On the 2d of June an obstinate battle took place, which speedily terminated in favour of the English. The victory was complete. Three of the best Dutch ships were sunk, two blown up, eleven captured, with many merchantmen; and the whole of them would have been destroyed, but for their timely retreat to the shoals, where the larger English ships could not follow them. The English did not lose a single ship, but Admiral Dean, one captain, and some few inferior officers and seamen, were killed. Van Tromp attributed his defeat to the inferiority of his ships in size and in weight of metal, and to the want of sufficient ammunition, especially gunpowder.

In consequence of this disaster, the party opposed to the house of Orange raised a cry in favour of peace, and some secret negotiations were carried on with Cromwell; but the public voice was strongly in favour of the Orange party, and compelled the government to renew the naval war. Another fleet superior in numbers was hastily prepared, and ready to proceed to sea in the middle of July. This last fleet amounted to one hundred and twenty sail, and they proceeded as soon as collected to engage the fleet of England, commanded by Monk, Lawson, and Penn, between Scheveningen and the mouth of the Meuse. But Tromp fell early in the action, and his death had a bad effect. A rout followed, and the Dutch lost twenty-six ships, with 4000 men killed, and near 2000 prisoners. The English lost some ships, had 600 men killed and 1000 wounded; but their ships had been so severely shattered that they were immediately obliged to seek repairs in their own ports.

The Dutch, though defeated, were not dispirited, and prepared to renew the contest, unless Cromwell would abandon his proposition for the annihilation of the power of the Orange family. He however had determined on a war with Spain, and on expeditions to Spanish America. He withdrew his propositions respecting the house of Orange, but obtained others excluding the royal family of England and their adherents from all refuge within the states, and thus a peace was concluded. The states of Holland bound themselves to exclude the house of Orange from the stadtholderate, but the other states did not agree to it; some of the members even of that province protested against the exclusion, and it was highly unpopular with the great body of the citizens everywhere but in Amsterdam.

The war with England, though short in its duration, had been very expensive as well as sanguinary. It was however no sooner at an end than the Dutch were engaged in hostilities with the Portuguese respecting their settlements in Brazil, which were terminated without any decisive naval combat. But many of the ships of Portugal were captured; and De Ruyter was sent with a fleet to make demonstrations before Lisbon, but having encountered severe storms, his ships were so much damaged that he was compelled to return to repair them, and soon afterwards peace was concluded.

The Dutch next interfered in a contest between the Danes and the Swedes. The latter power had besieged Copenhagen, when the Dutch admiral Opdam was despatched to the Baltic for its relief. He attacked and defeated the Swedish fleet under the walls of Cronenburg, and, by the supplies given to the Danes, saved their capital. A peace was soon afterwards concluded between the northern powers, through the mediation of Holland and England.

The death of Cromwell, in September 1658, had a favourable effect on the Orange party in the United Provinces, whilst the restoration of Charles to the throne of England strengthened it still more; and, though Holland opposed it, a settlement of a large sum was voted to support the household, and carry on the education of the prince. This became necessary from the French king having, upon some very frivolous pretences, seized on the principality of Orange. Charles and his adherents were full of animosity towards the Dutch; and they, elated with their independence, and their powerful naval forces, were not disposed to yield to the indignant superiority which the restored monarch had assumed. The Louvestein faction had again, under De Witt, reared its head in Holland, and some efforts were made to form a union with France, with the view of making a conquest of the ten Netherland provinces, and dividing them between France and Holland. By this proceeding, suspicions and jealousies were created towards the states, on the part of all the other governments of Europe. Towards England the Dutch had shown some animosity, and held language the more presumptuous because their party in England, the remains of the Cromwell faction, had assured them that, from the want of money, Charles would be unable to go to war. To the dismay of the Louvestein party in Holland, the king resolved on hostilities; and in April 1665, his parliament having voted abundant supplies, a fleet under the command of the Duke of York issued forth, and, after the capture of some merchant ships, finding no enemy, returned to Harwich. The states of Holland and Zealand with great activity prepared a naval force of 120 sail of vessels. The commander, Opdam, was met on the 1st of June by the Duke of York with 100 sail, and, after some manœuvring during two days, a battle was fought, in which the English were victorious, chiefly, as the Louvestein party affirmed, from the treachery of some of the captains of the Dutch ships. Their admiral was blown up in his flag-ship; the second in command, Cartemaer, was wounded, and died a prisoner; and eighteen ships, with 6000 men, were captured. The loss of the English was but one ship, and that of men on board the duke's ship was 200: the rest of the fleet had suffered very slightly; but Admiral Lawson, one of the most brave and skilful of the English commanders, fell in the conflict.

The remains of the Dutch fleet made a skilful retreat, and great vigour was exerted to reinforce it. The plague at that time raged in London, and prevented equal exertions from being made, so that the Dutch were enabled early in the following year to assemble a force of eighty-three large ships, furnished with much heavier metal than they had before employed. This force was greater than any that the English could oppose to it. A part too of the English fleet had been despatched to cruise in the mouth of the Channel, by which the grand fleet under the Duke of Albemarle was rendered still more inferior to that of the enemy. The Dutch were commanded by De Ruyter, and the opposing fleets met, and engaged on the 1st of June. The contest continued with great vigour throughout the day; but a reinforcement of sixteen ships having joined De Ruyter, Albemarle drew off, but being pursued, he turned on the enemy, and renewed the battle. During this fight the English Channel fleet made its appearance under Prince Rupert. The contest continued, on the whole, four days. The English then retreated in good order, with the loss of twenty-two ships. The Dutch had lost only seven ships, and were enabled to keep the sea, thus claiming the victory, and even threatening a descent on England.

The English fleet was so quickly reinforced, that on the 24th of July it again appeared at sea, and once more encountered the enemy with success. Three of the Dutch admirals and twelve captains were killed, with 2000 men; and seven ships were sunk, but none taken. After this last battle the English had the command of the sea, and inflicted a severe retaliation for the losses and mortifications they had endured. This produced great exhibitions of party-spirit in Holland, and also disposed them to peace. England, by the extravagance of its sovereign, by the sufferings of the plague and of the fire of London, and the intrigues of France, was much in need of peace.

Conferences were accordingly opened at Breda; but King Charles, with the negligence which characterised his government, had not stipulated for a cessation of hostilities during the negotiations. De Witt took advantage of this, and despatched a fleet to the Thames, which advanced to the Medway, and thus closed for a short time the port of London, at the same time threatening the naval arsenal of Chatham. This in its issue was little more than a bravado, though, after retreating from the Thames, the Dutch made some valuable captures. The negotiations at Breda were however carried on, and peace finally concluded on the 10th of July 1667.

This treaty was followed by one between England, Sweden, and Holland, designed to oppose the growing power of France. The king of England, at that time a pensioner, as well as some of his ministers, on the court of France, behaved with the greatest duplicity, and, upon the most frivolous pretences, resolved to aid France in her projects to conquer the whole of the Netherlands. Under pretence of supporting the triple alliance, Charles obtained money from his parliament, and then determined to attack the Dutch commercial fleets, which were navigating the ocean in full security in the state of peace which had been established. A rich fleet from the Mediterranean was expected to arrive in 1672, when Admiral Holmes was sent with a naval squadron to intercept it. Holmes assumed a pacific behaviour, but the Dutch distrusted him. He made an attack on the fleet, and took one of the ships of war and three small merchant vessels; but the rest, fighting as they retreated, reached the ports of Holland in safety. This naturally produced a declaration of war; and France, joined with England, was engaged in a contest, the object of which was to conquer the whole of the Low Countries, and subject them to the dominion of France.

The violent party-spirit in Holland was ground of alarm. The jealousy of the house of Orange had induced the party of De Witt to neglect the land forces, and the army was in a state of indiscipline, and especially in want of skilful officers, as nearly all the more experienced men of that profession were adherents of the house of Orange, and on that account were not employed. The naval force was in a far better state under the immediate control of the Louvestein faction, though many of its commanders were of the Orange party. De Ruyter was enabled speedily to fit out a fleet of ninety-one ships of war and forty-four fire-ships, and with them sailed to attack the fleet of England and France. This combined force, under the Duke of York and Marshal d'Etrées, was at anchor in Solebay on the coast of Suffolk, where the Dutch hoped by the help of their fire-ships to achieve their destruction. But the united fleets either cut or slipt their cables, and fought the Dutch on the open sea. The fight was tremendous, and was only ended by darkness, when the Dutch withdrew to their own ports. The loss on both sides was nearly equal, but heaviest on the English ships, as their new allies took but little share in the action. It was supposed they had secret orders to spare their own ships, whilst the Dutch and English should weaken each other, a supposition confirmed by subsequent events.

In the mean time the army of France had begun to act on the land side, under Louis XIV., who himself took the field. It was the most numerous and best appointed which Europe had ever seen. It amounted to 120,000 men, including the auxiliary troops of the elector of Cologne and of the bishop of Munster. The Dutch had not more than 25,000 to take the field, and the elector of Brandenburg had engaged to furnish an equal number, on the condition that the Dutch navy should assist him in taking Pomerania from the Swedes. The internal state of Holland was disturbed by party-spirit, but neither party were disposed to submit to a foreign dominion. The partisans of De Witt had projected a flight by sea, and made some preparations for the transport of 50,000 families to Batavia. The young Prince of Orange, though of a sickly frame, resolutely encouraged a spirit of defence, hopeless as it appeared; and when asked what he should do if the French should conquer the country, gallantly replied, "die in the last ditch." This inspirited others, and by the universal voice he was declared stadtholder with unlimited power, and the De Witts were prosecuted, stripped of their wealth, sentenced to perpetual banishment, and murdered by the populace.

In the mean time the French had made a rapid progress, and, proceeding by the Rhine, had subdued the provinces of Utrecht, Guelderland, and Overyssel. Amsterdam, Rotterdam, the Hague, with Middleburg, and the islands, were reduced to great straits, but were held by the Prince of Orange. As a last resource, the patriotic resolution was taken to drown the country, with its invaders. By this step, when the sluices were opened, the French were in part drowned, and such diseases broke out in their army that Amsterdam was saved. Louis had made more than 24,000 prisoners. These he could no longer keep, and on their release they joined their countrymen. The spirit shown by the Dutch had excited an interest in their favour with the emperor of Germany and other princes of the empire, and even the Spanish governor of the Netherlands sent to their aid a force of 10,000 men. A diversion too was operated in behalf of the Dutch by the elector of Brandenburg, and, though impeded by the French general Turenne, it proved of some benefit to the states.

Charles, though somewhat dissatisfied with the French, sent an English fleet to act in combination with that of France, and conquered the province of Zealand; but contrary winds rendered the attempt unsuccessful. In the beginning of 1673, an attempt was made by a French division under the Duke of Luxembourg, to march over the ice and seize Amsterdam and the Hague; but this attempt failed with great loss to the invaders, owing chiefly to a sudden thaw. In the same year a combined English and French fleet, the former commanded by Prince Rupert, and the latter by D'Etrées, engaged the Dutch fleet under De Ruyter and Van Tromp. After much cannonading, in which the French were accused of backwardness, the conflicting navies returned to their ports, each of them claiming a victory. This occurred on the 14th of June.

By this time Spain had declared war against France, the Imperialists had advanced, the invading army was compelled to abandon its conquests in Holland as rapidly as it had gained them, and the dominions of the elector of Cologne, the ally of France, including the city of that name, and Bonn, were occupied by the allies and the armies of Holland.

These events led to negotiations under the mediation of Sweden, and in 1674 a peace was concluded between all the belligerent powers. The transactions of the negotiators were so managed by the address of the Prince of Orange, as to enable him to lay the foundation of the grand alliance, by which, in subsequent periods, after his accession to the English throne, the power of Louis XIV. was reduced to the lowest point.

In 1677 the Prince of Orange was married to the Princess Mary, daughter of the Duke of York, and niece to Charles; an event hailed as favourable to their interests by the Dutch, and by those in England who were unfavourable to the mean dependence on the French court, to which Charles' pecuniary wants had subjected him.

The Dutch sent a fleet under De Ruyter to join that of Spain in the Mediterranean. In a contest with the French De Ruyter was mortally wounded, though his fleet was victorious; but in a subsequent battle the Dutch and Spaniards were defeated with great loss, by which the French became masters of the Mediterranean.

The Prince of Orange had attained to supreme, almost to absolute power in Holland. His ruling principle was hostility to France, arising from the manifest ambition of Louis XIV. With this impression he was induced to direct all his efforts to counteract the influence of France, especially amongst the German states. As his father-in-law James, who had ascended the English throne, was acting in an opposite direction, to the great disgust of the leading Protestants of his dominions, the prince opposed him by maintaining a correspondence with the discontented. They were received by him with some degree of privacy; but as James proceeded in his measures against the established religion, they became too numerous to escape the notice of France, though they engaged but little share of the attention of James, probably from the deceit of one of his ministers, who has been accused by history of having acted a false part towards him. A jealousy existed, though with no great force on the part of James, towards France, and this induced him to decline the acceptance of offers of succour from Louis XIV.

The Prince of Orange, under the pretext of a dispute with Bavaria and the elector of Cologne, collected an army of 14,000, with transports sufficient to convey them to England. After being once driven back by storms, the forces landed in Torbay on the 4th of November 1688; and thus was effected that change of succession usually called the Revolution, the details and consequences of which belong more to the history of England than to that of Holland.

The change of sovereigns brought England into the grand alliance against France; and the united navies, in 1692, fought the battle of La Hogue, in which, after a contest of three days' continuance, the French admiral Tourville was completely beaten, and suffered the loss of sixteen of his largest ships. The Dutch commerce suffered considerably by the privateers of France, especially by the operations of the celebrated Du Bart; but these and other hostilities were suspended by the peace of Ryswick, concluded in 1697.

The death of King William occurred in 1701, just at the commencement of that war respecting the Spanish succession, which continued till the peace of Utrecht, in the year 1712. The transactions connected with it belong more to the history of other countries than to that of Holland, though the Dutch states under the succession of William, who was created stadtholder, continued to bear a considerable share in the contests.

About the year 1742 the Louvestein party had gained the upper hand in Holland; and Cardinal Fleury, the French minister, engaged the states in some intrigues, and even hostilities, upon which a stadtholder was again appointed, and soon afterwards a general peace was concluded, that of Aix-la-Chapelle, in 1748.

The prince stadtholder died in 1751. He had seen but little service in the field, yet he had proved himself an active and skilful chief of the republic. He left a son and daughter, both minors; and his office was intrusted, as well as the education of his children, to their mother, a daughter of George II.

Whilst the Seven Years' War raged, from 1758 to 1763, Holland maintained its neutrality, or at least affected to do so. Great complaints and many discussions arose with England, on a question of neutral rights, which has continued till the present time; but they led to no events of any importance. When the war between England and her American colonies broke out, the question of neutral rights was again resumed; but, in the midst of the discussions on that subject, it was discovered that an attempt at a treaty with those called by us our rebel subjects had been favourably received in Amsterdam, and Mr Laurens, an American ambassador on his passage, was captured with the correspondence. This led to hostilities, in which St Eustatia in the West Indies was taken by the English. In the year 1782 a Dutch fleet was equipped, and met on the Dogger Bank by an English fleet of nearly equal force under Admiral Parker. A bloody fight ensued, which terminated in favour of the English. The peace which followed, in 1783, restored tranquillity to Holland, which had suffered severe losses by captures during the short hostilities that had been carried on. After the peace, the Anti-Orange party in Holland, which, from the hereditary dignity having been conferred on that family, had appeared extinct, gained fresh influence, and again raised its head. The Princess of Orange, the sister of the king of Prussia, had been grossly insulted, upon which that monarch demanded satisfaction; and this being refused, he marched an army into Holland, which was feebly defended by the clamorous boasters of their bravery. Amsterdam was occupied by the Prussians in September 1787; the stadtholder was reinstated in the power of which he had been deprived; and a strict alliance was formed with England and Prussia. Though tranquillity was thus restored, the party which had been suppressed were dissatisfied, and watched for the fittest opportunity to avenge their mortifications.

Nor was it long before an occasion presented itself. In 1794, when the French republican flag was displayed on the frontiers, the defeated party were active and clamorous, and when the country was invaded by the army of Pichegru, they gave it every assistance in their power. This state of affairs, with a frost of great intensity, which admitted the passage on the ice of the artillery and heavy baggage of the French army, rendered the conquest of Holland of easy accomplishment. In 1795 the Orange family fled and took refuge in England, whilst a republican constitution, framed by the French faction of the day, was established, with a directory of five persons as the executive power. The new republic, called the Batavian, was compelled to cede to France some parts of its territory, with the cities of Maestricht and Venlo, and the province of Limburg. An immediate demand was enforced for the payment of ten millions sterling, and the army of France was to be paid, fed, and clothed at the expense of the Batavian republic. Under this state of things, one part of their navy was given up to the British by the dissatisfied seamen, another part fought and were defeated; their colonies surrendered or were taken by the same power, their commerce was confined to mere coasting, and the bank of Amsterdam nearly shattered; but not a fraction of the pecuniary demands was abated by their new allies.

The constitution was new-modelled in 1801. The number of the directors was diminished, a kind of upper house was created in imitation of the council of ancients in France, and the country was divided into eight departments. The peace of Amiens gave back to Holland their colonies in South America and the Cape of Good Hope, but left Ceylon in the hands of England. When the war was renewed, the restored colonies were again captured, their ports were strictly blockaded, and every hope of prosperity was extinguished. In April 1805 a new constitution was introduced by France, and Schimmelpenninck was made sole director; but his integrity was unable to serve his country in the difficult circumstances in which both he and it were placed. It was therefore determined by Bonaparte to create Holland into a separate kingdom, and place his brother Louis on the throne. This was executed in June 1806. On his accession Louis availed himself of the talents and integrity of the late director, and acted, as far as he was able, for the benefit of the people over whom he had been placed as sovereign. But none of his efforts proved effectual in removing the general distress, and even in the few which were made, he was so controlled by his imperial brother, that, without communicating his intention, Louis withdrew himself from Holland, renounced all authority, and, with but scanty means of subsistence, took up his residence as a private individual in the dominions of the emperor of Austria. This step has been represented as having been hastened by his incapacity to relieve the distress which had been produced in his dominions by the landing of the English in Middleburg in their attempt upon Antwerp in 1809.

Louis retired in July 1810, and Holland was by a decree of the emperor incorporated as an integral part of his empire; Amsterdam was declared to be the third city of the imperial dominions; the French conscription law was extended to the whole of Holland, and those taken under it were equally divided between the land and the sea service; and the country was then, for military purposes, formed into two divisions.

Under this military yoke the Dutch suffered till after the battle of Leipsic in October 1813, when a part of the victorious army under General Bulow advanced toward Holland, and met there an English division under General Graham. On the 20th of November the two commanders called on the Dutch to join the cause of the allies. Two days before this, Count Hogendorp, a moderate Orangist, had privately collected in his house a number of the most distinguished persons, who, like himself, had formed part of the ministry from 1788 to 1795, and persuaded them to take upon themselves the provisional government, till the Prince of Orange, who was expected from England, should arrive.

A correspondence was opened with General Bulow, and with the allied monarchs, who had advanced to Frankfort; and invitations were addressed to the prince, who with little delay arrived at the Hague, and proceeded to Amsterdam amidst the rapturous acclamations of the assembled crowds. Proclamations had been circulated generally, headed, "The Netherlands are free, and William I. is the sovereign prince of this land of liberty." He however refused to assume any power till an assembly could be convened, which might properly be considered as a fair representation of the whole people. An assembly of notables, consisting of the most distinguished men of all parties and professions, was speedily called together. The number summoned was 600; of these, 125 declined attending, some on account of their age, others from ill health or personal reasons. With the dissent of only twenty-six voices, the prince was declared king, and a constitution decreed, which secured to him considerable power, limited, however, by two legislative assemblies.

When the French forces were compelled to abandon the ten ancient provinces of the house of Austria, these were considered as conquests made by the allied powers, who assumed the disposal of them. The congress of Vienna, of which Austria, the former sovereign of those provinces, was a member, resolved that they should be united with the seven provinces, and form together one independent kingdom, under a constitution, of which the princes of the house of Orange were to be hereditary monarchs. As an indemnification to the prince, now king, for the loss of his states in Germany, the duchy of Luxembourg, with the exception of the fortress, was given up to be added to this newly-constructed kingdom, and in it was included the ancient bishopric of Liège.

Before the complicated arrangements which the union of these parts required could be completed, the return of Bonaparte from Elba, and the revolt of the French army, created impediments to the settlement of internal affairs. But this newly-constructed kingdom, which was the first object of attack, entered with energy into the contest, and their troops, mustered as they had hastily been, took an honourable part, under the eldest son of the king, afterwards William II., father of William III., the present sovereign, in the grand events of that short but brilliant campaign of 1815, which ended in the decisive victory of Waterloo.

The consolidation of such heterogeneous bodies as the inhabitants of Belgium and those of Holland was a difficult task, owing to their differences of religion, of laws, of language, and of occupations. The Belgians were rigid Catholics, and their clergy strove to prevent the toleration of all other professions; their laws had all been founded on the system of the ancient Dukes of Burgundy, but altered to suit the Code Napoleon. The language spoken by the major part of the people, though it nearly resembled the Dutch, had considerably varied from it in the practice of two hundred years; and besides, a numerous portion of them spoke French almost exclusively, whilst another portion spoke the Walloon, and in Luxembourg the German language predominated. The Dutch were principally conversant in trade, in the fisheries, and in manufactures, whilst the Belgians were chiefly employed in agriculture.

The members of the legislative body contained nearly an equal division of the two countries; and as they acted rather with the feeling of delegates from the parts by which they were chosen, than as the representatives of the interests of the whole community, their decisions were subject to great fluctuations, according to the number of Dutch or of Belgian members who might happen, by sickness or by accident, to be prevented from being present when the votes on a particular proposition were taken. This inconvenience might have been removed by time, if other causes had not been in operation. The agriculturists wished to monopolise the whole supply of corn by means of a restrictive law; but the distillers, who used a great quantity of Baltic corn in making gin, and the speculative merchants in grain, who were a medium for supplying that commodity to a great extent from countries in which it was cheap, to countries in which it was dear, claimed a continuance of the free trade which they had long enjoyed. Though this point was finally settled in favour of the Dutch party, it caused a rankling feeling in the minds of the Belgians. The assemblies, besides their ordinary occupations, had their attention constantly directed to the composition of a system of law, applicable both to civil and to criminal cases, and had made great progress in the work. After much opposition to religious toleration, in which the king displayed both temper and firmness, a concordat was made with the pope, which, if not quite satisfactory, would, if left to itself, have probably removed all existing obstacles. The difference of language, though represented by those who availed themselves of every pretext to produce mischief, as of importance, was not in reality of very great moment. The Belgic and the Dutch are scarcely more dissimilar than the English and the Scotch, and one or the other was the language of a vast majority. All the books of any value were in the Dutch dialect, but they were neglected by the Belgians, of whom the few that could and did read drew their ideas from French publications. By directing all law proceedings to be carried on in the vernacular languages, a body of impetuous young men, imbued with French principles, were inflamed against the government, and gained more influence than they could have obtained if the exclusion of the French tongue from the courts had been gradually and not suddenly attempted.

In spite of these obstacles to a more perfect union, no country ever made so rapid a progress in prosperity as was exhibited in Belgium. The products of its soil, the iron and the coals of Liège and of Luxembourg, found most beneficial markets in Holland. The corn was, in spite of that imported from the north of Europe, sold at profitable rates. The trade with the Dutch colonies being opened to them, and the valuable port of Antwerp being no longer closed, Belgium made a great progress in foreign trade. The effect of this was to create new manufacturing establishments of cotton, woollen, and linen goods, and to extend those which had before existed. The advancement of the country was manifested to the most casual observer, and seen in the increase of private and public buildings, and in the improvement and embellishment of the old ones, in every city, town, and village.

The state of ease and improvement so striking in Belgium was, however, no security against the union of opposite factions, who agreed in nothing but in the work of inflaming the worst passions of the most ignorant part of the community, who, though highly bigoted to their religion, were made tools to overturn the government, by those who avowedly hated it.

The Parisian revolution of July 1830 quickly produced a similar one in Brussels. The events passed as rapidly as in the former city. There were few or no troops, a negligent and inefficient police force, and no spirit amongst those who possessed property, to protect it against the plunderers. They prayed the king to send troops to protect them; but when these arrived, the inflamed Belgians, who were from policy mixed up in the same ranks with the Dutch, would not act, and they abandoned the city. The mob, thus triumphant, compelled the feebler but richer citizens to submit to their demagogue leaders. This produced a declaration of independence against the house of Orange.

In the mean time, the Dutch, who were not without causes of complaint of the greater favour shown to the Belgians than to themselves, were firm in their allegiance to the monarch, and wished for a separation of the two countries. This measure was proposed and discussed in the legislative assembly at the Hague, and ultimately, by a majority, but not a large one, determined upon.

Application was made by the king of the Netherlands, to the several powers who had at Vienna sanctioned the union, and guaranteed to him the possession of his throne. This led to discussions and negotiations, during which a monarch was elected by the Belgians. They wished one from the family of Napoleon, or that of Orleans, but were not allowed a free choice, and at length Prince Leopold of Saxe-Coburg was placed on the throne.

The Dutch soon composed an army, which, though inferior in number to that of Belgium, invaded the country. The Belgians displayed neither courage nor discipline, but fled in all directions; and their new king would, but for an accident, have been made prisoner. A division of the French army advanced to the aid of the Belgians, upon which the Dutch retired.

The citadel which commanded the city of Antwerp was still garrisoned by a Dutch force. It appeared proper to England and France that this should be given up to Leopold; and as the Dutch refused to surrender it till all other subjects of contest between the two countries were arranged, it was resolved to compel its surrender by warlike measures. The ports of Holland were blockaded, and the fortress of Antwerp was attacked by a French army, and, after a gallant defence, compelled to capitulate. The embargo was then taken off, and all hostilities ceased in 1833. (W. J.)

The article Belgium contains a full statement of the political events connected with the separation of Belgium from Holland. The more recent history of Holland is one of progress and general prosperity without presenting any very striking events. In 1844, as a natural consequence of the Belgian Revolution, the public accounts of Holland showed a large deficit which the nation met with characteristic energy, by voluntarily subscribing a loan of ten millions sterling. In 1848, the Revolution in France was followed in Holland by a judicious revisal of the fundamental law, and extensive measures of reform, the results of which will be given under the section *Government*.

The partitioning of England into Roman Catholic bishoprics, was followed in 1853 by a similar interference of the Pope with the Netherlands' territory, the effect of which will be stated under the section *Church*. The adoption by Great Britain of the principles of free trade was highly acceptable to the Dutch merchants, and was followed by the government of Holland in 1854, abolishing the import duties on a great number of articles of merchandise. During the recent war with Russia, the Netherlands' government maintained a complete neutrality. The army and navy were kept on the peace establishment, and the trade and commerce of the country do not appear to have been greatly disturbed.

There have been several recent changes in the royal family. William I. abdicated the throne in favour of his eldest son, the Prince of Orange, in 1840, and died in 1843.

William II. dying in 1849, was succeeded by the present sovereign, William III., born 19th February 1817. He was married on the 18th June 1839, to the Princess Sophia Frederiker Mathilda or Würtemberg. They have two sons, William Nicolas, Prince of Orange, born 4th September 1840, and William Alexander, born 25th August 1851.

Physical geography. The kingdom of the Netherlands comprises the territory of the ancient republic of the Seven United Provinces, with some portions of Limburg. It does not include that portion of Luxemburg which the king of the Netherlands possesses, with the title of Grand Duke, as a part of the German confederation. It is situated between N. Lat. 50. 44. and 53. 34., and E. Long. 3. 30. and 7. 10. It is bounded on the E. by Germany, from which it is not separated by any natural barriers, on the N. and W. by the German Ocean or North Sea, and on the S. by Belgium.

The greater part of this country has been formed of mud deposited by rivers in the same manner as the Egyptian Delta is formed by the Nile. By tracing the courses of these rivers we obtain an idea of its conformation. The Rhine enters Holland at Lobith, a little below Emmerich, where it is 2300 feet broad; and then divides into two branches, the southern receiving the name of the Waal. At Westervoort, the northern branch is again divided, and there its right arm is called the New Yssel. Then the left branch, taking a westerly direction, is again separated at Wyk into two, and the left branch is called the Lek. The right branch flows on to Utrecht, and being there divided for the fourth time, receives for its right arm the name of Vecht; while the left, which still retains the name of Old Rhine, taking a westerly direction by Waerden and Leyden, finally makes its way at Kalwyk to the North Sea.

The Meuse enters the Netherlands' territory above Eysden in Limburg, and flowing northwards, unites with the Waal, near Loevestein; then divides near Dort, forming the island Ysselmonde. The right branch at Krimper is joined by the Lek, then flowing westward by Rotterdam, divides near Flardingen into two branches, and so forms the island Rosenburg. These branches uniting near Brielle, reach the sea at Oostvourn.

The Scheld touches the kingdom of the Netherlands at Fort-Bath, where it divides, forming the islands of S. and N. Beveland, and Walcheren. The left branch reaches the sea at Vlissingen. The right branch flows northward between Zeeland and N. Brabant, dividing near Bergen-op-Zoom, it forms the island Tholen, and the left arm reaches the sea N. of Walcheren. The right branch still separating N. Brabant from Zeeland, divides into numerous channels, by which its waters, mingled with those of the left branch of the Meuse, form numerous islands, and finally reach the sea.

To establish a firm footing amidst so many rivers, the inhabitants have kept them as far as possible within prescribed channels by embankments, and have formed innumerable canals to receive the superfluous waters, and to serve as means of internal communication. The country is thus a net-work of rivers and canals from the one end to the other. The system of drainage, of what would otherwise have been an immense mud-bank, well deserves to be ranked among the wonders of the world. The land thus rescued from the rivers, is nowhere much elevated above the sea, and in many places is even below the sea-level, so as to require still more wonderful defences against the ocean. These defences are in part supplied by the operation of nature, casting up sand-hills along great part of the coast; but where these have not been formed, their place is supplied by dykes of vast extent, built in the course of ages, partly of huge blocks of granite brought from Norway, and partly of bundles formed of young trees, reared expressly for the purpose. These dykes stretch for hundreds of miles along the coast, and with those which line the rivers and canals, and with the requisite sluices, drawbridges, and hydraulic works of every kind, are estimated to have cost not less than L.300,000,000 sterling. They form in so small a country a most astonishing monument of human industry. Yet they are not greater than the situation requires. They are barely sufficient to preserve the country from the dominion of the waters. The motto on the arms of one of the provinces, "Luctor-et-Emergo," still describes the struggles of the invincible Hollanders requisite for maintaining the ground they stand upon. A destructive inundation occurred so lately as March 1855. The rivers, augmented by the snows of winter, burst through the dykes in several provinces. A fourth part of Gelderland was submerged. The whole province of S. Holland was in the most imminent danger. The embankment of the Rhine having burst in five places in Gelderland, admitted the flood, where it had not extended during 150 years. In Utrecht and N. Brabant, the people of many communes had to abandon their property to the waters, and sought refuge for themselves on the roofs of houses and on trees. The neighbourhood of Zutphen was very speedily converted into a vast lake, and the villagers hastily betaking themselves to boats and rafts, reached with the greatest difficulty the ramparts of the city. This flood which happily subsided after some days, exhibited, while it continued, the promptitude and energy with which the Hollanders have always contended against the peculiar difficulties of their situation. The king immediately repaired in person to the scene of danger, and took his station in the centre of the inundated country, directing all the operations, and giving every possible assistance. A collection ordered by the king for the sufferers produced L.41,667, and private collections reached an equal amount. This sum was immediately distributed among the distressed families, whose habitations and lands had been laid waste. To drain off the remainder of the flood, to rebuild the dykes, to repair the Rhine railway, a considerable part of which had disappeared, could not be so quickly done, but all this the patriotism of the Hollanders has completely accomplished.

This recent calamity illustrates the origin of the lakes, which, although greatly diminished since the sixteenth century, are still numerous and extensive.

The Biesbosch, in the neighbourhood of Dort, was formed in 1491, burying 72 villages under water, and drowning 100,000 persons. Of these villages 34 have been rebuilt, as the progress of drainage permitted. The Dutch method of draining is highly ingenious. A marsh or lake is inclosed with a dyke to prevent any water from flowing into it. Windmills are then erected on the edge of the dyke, each of which works an Archimedean screw, and the water thus raised is discharged into a canal which conveys it to the sea. The lake of Haarlem was the most celebrated of those occasioned by the overflowing of rivers; and its drainage by the application of steam, is a great improvement on the old method of draining by windmills. (See HAARLEM.)

Besides these inundations from the rivers, Holland has experienced many others from the sea, which have left large tracts of country submerged, of which the Dollart and the Zuider-Zee are the most extensive.

The Dollart between Groningen and East Friesland originated in 1277, and was greatly extended in the three following years. One town, thirty-five villages, and several hamlets were overwhelmed. It has from time to time been much reduced by drainage. The Zuider-Zee was formerly only a lake, known by the name of Flevo, communicating by two channels with the North Sea. Subsequently the sea covered the lowlands, and the channels of communication were multiplied. Now the expanse of water is 80 miles long, and from 20 to 40 miles broad. Proposals for its drainage have been made to the government, and are under serious consideration. As means of communication between Amsterdam and the North Sea, the Zuider-Zee has long been unsatisfactory, on account of the Pampus bank and numerous shallows. Sometimes, in consequence of long-continued northerly and easterly winds, its bed is almost dry, and vessels are everywhere lying on the sands. A substitute has accordingly been provided for it in the great North Holland Canal, one of the most stupendous works of the kind in existence. It was begun in 1819, and finished in 1825, at a cost of about one million sterling. It is about 50 English miles in length. Its breadth, at the surface, is 124½ English feet, at the bottom 36. The depth is 20 feet 9 inches. Its level is that of the high tides of the sea, from which it receives its supply of water.

While the country possesses abundant means of communication by rivers and canals, it also has excellent roads. The highways in the central provinces are among the best in Europe. They run for miles in a straight line along the summits of the dykes, and are thus at once dry and elevated, commanding extensive views. Between the large cities they are broad, and usually paved with a kind of small hard bricks, called *klinkers*, made of sand mixed with the clayey mud obtained in cleaning the canals. They are fitted so exactly to each other when laid down, that scarcely a crevice is to be seen; and being well covered with sea-sand, they sustain little injury from carriages. Railways have also been made, or are in progress in all directions. Those between Rotterdam and Amsterdam, and between the latter city and Arnheim have been in operation for several years. Rotterdam is also in communication by railway with Utrecht *via* Gouda, and with Antwerp. There is a branch between Antwerp and Breda. Maestricht, in Limburg, is also in communication with Aix-la-Chapelle.

The general aspect of this country is different from that of any other in Europe. The roads and canals are usually lined with willows and other trees, which afford an agreeable shade and relieve the uniformity of the landscape. Innumerable villas are seen decorated with the utmost nicety of art. Spires, church towers, villages admirable for neatness and cleanliness, large and well-built cities, rapidly succeeding one another, meadows in vernal green, varied by sheets of water, cattle in large herds, barges towed by horses, or spreading a sail to catch a favouring breeze—every thing and every place in the highest order and perfection; such are the sights which Holland supplies in abundance, and in respect of which it has no parallel in any other part of the world.

The following Table gives the Statistics of Holland as ascertained by the Census, 31*st December* 1853.

PROVINCES.	Population.	Houses.	Acres of Cultivated Land.	Acres of Roads and Waters.	Acres of Uncultivated Land.	Acres of Total Extent.	Proportion Uncultivated.
North Brabant	405,525	3,106	704,301	97,283	453,876	1,263,136	1 : 2·78
Gelderland	387,423	2,893	784,311	51,982	409,713	1,253,155	1 : 2·309
South Holland	391,493	3,067	606,455	103,802	32,236	750,071	1 : 23·26
North Holland	514,755	2,502	421,411	61,835	126,926	616,354	1 : 4·85
Zeeland	165,075	1,723	353,228	8,026	43,968	409,480	1 : 9·31
Utrecht	155,324	1,103	271,587	21,464	43,338	349,114	1 : 7·82
Friesland	259,508	2,184	632,128	66,871	103,248	807,643	1 : 7·82
Overyssel	227,683	1,532	430,922	20,283	379,459	834,450	1 : 2·08
Groningen	197,101	1,860	444,147	28,922	100,599	578,265	1 : 5·74
Drenthe	89,944	603	212,669	5,219	437,120	656,498	1 : 1·50
Limburg	211,401	1,000	352,259	4,942	182,862	545,006	1 : 2·84
	3,203,232	21,573	5,213,418	470,629	2,313,345	8,053,172	1 : 3·18

The colonies in Asia—Java, Amboyna, Banda, Ternate, Macassar, with settlements in Sumatra and Borneo, also Desima in Japan, are stated to have a population of	16,478,137
The colonies in America—Surinam and the islands of Curacao and St Eustathius,	90,581
The colonies in Africa—Elmina, on the coast of Guinea,	100,000
	16,668,718
Population of Holland	3,203,232
Total subjects of the King of the Netherlands	19,871,950

The population has increased by 60 per cent. in 57 years at the following rates:—

Years.	Populations.		
From 1796 to 1815	166,422,	or annually,	8760
... 1815 ... 1830	380,321	...	25,355
... 1830 ... 1840	236,525	...	23,652
... 1840 ... 1850	187,887	...	18,788
... 1796 ... 1853	1,101,368	...	19,322

The number of the inhabitants of 87 cities in 1853 was 1,163,559, and of the country 2,039,673. The population of the principal cities at the same period was the following:—

Cities.	Pop.	Cities.	Pop.
Amsterdam	247,730	Haarlem	27,770
Rotterdam	90,888	Maestricht	26,919
The Hague	75,276	Leuwarden	24,461
Utrecht	50,710	Nimeguen	22,009
Leyden	37,106	Dort	21,905
Groningen	35,126	Bois-le-Duc	21,862

Climate.

In respect of climate Holland labours under many disadvantages. In winter it is much colder than England, and the waters are frequently frozen for three months. Even the Zuider-Zee is sometimes frozen over. The temperature has been sometimes as low as 23° below zero of Fahr., and sometimes as high as 102. In summer cold nights often succeed to days of intense heat. The climate generally is variable. The atmosphere, especially in the western provinces, is loaded with moisture, and there agues, dropsies, pleurisies, and rheumatisms are frequent. Gelderland is the healthiest province, but all the eastern side of the country is comparatively salubrious. Holland is frequently subject to violent gales of wind, which, when they blow from the W. or N.W., are apt to cause inundations of the sea.

Agriculture.

This remarkable country largely rewards the skill and labour of the agriculturist. The south and central provinces are the most fertile. As has been shown above in one of the tables, there are still extensive tracts of uncultivated land, although much has been reclaimed of late years. The farms in the best parts of Zeeland vary in extent from 166 to 330 acres each. In South Holland the proportion of pasture to arable land is about 2 to 1. In Friesland the quantity of pasture is more than eight times that of arable land. In Gelderland there are large plantations of apple, pear, and cherry trees. Tulips and hyacinths are extensively cultivated in the neighbourhood of Haarlem in fields of several acres each. Pulse and garden vegetables are everywhere raised in great abundance, also woad and madder. Flax is largely cultivated in the south, and especially in the neighbourhood of Dort. Utrecht and Gelderland produce considerable quantities of tobacco. The following are the statistics of the harvest of 1853:—

	Cultivated land in acres.	Produce in quarters.		Cultivated land in acres.	Produce in quarters.
Wheat	177,065	329,267	Peas	25,533	78,780
Rye	448,648	883,036	Beans	32,404	340,133
Barley	108,316	435,866	Potatoes	216,074	2,604,954
Oats	211,218	980,585	Carrots	2,617	...
Buckwheat	157,489	474,055	Flax	51,572	...
Cabbage Seed	53,062	108,154	Tobacco	3,383	...

The rearing of live stock, however, and dairy husbandry, are much more important sources of national wealth than tillage. The lean cattle brought from Denmark and Germany fatten with great rapidity in the Dutch *polders*. Large herds of beautiful cows yield great abundance of the richest milk. Butter and cheese of the best quality are largely exported, and bring great wealth to the peasantry. The Dutch horses are good, and well adapted for draught; the best are those of Friesland. The breeds of sheep, however, are not particularly good.

The statistics of 1853, Dec. 31, give the following numbers for the whole kingdom:—

Horses	236,562	Sheep	826,061
Horned Cattle	1,236,974	Swine	233,900

In North and South Holland, Groningen, and Utrecht, there are made 140,000,000 lbs. of cheese annually, the home consumption of which does not exceed one-twentieth. This large quantity at its average price produces L.1,800,000 sterling annually. The value of the butter is about L.2,000,000 sterling more, of which their own consumption amounts to one-tenth.

Industry.

The soil being almost everywhere alluvial clay and sand, Holland possesses little, if any, mineral wealth. No coal deposits are found; but extensive beds of marine peat of most excellent quality abound, especially in Friesland and Holland, and the manufacture of this into fuel is an important branch of industry. In 1853 the produce of this industry amounted to 31,525,998 tons, on which an excise was paid to the government of L.120,267, after deduction of 10,370,762 tons exempted from excise as being employed in other manufactures. Among the branches of industry, ship-building holds the first place. The ship-building yards are in all 607; and in 1854, 220 new vessels, measuring 54,636 tons, were launched. The Dutch East Indiamen are handsome ships, well rigged, manned, and armed, and are not surpassed either in speed or durability by any similar class of merchantmen in Europe.

In connection with ship-building the saw-mills are worthy of mention. They are in number 397, driven by wind; 81 of these at Zaandam work 324,000 beams yearly, representing an annual value of L.135,000.

The manufacture of bricks and tiles is a great branch of industry, and is indeed most necessary in a country where scarcely any stone is to be found. There are 332 of these manufactories, 70 of which, in Overyssel, employed 1250 persons in 1853; 46 of them at Ryssen produced 16,000,000 of bricks; 7 of them at Zwollerskerspel produced upwards of 8,000,000. In Gelderland this business occupies 4000 persons, and produces 36,000,000 of bricks annually. At Gouda 119 tobacco-pipe manufactories employ 700 persons. Delft still produces the earthenware for which it was long celebrated, but now feels the effect of foreign competition. The white-lead made in Holland is the best in the world, and the use of paint is there most extensive. The oil-mills are 312 in number, and steam power in this branch begins to supersede windmills. There are 112 establishments for the preparation of madder; 65 of these in Zeeland employ 500 labourers. There are 285 manufactories of tobacco. Those at Amsterdam alone employ 766 persons. At each of five other places about 200 are employed. They export largely to North America and Germany. Gin distilleries are numerous and very active. At Schiedam in 1853, 172 of these employed 615 men at from 12s. to 20s. per week. Delfshaven, in that neighbourhood, had 30 more, with 124 labourers. Great quantities of gin are exported in bottles to England, for Australia. It is stated that the only limit to the export is the impossibility of procuring bottles in sufficient numbers. At Amsterdam there are 17 distilleries of liqueurs, which export largely to the west coast of America. The distilleries in all are 324. The breweries 376. There are 27 sugar-refineries. Of three at Amsterdam one employs from 400 to 800 labourers. Here 83,000,000 pounds were refined in 1853, of which 7,000,000 were exported to Great Britain. This branch, however, has of late years been declining.

An important branch of industry is the manufacture of paper. There are 167 paper manufactories, employing more than 3000 workmen, and using 9823 tons of rags per annum. The largest is at Waperveldc, where 69 persons earn L.542 of wages yearly. Forty-two of these manufactories at Appeldoorn exported, in 1853, 20,000 reams of paper to Java; and 21 at Epe produced 43,000 reams. Shoes are made in considerable quantities for exportation at 277 establishments in North Brabant, 128 in Gelderland, 111 in Friesland, and 87 in Groningen. These give full employment at Waalwyk to 475 persons, and at each of six other places to nearly an equal number. The making of wooden shoes is in some places an important occupation. At Epe, in 1853, 51,650 pairs of wooden shoes were made. Amsterdam has a monopoly of diamond-cutting. The diamond-cutters there are 287, employed with 409 other workmen and three steam-engines of 40, 36, and 10 horse-power. 1000 families are supported by this branch of industry. Manufactories of steam machinery and other iron works are on the increase. The largest at Amsterdam employed, in 1853, 1000 hands, paid L.25,605 in wages, and used 2,000,000 lbs. of iron.

The principal woollen manufactories are at Tilburg, and these, 61 in number, employ 3300 persons. They have 26 steam-engines from 1½ to 30 horse-power, and produced in 1853 3306 pieces of goods. Three linen manufactories at Leyden, with 4 steam-engines, employ 400 hands. The Dutch linens are of the best quality. The principal carpet manufactory is at Deventer. It employs about 300 persons.

The manufacture of linen and cotton goods is widely extended over most of the provinces, and in Overyssel alone gives employment to 8865 persons. The number of establishments great and small is given at 528. Silk manufactories have long been established at Haarlem and Amsterdam. One was commenced at Breda in 1848, which in 1851 was in great activity with expectation of further increase. Upon the whole, the Hollanders merit the praise of having attained a high degree of perfection in the mechanical arts, those especially which are in connection with their peculiar situation. Their hydraulical works display not only incredible labour, but wonderful skill and contrivance. They excel all other nations in the construction of mills; they are the best wheelwrights in the world; indeed, in work of every kind they exhibit the highest degree of neatness, strength, and economy.

Fisheries. Julius Cæsar describes the Batavians as deriving a part of their subsistence from the fishery. The herring fishery of Holland was carried on as early as the twelfth century; but what rendered this branch of industry the gold mine of Holland was the discovery by Beukels, towards the middle of the fourteenth century, of the mode of curing and barrelling herring. At a period when the prohibition of eating butchers' meat during two days every week and forty days before Easter was universal, a supply of some sort of subsidiary food was urgently required throughout Christendom; so that the discovery of Beukels was of the greatest consequence, and contributed more, perhaps, than anything else, to increase the maritime power and wealth of Holland. The Emperor Charles V. being at Biervliet in 1550, where Beukels is buried, visited his grave, and ordered a magnificent monument to be erected to record the memory of a man who had rendered so signal a service to his country. For a long period the Hollanders enjoyed nearly a complete monopoly of the herring fishery. They carried it on not only in the bays and inlets of their own country, but along the British coasts, from the Shetland and Orkney Islands to the mouth of the Thames. Their sense of its importance was shown by the saying in common use among them, that "the foundations of Amsterdam were laid on herring bones." In 1610, 3000 vessels, manned by 50,000 fishermen, were employed in this fishery, which then produced L.2,500,000 sterling yearly. In the middle of the eighteenth century 100,000 fishermen were employed. In 1780, owing to the British and other maritime nations giving attention to their own fisheries, the number of Dutch herring vessels was reduced to 200. In 1842 the British vice-consul at Rotterdam reported 165 vessels and 2325 fishermen employed in the herring and cod fishery; the whole number of vessels employed in fishing being 1605, and the fishermen 8350. He stated the produce to be 40,000 tons of salt herrings, 10,000,000 herrings for smoking and drying, and 10,000 tons of salt fish. He estimated the gross value at L.334,000; of which the proportion consumed in Holland was L.30,000; and the value of L.304,000 exported to Germany, Poland, Russia, and Belgium. Since that period the Dutch herring fishery has considerably declined. In 1854 a commission of the states of N. and S. Holland was appointed by royal authority to inquire into its state, and to suggest means for its revival. The whole value of the herrings in 1853 was L.59,916; the quantity being 60,933,800 herrings. The value exported, L.22,999 in salt herrings, and L.14,402 in smoked. The cod fishery at Doggersbank and Iceland, which in 1771 employed 121 vessels, in 1853 employed only 35. The export of fresh fish was valued at L.16,775; and of salt fish at L.5000. But the Hollanders were, if possible, still more indebted to the whale fishery, which they at one time prosecuted to an extent and with a degree of success that distanced all their competitors. This fishery, when in its most flourishing condition, was principally carried on in the seas and bays round Spitzbergen; and there the Hollanders constructed the village of Smeerenberg, where they boiled the blubber, and prepared the oil and the whalebone. The havoc made among the whales, and their dispersion to the coasts of Greenland and Davis' Straits, put an end to the establishment at Smeerenberg, and, with it, to the golden age of the whale fishery. In 1842 there was only one vessel engaged in this once flourishing fishery; in 1853 there were five; and in 1854 there were three. The commissioners give the following statement of the Dutch fisheries at present:—Ships of all sorts employed, 1375; value of produce, L.318,517; men, 7753; annual expenses, L.284,783.

Commerce. The Hollanders, though placed, apparently, under circumstances the most unfavourable for the accumulation of wealth, overcame one difficulty after another with matchless perseverance, until they rendered their country the centre of European commerce, and diffused opulence and a taste for conveniences and enjoyments among the lowest orders of the people. In 1602 the Dutch East India Company was formed, and the Indian trade increased rapidly in magnitude and importance. Ships fitted both for commercial and warlike purposes were sent out. Amboyna and the Moluccas were wrested from the

Portuguese. Factories and fortifications were established from the mouth of the Tigris along the coasts and islands of India, as far as Japan. Alliances were formed with the native princes. In Ceylon, Malabar, and Coromandel, the Dutch were themselves the sovereigns. Batavia, in the large and fertile island of Java, formed the centre of their Indian commerce. In 1621 the Dutch formed a West India Company. Within the short period of 15 years this association conquered the greater part of Brazil, fitted out 800 trading and warlike ships, and captured from the Spaniards and Portuguese 545 ships, which were supposed to be worth L.7,500,000. In 1651 they founded the colony of the Cape of Good Hope. Between the years 1651 and 1672, when the republic was invaded by the French, the commerce of Holland seems to have reached its greatest height. Not by means of any artificial monopoly, but by the greater number of their ships, and their superior skill and economy in all that regarded navigation, the Dutch engrossed almost the whole carrying trade of Europe. In 1690 Sir William Petty estimated the whole shipping of Europe at about 2,000,000 tons; that of the Seven United Provinces being then, according to him, 900,000 tons. The necessities of the Hollanders, and the central situation of their country, no doubt directed their views to navigation and trade; but to account for their astonishing success in commerce, we must refer to moral causes. Without that free system of government, that toleration of all religions, and that perfect security of property which they early, and for a while almost exclusively, enjoyed, the Dutch could not have figured as they have done among the nations of Europe. The intolerance, the persecutions, and the folly of their neighbours, drove many of their most valuable and intelligent citizens to seek an asylum in Holland, where they established trades, manufactures, arts, and sciences. From the beginning of the eighteenth century the commerce of Holland gradually declined. This was owing to the growth of commerce and navigation in other countries, especially in England, and to the increase of taxation caused by the unavoidably heavy expenses incurred in the construction of the vast works required to confine the rivers and to keep out the sea, and by the heavy cost of the wars in which the republic was engaged. As a subordinate cause contributing to the decline of Dutch commerce, may be reckoned the subjection of the trade with India to the trammels of monopoly. The directors of the East India Company did not exert themselves to carry on an extensive trade with moderate profits, but to have a limited trade with enormous profits. Unlike their countrymen engaged in other branches of commerce, this company made no efforts to prosecute trade on fair mercantile principles. Their whole object was to exclude competition, to grasp at the monopoly of particular products; and when they had obtained it, they took care, by narrowing the supplies brought to market, to raise the price of their own articles to many times their real cost.

During the 20 years from 1794 to 1814, when the country was subjected to France, the foreign trade was annihilated, and the intercourse with the colonies was suspended; and it has been estimated that more than L.100,000,000 sterling, besides the expenses of government, were extorted from Holland by their acute masters. This is said, however, to have been met by such rigid parsimony on the part of private individuals and families, that the actual capital of the country was little, if at all, impaired by the extortion. On the return of tranquillity, the capital thus reserved was in a great degree employed in loans to the several foreign states of Europe; and these loans were made on terms so advantageous to the lenders, that, in the course of another period of 20 years from 1814 to 1834, more gain was made by the Dutch capitalists than had been taken from them in the preceding equal period. This traffic in money, of which Amsterdam may be considered as the central market for the whole of Europe, is not confined to the great capitalists, as in most other countries, but, by various modes, is so diffused over the community that those who have but small reserve funds are enabled to partake of the advantages of it, without having their attention withdrawn from their regular and customary occupations.

With the return of peace the intercourse had been renewed with the colonies in the East Indies and in South America, which had been restored to their former possessors in an improved condition. A new East India Company was formed, free from the erroneous principles that guided its celebrated predecessor. It still carries on a great, but not an exclusive trade. The old monopoly, with its long train of abuses, is now wholly abolished throughout all the Dutch possessions in the East. Proprietors of estates and villages, who have lands assigned to them by government, are obliged to furnish to its agents a certain quantity of spice, or of some other article, at a fixed and reasonable price, as a land-tax or rent. But this is the only obligation imposed on them. In all other respects they are quite free to act as they please; and hence these colonies have made extraordinary progress since 1815. While thus a profitable commerce with South-Eastern Asia was re-established, the proprietors of estates in Surinam were also enabled to realize their property. The fisheries, the transit trade, the commerce with the Baltic, and with the Peninsula and the ports of the Mediterranean, were all reopened. During the continuance of the union with Belgium, that part of the kingdom shared these branches of traffic, chiefly through the noble port of Antwerp. But the revolution which separated Belgium threw back the greater part of the commerce into the hands of the Dutch, and left the northern kingdom in possession of all the colonies. The most substantial of the merchants and the larger shipowners removed from Antwerp to Rotterdam or Amsterdam, and the trade of Holland has greatly benefited by the separation of the two countries.

From the tables of commerce and navigation published by government, it appears that in 1853 the total value of imports was L.26,754,311, about L.138,333 less than in 1852; and of exports, L.22,733,472, about L.25,000 more than in 1852. The total value of the transit trade was L.9,846,542, about L.225,000 more than in 1852. The following table will exhibit the proportions in which this trade was distributed among the different countries of the world:—

COUNTRIES.	IMPORTS.		EXPORTS.	
	1852.	1853.	1852.	1853.
	L.	L.	L.	L.
1. GREAT BRITAIN	6,954,833	7,324,667	5,085,167	6,164,083
2. NORTH SEA, BALTIC, WHITE SEA, AND CENTRAL EUROPE—				
German Customs Union	4,458,583	5,344,250	9,312,083	8,345,583
Hanover and Oldenburg	425,000	343,750	192,917	199,167
Hamburg	267,917	410,000	631,667	609,500
Bremen	96,083	94,917	65,667	81,917
Lubeck	5,000	6,667	1,750	3,333
Mecklenburg	55,667	9,417	14,333	11,083
Denmark	184,333	163,667	106,333	83,917
Sweden	41,417	35,250	26,667	31,500
Norway	378,583	383,000	61,416	56,750
Russia, Baltic, and White Sea............	1,243,750	1,268,917	426,000	286,500
	7,156,333	8,059,835	10,838,833	9,709,250
3. WESTERN EUROPE—				
Belgium.....................	2,208,917	2,097,083	2,047,083	2,009,417
France	1,067,583	1,044,250	859,250	974,000
Spain.........................	47,000	57,250	44,167	54,750
Portugal	47,750	42,583	34,250	28,167
	3,371,250	3,241,166	2,984,750	3,066,334
4. MEDITERRANEAN AND BLACK SEA—				
Russia	286,917	220,333	5,833	23,000
Turkey and the Levant	226,917	143,000	304,917	284,917
Austria	134,500	101,750	311,000	372,750
Italy	176,333	149,083	826,000	548,000
	824,667	614,166	1,447,750	1,228,667
5. AMERICA—				
United States	778,000	562,250	480,167	458,917
Surinam	406,000	369,917	122,250	105,167
Curacao......................	14,583	10,667	22,917	26,833
South America...........	352,417	631,500	120,833	64,500
	1,551,000	1,574,334	746,167	655,417
6. ASIA, AFRICA, AND AUSTRALIA—				
Java	6,276,333	5,310,750	1,569,500	1,817,500
China...........	208,583	117,583	333	250
Coast of Guinea	18,833	34,500	16,167	20,917
Cape of Good Hope, Canary Islands, British India	494,750	446,333	18,083	13,333
Philippine Islands	20,167	20,917	83	...
Australia	...	...	...	57,917
	...	5,930,083	1,604,166	1,909,917

Butter and cheese figure among the great articles of the industry and the commerce of Holland. It appears, from one of the published tables, that from 1803 to 1850 the export of butter has constantly increased, so as to have been quadrupled in half a century. From 3437 tons in 1803, it arrived at 11,931 tons in 1852. The export of cheese was 9823 tons at the beginning of the century. In 1852 it was 19,646 tons.

For 1854, instead of a general statement such as the above, we have found indications regarding particular commodities, the trade in which was very active. The importation of raw sugar in 1854 was 108,546 tons, against 102,101 in 1853. The export of raw sugar rose to 55,536 tons, being 4420 tons more than in 1853. The importation of coffee from Java, on the other hand, was less in 1854 than that in 1853 and 1852. In 1852 it was 1,073,838 bags; for 1853, 938,680 bags; and for 1854, only 928,230 bags. The trade in indigo, however, was progressing. The imports in 1854 were 14,130 chests, against 10,200 in 1853; 8600 in 1852; and 5500 in 1851. The importation of cochineal was equally increasing—1535 chests in 1854 against 868 in 1851. Tobacco held also a principal place in the imports of 1854. There were received 13,550 barrels from Maryland, and 3110 from Virginia. Tin from Banca furnished 132,864 blocks. The trade in wool revived, and that in cotton assumed considerable importance. The trade in flax was 1611 tons in 1854. In 1850 it had not reached 344 tons. Thus it had been quadrupled in five years.

The account of exports is not for the same period so favourable. It gives indeed the first notice of direct trade with Australia, but the result of this new enterprise was not encouraging. Holland exported its agricultural produce, however, in great quantity. In 1854 the export of butter was 14,244 tons, against 13,261 in 1853. That of cheese was nearly 25,540, being 982 more than in 1853. That of cattle, 77,198 head of oxen. In 1853 there were 83,074 oxen and 204,148 sheep.

Shipping.

The following account is given of the shipping:—

	Cleared inwards.		Cleared outwards.	
	Ships.	Tonnage.	Ships.	Tonnage.
1850	6961	1,099,671	7031	1,136.664
1851	6960	1,166,140	7177	1,216,558
1852	7457	1,249,728	7712	1,317.425
1853	6883	1,151,293	7068	1,215,869

The Netherlands' and foreign ships were in 1853 in the following proportions:—

	Cleared inwards.		Cleared outwards.	
	Ships.	Tons.	Ships.	Tons.
Netherlands' flag	49½ p. cent.	44½ p. cent.	47½	43
Foreign	50½ ...	55½ ...	52½	57

To have a full view of the trade of Holland, we must not only learn its state as carried on by sea, but also by the rivers, which carry a great amount of it. Tables have been published of the merchandise which arrived and was forwarded by way of the Rhine in 1854. There was an increase above 1853 of 7260 tons from Amsterdam to places on the Rhine, and of 12,328 tons from the Rhine to that city. Coffee, rice, and the oleaginous grains are foremost in this progressive increase. The export of rice to Germany has had a remarkable increase. In 1842–52 it was only 8666 quarters per annum. In 1853 it was 46,459. The quantity of grain sent from Amsterdam to the Rhine in 1834 was 15,600 tons.

The vessels engaged in the river navigation were in 1853:—

	Cleared inwards.		Cleared outwards.	
	Vessels.	Tonnage.	Vessels.	Tonnage.
Laden	15,973	1,134,748	9844	787,105
In ballast	2,213	148,680	8187	521,975

with 127 wood-rafts, measuring 24,328 cubic ells.

The proportion of these belonging to the Netherlands was:—

Of laden vessels	8879	Tonnage	611,578	cleared inwards.
...	4615	...	376,009	cleared outwards.

The remainder belonged principally to Belgium and Prussia, and in smaller proportions to Hanover, Baden, Nassau, Hesse, Bavaria, Frankfort, and Wurtemberg.

On the 31st December 1853, the merchant fleet of Holland counted in all 2037 vessels = 239,601 lasts burden. There were 142 frigates = 56,142 lasts; 334 barques = 93,091 lasts; 66 brigs = 8439 lasts; 168 schooners = 13,436 lasts; 783 koffs = 46,465 lasts; 250 tjalks = 7259 lasts.

The number of steamers belonging to the Netherlands in 1837 was only 30, with 58 engines of 2200 horse-power. In 1853 there were 100 steamers, with 118 engines of 6911 horse-power, not including those of the royal navy. It is stated in the tables that, independently of the Netherlands' trade, there were employed during 1853 in the carrying trade between foreign parts, Netherlands' ships which made no less than 2266 voyages, with 207,204 lasts of lading. The Dutch consuls at foreign ports furnished the data of this enumeration, which was made in 1853 for the first time. In connection with the great emigration to the gold fields of Australia more than 50 Dutch ships were freighted in different British ports for that distant country during the first six months of 1854.

To these details, gathered from the statistical publications of the Dutch government, by which it has been attempted to convey an idea of the present state of the trade of Holland, we will only add one remark, that with the exception of the old East India Company's monopoly above mentioned, the commercial policy of Holland for a lengthened period was more liberal than that of any other nation. The same enlightened policy, if partially departed from during recent years, has been again cordially entered into after the recent example of Great Britain. A law enacted on 1st Sept. 1854 abolished the import duties on a great number of articles of merchandise, and the Netherlands' tariff thus modified, equals, if it does not even surpass, in liberality all other tariffs in existence. It has evidently been in consequence of this enlightened policy having for many generations been generally understood and practised by the Dutch government, that a country not more extensive than Wales, and naturally not more fertile, recovered, indeed, in a great measure from the waters, and kept from being again submerged by constant watchfulness and a heavy expenditure, accumulated a population of more than three millions, maintained wars of unexampled duration with the most powerful monarchies, and besides laying out immense sums in works of utility and ornament at home, lent hundreds of millions to foreigners. Notwithstanding their want of native timber and iron, they are abundantly supplied with all the materials of carpentry, ship-building, and manufactures. And though their commerce, notwithstanding its revival in later years, is much diminished from its earlier pre-eminence, the Dutch, even at this moment, are the richest and most comfortable people of Europe.

Army and navy.

The army and navy force amounted on the 1st Jan. 1840 to 40,265, in 1845 to 24,563, and in 1850 to 21,418 men. Thus the forces were in the course of ten years diminished by 18,847. This diminution is explained by the change of circumstances in relation to Belgium. The state of the army, as shown in the budget of 1853, was as follows:—

Arms.	On permanent duty.	During 3 mths.	During 1 mth.	Reserve.
Infantry	12,807	5964	...	23,924
Cavalry	2,970	...	...	1,272
Artillery	4,272	130	...	4,599
Engineers	439	60	60	206
	20,488	6154	60	30,001

The contingent for the militia in 1853 was 8834; the force of the communal guard (Schuttery) over the whole kingdom on 31st Dec. 1853 was 83,253, of which number 24,790 were in active service, and 58,463 in reserve.

In 1853 The Netherlands' fleet was composed of 5 ships of the line, 13 frigates, one of which had steam-engines, 13 corvettes, two of which had steam-engines, 11 brigs, 13 schooner brigs, one of which had steam-engines, 7 schooners, 17 steamers, 2 transports, 58 gunboats, and 3 vessels serving for exercise, barracks, or hospital; besides 3 steamers, of 206, 150, and 100 horse-power respectively, equipped by the navy department for the service of the colonies. The number of guns carried by these different ships-of-war varies from 84 to 74 for ships of the line, from 60 to 28 for frigates, from 28 to 12 for corvettes, from 8 to 12 for brigs, from 8 to 5 for schooner brigs, and from 10 to 1 for schooners. There were thus 145 vessels in all, of which there were, on the 1st Aug. 1854, employed in actual service—

	Vessels.	Guns.	Men.
At home	13	167	941
Abroad	4	82	706
In the Levant	2	66	562
For protection of the herring fishery	2	7	88
Going to the East Indies	2	48	497
The Mediterranean	1	8	99
Returning from the West Indies	1	22	128
In the West Indies	9	86	652
In the East Indies	28	318	2215
	62	804	5888
Add natives of India employed as sailors			580
Total			6468

The principal fortresses are Maestricht, Breda, Bergen-op-Zoom, Bois-le-Duc, Vlissingen, and the Helder.

Government. The form of government is prescribed by the fundamental law which was adopted by an assembly of 500 notables, called together as representatives of the nation by the Prince of Orange at Amsterdam in 1814. In 1848 it received important amendments. According to this magna charta of the Dutch nation, (1.) all the inhabitants of Holland, resident foreigners as well as natives of the country, have right to protection of person and property. Admission to offices and employment is open to all Netherlanders without distinction. The press is free; the rights of petition and of assembling are recognised.

Royal family. (2.) The crown is hereditary in the House of Orange. Male heirs are preferred, but females are not excluded. The king may not accept any foreign sovereignty except that of Luxemburg. The civil list is regulated anew upon every accession. In the present reign its amount is L.66,667. The eldest son of the king bears the title of Prince of Orange. The king, on accepting the government, takes an oath to observe and maintain the fundamental law. This oath is taken in an assembly of the states-general, convened for the purpose of his inauguration, in the city of Amsterdam as being the capital of the kingdom. The person of the king is inviolable; his ministers are responsible. The executive power is vested in the king. He has the direction of the external relations of the state. He declares war, and concludes peace and other treaties. He is not obliged to communicate them to the states-general if he shall judge that the communication would compromise the safety of the state. But without previously obtaining the permission of the states-general, he cannot ratify any treaty that would alter the limits of the kingdom. The king commands the army and navy, and appoints the officers. The administration of the colonies is committed to him. To him is also confided the management of the finances of the kingdom. He fixes the salaries of all employés, but pensions are regulated by special laws. He has the direction of the mint, and the right to confer titles of nobility. A Hollander may not accept foreign titles of nobility. Orders of knighthood are instituted by special laws. The king grants reprieves, abolition, and remission of punishment. It belongs to him to propose projects of law to the chambers. He can dissolve them when he pleases, but must command new elections in the course of forty days thereafter, and convene the new chambers in the course of two months.

Council of state. (3.) There is a council of state presided over by the king. This council must be consulted regarding every project of law, and every measure of general interest. The king chooses the members of this council, and also the ministers or heads of the departments of administration. All his decrees must be countersigned by one or other of the ministers. The council of state consists at present of 8 members, with the addition of Prince Frederick of the Netherlands, the king's uncle. The vice-president receives a salary of 8000 florins. The other members have 5000 florins each. The ministerial departments are variously arranged from time to time. In 1855 they were the minister of the interior; of justice; of finances; of exterior; of marine; of war; of colonies; of Protestant churches and Jewish synagogues; and of the Roman Catholic Church. The ministerial salaries are at the same rate as those of the members of the council. There is no prime minister properly so called.

States-general. (4.) The states-general are composed of two chambers. The members of the first chamber are elected for nine years, a third of their number retiring every three years; but they may be re-elected. They are 39 in number. They are chosen by the several provincial states from the class who pay the highest amount of direct taxes. The king names a president for each annual session. The provincial states elect the members in the following proportions:—North Brabant 5, North Holland 6, Friesland 3, Drenthe 1, Gelderland 5, Zeeland 2, Overyssel 3, Limburg 3, South Holland 7, Utrecht 2, Groningen 2.

The members of the second chamber are chosen by electors, who must be Hollanders, twenty-three years of age, paying direct taxes from L.1, 14s. to L.13, 10s., according to the localities and circumstances of their several districts. The country is divided into electoral districts, on the principle of giving one representative to each 45,000 of the inhabitants. The number of members of the second chamber is at present 68, nominated from 38 electoral districts, each sending 1, 2, or more members, according to their population. Amsterdam sends 5 representatives, 25 other districts have each 2; 13 districts have only 1 each. The total number of electors in 1853 was 82,593, of whom, at the elections in that year, 56,177 gave their votes. In 1854 only 41,736 voted, or about one-half of those entitled. Members of the second chamber must be Netherlanders, in possession of all the rights of citizenship, thirty years of age or upwards. They are chosen for four years. Half of the members retire every two years, but may be re-elected. They ought to vote without consulting or being instructed by their constituents. Each receives a stated salary of L.166, 15s. per annum, with travelling expenses. The king chooses a president for each annual session. The ministers of state have right to sit and deliberate with both chambers, but no right to vote unless they have been elected members. The same individual cannot be a member of both chambers. A member of either chamber cannot be a member of the high court of justice, nor of the chamber of finance, nor a governor of a province, nor an ecclesiastic, nor a military officer on active service. If a member accept any office under government, he must vacate his seat unless re-elected by his constituency. The members cannot be prosecuted in a court of law for their sentiments expressed in the sittings of the chambers. The states-general meet every year at the Hague, ordinarily on the third Monday of September. Their meetings are usually public. On the death or abdication of the king, the chambers meet in 15 days without having been summoned. The sessions of the states-general are opened and closed by the king either personally or by commission. On these occasions the two chambers assemble together, and the president of the first chamber presides. The annual session must be of at least 20 days' duration. The chambers cannot discuss any business unless more than half their members are present. In every question there must be an absolute majority. If the votes are divided, the question is resumed at another sitting. Votes are given *viva voce*, except in electing to offices, when the ballot is resorted to.

The legislative power resides in the king and the states-general. Projects of law made by the king, are first debated in the different sections, before being publicly discussed. The second chamber has the right of making amendments. A project of law, when adopted or amended by the second chamber, is by it transmitted to the first chamber. The states-general have right to offer projects of law to the king, but these must always originate in the second chamber.

The law fixes the annual budget, along with the ways and means. Each head of the budget must contain the expenses of one department only of the administration. The ministers give account of the receipts and expenses of each department, by presenting to the states an account previously approved by the chamber of finance.

Provincial states. (5.) The states-general are so called in contradistinction to the provincial states, which are legislative and administrative councils for the several provinces. The latter, besides electing the members of the first chamber of the states-general, exercise other important functions. They are charged with the execution of the laws of the kingdom within their limits, and have power (with the sanction of the king) to make particular laws for the several provinces. They have also considerable funds under their control, possessing power to levy taxes with the concurrence of the general legislature. They have charge of the embankments and other hydraulic works within their limits. They also co-operate with the general government for the promotion of religion, education, the maintenance of the poor, agriculture, manufactures, and trade. Whatever, indeed, relates specially to the internal police and government of the provinces is left to their regulation and decision. The king appoints a governor or commissioner to preside over their meetings and to observe their proceedings. They appoint a permanent commission to administer affairs during the intervals of their sessions, and to carry on the ordinary business of the provincial government. The members of these provincial states are elected directly by the parliamentary constituency of each province for a term of six years. One-half retire every three years. The same individual may not be a member of the states-general and of the provincial states at the same time. These councils assemble regularly twice every year. Their meetings are public. The number of members of the states of the provinces, severally, is as follows:—North Brabant 64, Gelderland 62, South Holland 80, North Holland 72, Zeeland 42, Utrecht 41, Friesland 50, Overyssel 47, Groningen 45, Drenthe 35, Limburg 45.

Communal councils.

(6.) The provinces are again subdivided into communes, each having a local administration, the composition and the powers of which are regulated by special laws according to the circumstances of each. At the head of this administration is a council, whose members are elected by the inhabitants for a certain number of years. To be an elector for the communal council requires payment of only half the amount of direct taxes necessary for an elector to the general or provincial states. The king names the president or burgomaster. The communal council superintends the interests of the commune, with reservation of certain points which must be submitted to the states of the province. They must submit the account of receipts and expenditure to the provincial states. The law establishes general rules for the communal administrations, but in imposing, changing, or abolishing local taxes (which the several communes have also the right of levying within their respective limits) the royal sanction is required. These communes include the cities and towns as well as villages and country districts.

The communes are,—In North Brabant 185, including 10 cities; in Gelderland 118, including 15 cities; in South Holland 234, including 13 cities; in North Holland 145, including 11 cities; in Zeeland 116, including 19 cities; in Utrecht 91, including 6 cities; in Friesland 43, including 11 cities; in Overyssel 62, including 3 cities; in Groningen 57, including 1 city; Drenthe 33, including 3 cities; in Limburg 125, including 5 cities: in all, the communes are 1209, including 87 cities. The cities, however, and the other communes are all locally governed in the same general manner; each country district having its burgomaster with his council, much the same as a city. The burgomaster and other magistrates receive salaries, as do also the governors and other officials of the provinces.

Revenue.

The following is the budget of receipts and expenditure of the national revenue for 1856:—

REVENUE—	
Direct taxes (land tax, provincial taxes, patents)	L.1,597,378
Excise	1,395,871
Stamps, registrations, hypothec successions	958,525
Import, export, and navigation duties	352,664
Duty on pawned gold and silver wares	19,158
Domains	108,975
Post-office	120,833
Lottery	33,333
Sporting and fishing licenses	7,083
Duty on mines	96
Diverse revenues	102,475
Interest of national debt contributed by Belgium	33,333
Interest at the charge of the colonies	900,000
Balance derived from colonial administration at home	391,667
Derived from sale of the national domains	77,864
Total	L.6,099,255

EXPENDITURE—	
1. King's household	L.66,667
2. High departments of state	45,688
3. Department of foreign affairs	40,834
4. Department of Justice	212,225
5. Home department	471,642
6. Reformed and other Protestant churches and Jewish synagogues	141,180
7. Roman Catholic church	49,246
8. Department of marine	634,715
9. Interest of national debt	2,935,586
10. Department of finance	530,159
11. Department of war	973,750
12. Colonial department	9,645
13. Incidental expenses	8,333
Total	L.6,119,670

The following table gives the receipts and expenditure of the different provincial governments for 1855:—

	Receipts.	Expenditure.
North Brabant	L.60,925	L.60,363
Gelderland	11,258	11,258
South Holland	19,928	19,928
North Holland	20,524	20,525
Zeeland	9,848	9,848
Utrecht	5,604	5,603
Friesland	28,787	28,777
Overyssel	16,429	16,429
Groningen	26,727	26,721
Drenthe	4,661	4,661
Limburg	6,369	6,369
Total	L.211,060	L.210,482

Further, the statistical publications of last year give the following budget of the communes for 1854:—

	Receipts.	Expenditure.
North Brabant	L.96,328	L.87,563
Gelderland	119,570	121,693
South Holland	366,725	364,831
North Holland	421,025	424,820
Zeeland	75,981	75,937
Utrecht	59,713	59,687
Friesland	124,361	130,436
Overyssel	92,804	89,424
Groningen	109,684	109,597
Drenthe	19,863	19,846
Limburg	51,171	40,972
Total	L.1,530,225	L.1,524,806

In consequence of the provincial and communal councils having right to levy taxes as well as the general government, it is necessary to sum up all the three budgets in order to obtain the whole amount of the public revenue and expenditure. This can, however, only be done for 1854, as the communal budgets for 1856 and 1855, and the provincial for 1856, are not given in the latest statistical publications:—

	Income.	Expenditure.
National	L.6,656,056	L.6,936,842
Provincial	176,345	176,665
Communal	1,536,225	1,524,806
Total	L.8,368,626	L.8,638,313

Justice.

Justice is administered in the king's name. There are codes of civil, commercial, and criminal law, of civil and criminal procedure, and of the composition of the judiciary body. The law also regulates military justice as well in the army as in the communal guard (Schuttery). No one can be deprived of his possessions unless on account of the public good, and then on receiving indemnification, except in case of war or inundation. The law indicates the judges. No one can be arraigned before a different judge from the one whom the law has appointed to try the case. The law regulates the mode of terminating differences which may arise between the administrative and judiciary powers. No one can be arrested without an order from a judge containing the reasons for the arrest. This order must be shown to the delinquent as promptly as possible. If, in extraordinary circumstances, a citizen is arrested by the political power, he who has given the order must inform the judge of it immediately, and deliver the person to him within three days. No one may enter the dwelling of another against his will, unless by order of some power authorized by law. Confiscation is forbidden. Every sentence must include the grounds of judgment, and specify the points of law on which it is founded. It must be pronounced in public. Under the sanction of the king, the administration of law and justice is confided to various courts.

1. The High Court of the Netherlands. The king selects the judges of this court from a list of three candidates for each vacancy presented to him by the second chamber of the states-general. The king chooses the president from among the members of the court. With the president it has a vice-president and twelve puisne judges. Members of the states-general, heads of ministerial departments, members of the council of state, governors of provinces, and other high functionaries, are amenable to this tribunal only. All causes in which the king, the members of the royal family, or the state, are defenders, must be tried before this court. It is the court of ultimate appeal, and superintends the execution of the laws by the lower courts. Its judges are appointed for life. They are divided into two chambers, one for civil and the other for criminal causes.

2. Next in order are the provincial courts. Their judges are appointed by the king from lists of candidates presented to him by the provincial states. These judges are also appointed for life. The provincial court of South Holland, seated at the Hague, alone is divided into two chambers, one for the trial of civil and the other of criminal causes.

3. Subordinate to the provincial, there are district courts in the several provinces (arrondissements or regtbanken). These district courts have from 5 to 14 judges each. including the presidents.

4. These arrondissements are still farther divided into cantons, each having a local court of its own.

5. The high military court has its seat at Utrecht, and has 14 judges.

In 1853 the high court had 369 criminal causes, the provincial courts, 1250; the arrondissement courts, 12,482; the canton-geregten, 11,595; and the high military court, 361. Of civil causes the high court had 119; the provincial courts, 454; the arrondissement courts, 4469; the canton-geregten, 7391.

In 1853 there were the following prisons:—8 for criminals, 12 for confinement in civil and military cases, 22 houses of arrest, 174 houses of detention. These on 31st December 1852 contained only 4087 inmates.

The prison at Rotterdam for juvenile delinquents of the male sex under eighteen years of age, and that for those of the female sex of the same age at Amsterdam, merit special notice. They receive all juvenile offenders from all parts of the kingdom. The number of males incarcerated at one time has varied from 84 to 116. These prisons are in effect schools under admirable management, connecting the branches of ordinary school education with religious instruction, according to the several professions of the childrens' parents, and with industrial training. When their period of imprisonment expires, they are not turned out to the streets to fall into the commission of new crimes, but are placed as apprentices or workmen, where they will be strictly attended to, and for two or three years they remain, to a certain extent, under the surveillance of the police.

Church.

According to the fundamental law, full liberty of religious profession is allowed to every one; but there is a right of *observation* asserted for the civil power, lest sects should arise which, under the name of religion, might seek to subvert the order of society. Equal protection is accorded to all religions recognised by the state. The members of the different churches and sects enjoy equal privileges as citizens, and have equal right to all public employments and all dignities. The statistics of 1854 give the following distribution of the population, according to their religious professions:—Protestants, 1,935,422; Roman Catholics, 1,201,891; Israelites, 62,610; religion not ascertained, 1,479.

Of the Protestants, about 1,700,000 still adhere to the Reformed Church which was established in Holland after the separation from Spain, and being then taken into the closest alliance with the states, obtained many privileges. It no longer enjoys an exclusive establishment, as salaries are now paid by the state to the ministers of various sects, and even to the Jewish rabbis. But the Reformed Church has still much the largest share of such benefits, including the king and the greatest body of the people among its members and adherents, and also receiving pecuniary supplies from the state twice as large in proportion to the number of its members as are accorded to other denominations. The Reformed Church of the Netherlands continues to hold the *Confession of Faith*, *Catechism*, and liturgical formularies, drawn up according to the doctrines of Zuinglius and Calvin, which it received at the Reformation and in the immediately succeeding age. The form of government is still Presbyterian, in accordance with the Calvinistic institution, so far as the jealousy of ecclesiastical rule, always manifested by the civil authorities of Holland, has allowed it to be carried into effect. The following resolution of the first National Synod held at Dort in 1578 lays down the basis of the church government:—"To establish good and legitimate order in the church, it is resolved that four sorts of ecclesiastical councils shall be instituted,—1. The consistory in each congregation. 2. The classis. 3. The provincial synod. 4. The general or national synod. In these assemblies only ecclesiastical affairs shall be transacted. As regards matters that are partly ecclesiastical and partly political, these shall be settled by consultation between the civil and the ecclesiastical authorities."

1. The consistories were composed of ministers and elders of each congregation, the latter selected from the heads of families, and appointed for a limited term, generally two years, but allowed to be re-elected. They managed the discipline and other spiritual matters of the flock. There were deacons similarly appointed to take charge of the poor. These were not constituent members of the consistories, but were allowed to take part with the elders in the calling of ministers.

2. The classes were composed of the ministers of several contiguous parishes, together with one elder from each. There was an appeal from the consistories to the classes. They also originated measures for the general interests of the parishes and had charge of the ordination of ministers.

3. The provincial synods consisted of two ministers and two elders from each classis within the province, together with correspondents from the synods of the neighbouring provinces. They assembled once every year, when they could obtain permission of the civil states of the provinces. But this permission was not seldom withheld. They usually had representatives of the states, called commissaries politic, present during their deliberations. These did not vote as members, but attended on purpose to *observe*, and doubtless to influence their proceedings. There was an appeal from the classes to the provincial synods. They had charge of the trial and license of candidates for the ministry.

4. From the provincial, there was again an appeal to the national synod, which consisted of two ministers and two elders, commissioned not from each classis, but from each provincial synod, to whom also foreign divines were sometimes joined. These national synods were assembled at irregular intervals when affairs of interest to the whole church had to be transacted. At the first, at Dort, in 1578, above referred to, it was resolved that such general synods should be convened once in three years. Accordingly, another was held at Middelburg in 1581. The next took place at the Hague, but not before 1586. No other was assembled for more than 30 years, until the celebrated synod of Dort in 1618. And that was the last which was held until after the restoration of the sovereignty to the House of Orange in 1816. These church courts had, indeed, considerable powers, but different in different provinces, as conceded or prescribed by the provincial governments. They were entitled to maintain order in the congregations, to exercise discipline on offenders against the laws of religion and morality, to compose differences and disputes between congregations and their ministers, to debar unworthy members from the Lord's Supper, and, if necessary, to excommunicate them. Classes and synods could suspend ministers, with suspension also of their stipends, and, if necessary, depose them. But they were overruled in the exercise of these powers by the civil authorities, who often prescribed rules to the ecclesiastical courts. Even when these came to a unanimous finding on points effecting either whole congregations, or ministers, or individual members, the party deeming himself aggrieved by their decision could always appeal to the judgment of the states of his province, by which the ecclesiastical sentence was not unfrequently reversed. During the twelve years of French ascendancy, this system of Presbyterian Church government in Holland fell into total disorder. It was remodelled in 1816 under the *observation* of William I., and, in some respects, greatly improved, yet so as not yet to enjoy any high degree of that spiritual independence demanded by the principles of Calvinism. The four graduated courts were restored to the consistories without any alteration in their constitution. The classes were restricted to one meeting annually, and (with the exception of the management of their ministers' widows fund) limited in their deliberations to the choosing of deputies to the provincial synods, and of a small committee called moderators, to whom were entrusted all the other duties and functions of the ancient classes. The provincial and general synods were restored to nearly the same position as under the ancient rule, with the advantage, however, of being allowed to meet at regular intervals, and to transact their appointed business without interruption from the civil power. The general synod, accordingly, has met every year since 1816 at the Hague, usually for 14 days. This court has the supreme direction of all the affairs of the Netherlands' Reformed Church, frames all the general regulations relating to its government, worship, and discipline, and has alone the power to depose ministers and excommunicate unworthy members. This modification of Presbyterian

government, though more orderly than that which preceded it, and free from the tendency by which that was characterized to tumultuous discussions and collisions with the civil power, did not prove upon the whole satisfactory to the Church. The very limited numbers composing all the higher administrations failed to secure confidence in and respect for their decisions; and the constant *observation* of the head of the state, although he asserted no right of positive interference, was regarded as inconsistent with religious liberty. A secession of members, at first attended with some disorder and tumult, and interference of the civil power in a manner that had much appearance of religious persecution, was, more than twenty years ago, the effect of this dissatisfaction. In recent statistics, the seceders are numbered 42,619. A more popular system of church government was demanded by many who still remained in the communion. When, in 1848, alterations began to be made in the fundamental law of the states, the church was also invited by William II. to revise its constitution, and to consider what changes in the mode of its government would be useful and satisfactory. This important affair was taken up by the church courts with great deliberation, and excited much interest among the members. Various changes have been made, and others proposed; but the whole cannot be considered as yet settled and arranged. The church courts are still constituted pretty much as they were from 1816 to 1848; and the community is not yet disposed to acquiesce in and be satisfied with their organization and proceedings. They are loudly accused, in religious periodicals, of too great remissness in dealing with preachers of erroneous doctrines at variance with the old Calvinistic *Confession*, and even of setting the old standards aside by their positive decisions. But whether these accusations are founded on fact, or the result of undue jealousy and suspicion, it is certain that the spirit of true and enlightened Christianity has mightily revived of late years, both among the clergy and people of the Netherlands' Church. For details we would refer the reader to *A Brief View of the Dutch Ecclesiastical Establishment*, by the Rev. W. Steven. D.D., Edin., 1839.

There are 1637 ministers in the Reformed Church of Holland, not including 25 ministers and 8 emeriti of the Wallon Synod, which is also represented in the General Synod of the Netherlands' Reformed Church. To these must be added 13 professors of theology in the universities and Athenæum, making in all 1683 clergy; while 4 ministers of the Scotch Church, 1 English Presbyterian, and several German Protestants are included in the numbers composing the Dutch classes. Those ordained and sent to the colonies are,—in the East Indies, 21; in the West Indies, 7; making an entire total of 1711. The licentiates or candidates for the ministry are 92. Holland was even divided into dioceses of the Roman Catholic Church, by a papal bull of 4th March 1853. This proceeding on the part of the Bishop of Rome raised great excitement among the Protestants of Holland, and a law was made by which this Roman Catholic hierarchical establishment was sanctioned and agreed to only on certain conditions. These conditions are, principally, a modification of the oath usually taken by Roman Catholic bishops at their consecration, a stipulation that none of them shall enter on their functions without the special license of the king, the taking of an oath of allegiance to the national government, and an agreement that the bishops shall reside, not in the cities from which they assumed their titles, but only in such places as are appointed them by the king. Accordingly, they have been all settled, according to the following scheme, in North Brabant and Limburg, where the greater part of the population is Roman Catholic.

Support of the poor.

The Hollanders are very liberal and charitable in their support of the poor. In general, the destitute are cared for by the deacons of the churches to which they belong. The communes give assistance, which is applied principally to those unconnected with any church. Official returns for 1853 make known the existence of 7410 charitable and benevolent administrations, of which 2900 relieve the poor at their own dwellings to the number of 418,318; 494 are hospitals, where the destitute are lodged; 59 are infirmaries; 41 lying-in hospitals; 163 are poor schools—the scholars 56,619: 2262 are schools, where the poor children are taught gratis, along with others who pay for instruction; 138 asylums; 2 institutions for the deaf and dumb; 2 for the blind; 40 institutions for employing poor labourers who can find no occupation; 47 for relieving poor travellers.

There are three great workhouses for the whole kingdom, into which all destitute persons who apply obtain admission—one at Amsterdam, another at Middelburg, and a third at Nieuwe Pekel A, near Groningen. Plain ordinary food, in no great abundance, is supplied to all, with clothing of coarse materials. There are looms and other implements of industry for those who will work, wages are paid to the industrious as means of purchasing such comforts as would improve their diet. The sexes are kept strictly separated. The inmates, while they continue such, are not allowed to go abroad; but they may at any time obtain their discharge on application to the governors. Those discharged on their own application cannot be re-admitted during the first month thereafter. These workhouses are very spacious, and, in times when employment is scarce, as during a severe winter, are resorted to by multitudes of the destitute. There have also been formed, in part by government assistance, but chiefly by voluntary subscriptions, several pauper colonies on waste lands on the borders of the Zuider-Zee. Poor families are settled there at their own request. At first they are provided with dwellings, implements of work, and means of subsistence for a limited period. They are encouraged to establish themselves by their own industry and frugality. A moderate sum, paid by instalments, is accepted as the price of their outfit, and ultimately of their houses and lands, which they are thus enabled to acquire in full property. They may then, if so inclined, dispose of them to new settlers, and return with their realized property into the general community. According to the returns above referred to, 665,000 indigent persons were, in 1853, succoured by the different charitable administrations, being at the rate of 208 for every 1000 of the population. The expense of all these charitable establishments amounted to L.1,125,000. L.694,445 were given to paupers for their subsistence; L.2,500,000 were absorbed in expenses of administration and board of pauper inmates. The expense of the pauper colonies amounted to L.208,334 more. The receipts were L.1,160,618. The sources of this income were—contributions from the communes, L.228,667; donations and collections, L.155,192; individual subscriptions, L.26,147; revenues of hospitals and other establishments, L.3,714,783.

Society for the Promotion of the Public Good.

Among the various benevolent institutions of Holland, special attention is due to the "Society for the Promotion of the Public Good," which originated in 1784 with John Nieuwenhuizen, a humble Baptist minister at Edam, assisted by a few benevolent individuals. It has now 220 branches throughout Holland, supported by 14,000 members, each paying a small yearly contribution. The amount and variety of good effected by this institution cannot be easily calculated. It has promoted the establishment of numberless schools, asylums, and works of public utility. It is feelingly alive to every interest of the population, especially the indigent classes. Pervading the whole country with its cheering influence, its sections hold fortnightly meetings, at which lectures and essays on useful subjects are delivered, questions (neither political nor polemical) of public utility are discussed, and good works of all kinds originated and provided for. As soon as one section has got 500 members, a new section is founded to be formed of those who shall afterwards join. Their meetings are reunions of the various classes in society, and are of great advantage in promoting intercourse and sympathy among all ranks.

Education.

Education is promoted in Holland under the general direction of the minister of the interior, by three universities—Leyden, Utrecht, Groningen, and the Athenæa of Amsterdam and Deventer; then by seminaries of an intermediate class, and special schools; and then by numerous primary schools. The University of Leyden possesses a library which has been greatly enriched of late years by donations from individuals, and by a judicious application of funds dedicated to that object; a botanical garden, to which Professor Reinwardt, who died in 1854, bequeathed his valuable herbarium; an archæological museum, where Javanese and Hindu monuments are found, along with German antiquities; a collection of papyrus and of Egyptian monuments; of Roman and Greek antiquities; a numismatic cabinet, remarkable for its collection of Lusitanian and Iberian coins; and a museum of natural history containing many rare specimens of animals from the far east and the Indian Archipelago. Such, along with the library, are the rich stores of this celebrated university. There are the four faculties of theology, medicine, law, and sciences. The Latin

University of Utrecht.

language is employed in most of the classes of theology, and also in several of the law and medical classes. The principles and the history of Roman law, and of the law of nations, are taught in Latin. Dutch is generally employed in teaching civil and commercial law, the history of diplomacy, and political economy. The law faculty of Leyden aspires to the credit of forming not only lawyers, but men enlightened as to all the interests of modern life. The faculty of medicine employing Dutch in the theoretical instruction, still keeps up the use of Latin for those practical lectures which are given beside the couches of the patients. The courses of scientific lectures are generally given in Dutch. Zoology and comparative anatomy are still taught in Latin. Oriental studies are prosecuted with ardour at Leyden. Professors and students rival each other in the zealous study and investigation of the literary monuments of the East, and especially of Arabia. The University of Utrecht has a library containing most interesting collections of theological writings. Along with the library are an anatomical museum, a chemical laboratory, an observatory in perfect order, and a botanical garden abounding in rare plants. In the instruction of Utrecht the theological is the principal faculty. This university educates numbers of Protestant ministers for the German provinces of the Rhine, where the system followed at Utrecht, which consists of combining classical with theological studies, is greatly approved of. In the other faculties Latin is also employed, side by side with Dutch, as at Leyden. The faculty of law at Utrecht directs the attention of the students not only to the essential elements of the Roman law, but principally to German law and the ancient customs of the country. The number of foreign students increases at Utrecht: in 1854 there were 18 students from the Cape of Good Hope.

The University of Groningen reckons among its principal resources a very good chemical laboratory. The use of Dutch and Latin in the delivery of lectures is regulated pretty much as at Leyden and Utrecht. The Athenæum at Amsterdam has a good library, a museum of natural history, a beautiful mineralogical collection arranged by Professor von Baumhauer, a botanical garden, to which, in the year 1854, 400 new species were added. This Athenæum supplies the means of instruction on a great variety of subjects. The Athenæum at Deventer, while it continues to provide well for instruction in the higher branches of knowledge, also affords the means of a commercial education. The number of professors at Leyden is—in theology, 5; law, 5; medicine, 5; science, 8; and literature, 10—in all 33, and one lecturer. At Utrecht—in theology, 3; in law, 5; medicine, 5; science, 6; and literature, 4—in all 23, and four lecturers. At Groningen—theology, 3; law, 3; medicine, 5; science, 5; literature, 5—in all 21.

The number of students on 31st December 1853 was as follows:—

	Leyden.	Utrecht.	Groningen.	Amsterdam.	Deventer.
Theology......	179	223	80	65	1
Law	270	179	97	44	7
Medicine......	134	66	70	25	...
Science.........	19	7	7	5	4
Literature.....	41	14	10	4	...
Total......	643	489	264	143	12

Total of university students, 1551. Total of degrees conferred in the university, in 1853–54, 149, distributed as follows:—Leyden, 60; Utrecht, 57; Groningen, 32; Amsterdam, 13; Deventer, 0.

Intermediate instruction was given in 1853–54, at 67 establishments (40 Latin schools and 27 gymnasia), training 247 masters and 1826 students. With these seminaries may be classed various special schools, viz.,—the royal academy for the army and navy at Breda. Practice is there combined with theory. The pupils for the navy make a tour of instruction of six weeks on board a brig. They visit the naval establishments of England, and cruise in the Atlantic. The pupils destined for the army form a camp on the heaths of North Brabant. This academy in 1854–55 had 308 students. There were admitted from it into the navy 21, and into the army 38. The royal academy at Delft trains engineers and functionaries for the East India service. In 1853–54 it had 154 students. The public school of military surgery at Utrecht in 1853–54 had 122 students. The clinical schools at Rotterdam, Amsterdam, Hoorn, Alkmaar, and Middelburg, had together 209 students. The veterinary school at Utrecht had only 7 students. In the same year the school of rural economy at Groningen, having a farm connected with it, gave theoretical and practical instruction to 30 pupils. A school for instruction in commerce and industry at Amsterdam, had 30 pupils. Schools of training for the merchant navy occupy a distinguished place among the educational institutions of Holland. The institution at Amsterdam for the merchant navy, had in 1854, 92 pupils—44 within the institution and 48 on a voyage. The technical school at Utrecht ought also to be mentioned, which gives scientific instruction to artisans, and is in a prosperous state. Nor would we omit the military schools, where practical instruction is given by under officers, superintended by lieutenants-adjutant. The pupils in these were 643.

Primary instruction was given in 1853–54 in 3374 schools, of which 2469 were public, and 905 private. The teachers in these were 7027, of whom 6329 were male, and 698 female teachers. The number of pupils was, 1st January 1854, 392,161; of whom 218,723 were boys, and 148,680 girls; on 15th July there were 321,850, of whom 173,170 were boys, and 148,680 girls. Thus the pupils attending the primary schools alone, amounted in winter to one-eighth, and in summer to one-tenth, of the whole population. Allied to these primary schools are others of particular sorts:—Infant schools, 612 in number, with 32,250 children. Boarding schools, 22 for boys and 17 for girls, the former having 594, and the latter 365 pupils. Boarding and day scholars, 196 for boys, and 88 for girls, having 4516, and 2869 pupils respectively. Repetition schools—designed for young persons who have finished the intended course of their education, and being now engaged in trades or otherwise, are encouraged to revise their studies in the evenings—136 in number, with 3199 male, and 1365 female scholars. Sunday schools 114, with 5000 male, and 4861 female pupils. Industrial schools 49, with 349 male, and 4792 female learners. Popular singing schools 129, with 3287 boys, and 2448 girls. Schools in the army for the common soldiers, having 177 teachers, with 2768 scholars. Of those aspiring to the rank of 2d lieutenant, and requiring scientific instruction, 304 additional pupils. Taking all the above numbers of pupils into the account; those studying at universities and the intermediate seminaries, together with the primary schools, and those others which we have noted as allied to them, we have of youths under instruction in Holland in January 1854, 466,100, being about 1 in 7 of the entire population. The primary schools (properly so called) are superintended by local boards, assisted by inspectors, of whom there are 70, or one for each of the school districts into which the kingdom is divided. In the general superintendence of the whole, the minister of the interior is assisted by an inspector-general. No person is allowed to open a school, or to act as an assistant schoolmaster, or even to give private lessons (except without fee or reward), until first he has received a certificate of his ability to teach, granted after examination by a board, consisting of inspectors. There are two normal schools for teachers, one at Groningen for the northern provinces, and the other at Haarlem for the centre and the south. In the primary schools the pupils are admitted without distinction of creeds, and no religious instruction, except a little Bible history, is given by the masters. Religious instruction is communicated to the scholars by ministers and catechists at separate hours, and often not in the schoolrooms, but at the houses of the clergymen.

Literature

In no country of Europe has the proportion of highly learned men to the whole population been so great as in Holland. Among many, including Thomas à Kempis and his pupil Agricola, whose writings exercised the most extensive influence, and who, by the wide diffusion of light, were precursors of the Reformation, Erasmus holds the highest place. He was born at Rotterdam, 1467, where a fine bronze statue of him, erected in 1622, still stands, and is accounted one of the chief ornaments of the city. Subsequently a great impulse to literature was communicated by William I., Prince of Orange, who, in 1575, founded the University of Leyden as a reward to that city for its brave defence against the Spaniards in the preceding year. Men like Scaliger, Lipsius, Heinsius, Gronovius, and Spanheim, in ancient learning; Erpenius and Gollius in Oriental literature; Gomarus, Arminius, Drusius, and Cocceius, in theology, extended their own fame and that of their university throughout the whole of Europe. Soon afterwards the universities of Franeker, of Groningen, and of Utrecht, produced a rivalry highly advantageous to the diffusion of knowledge. In the seventeenth century, Huygens, Leeuwenhoeck, Zwammerdam, and Hartsecker, were highly distinguished as astromers, and as natural historians. In the eighteenth century Albert Schultens, Hemsterhuis, and the celebrated Boerhaave, with many others, extended the study of the Greek and of the Oriental languages, improved their own, and more especially diffused a more correct knowledge of the healing art. The science of the law of nations, as well as of law in general. owes much to eminent Dutch writers; and nowhere has the research into antiquities been more assiduously pursued, or with greater success. The celebrity of Dutch literature, combined with political and polemical reasons to attract able men from other countries; and their works, published in Holland, still farther extended the renown of the Dutch schools. Thus Scaliger and Luzac, men of French origin; Albinus, Vossius, Gronovius, Ruhnken, and Vorstius, were Germans; and Wyttenbach was a native of Switzerland. Most of the works of these earlier Dutch writers were published in Latin for the sake of greater circulation. But a vast number of other writers who published in Dutch, though little known for that reason, beyond the narrow limits of their own country, are well deserving of a European reputation. Vondel, born in 1587, not only merited, but obtained such a reputation in his own time by his dramatic poems, *Palamedes*, *Gysbrecht*, *Van Amstel*, and *Lucifer*, the last of which has been characterized as the precursor of Milton's *Paradise Lost*, which it preceded by fourteen years, and which bears a surprising resemblance to it. Contemporary with him was Jacob Cats, a truly national and popular poet, who has addressed himself to all the best feelings of his countrymen, and whose works are still highly prized by Hollanders of all classes. Elizabeth Hoofman, or, according to her marriage name, Koolaert, born in 1664, was one of the most learned women, not only of her own, but of almost any other age or country. Besides several poems in Latin, she wrote in Dutch the *Schouwburg der Verwoesting*, which has enjoyed a lasting reputation. Van Effen, who was born in 1684, is one to whom the prose literature of Holland is most highly indebted. He has deservedly been called the Dutch Addison, not only as being a distinguished essay writer, but on account of the terseness and elegance of his style. Jan de Marre, born in 1696, contributed to the Dutch stage one of its best and most popular tragedies, viz., *Jacoba van Beyeren*. In 1710 and 1713, were born William and Onno van Haren. The former, author of *The Friso*, a romantic epopœia, possessing varied and distinguished merits. The latter, however, was of superior talents. He was author of *The Geuzen*, a cycle of national poems, celebrating the leading events in the history of the Netherlands. This is the chef-d'œuvre of the Dutch literature in the eighteenth century. In 1738 was born the Baroness Cornelia Juliana de Lannoy, who wrote excellent tragedies. Van Alphen, born in 1746, besides his poetry, has other claims to fame, as a moralist, a philosopher, and a critic. Admirable in themselves, his *Cantatas* have the further merit of being the first productions of the kind in the language, and are still unrivalled in it. P. L. van Kasteele, a friend of Van Alphen, wrote good original poetry, and showed considerable talent by his translations, among others his version of *Ossian* in hexameter verse. Arend Fokke, born 1755, stands without a rival in the language as a humorous and satiric writer. His "*Boertige Reize*" *Comic Journey through Europe;* and his *Ironical Comic Dictionary*, are celebrated. Feith Helmers and Bilderdyk, are writers who lived within our own time, and such as would do honour to any country. Feith, born 1753, is entitled to admiration both as a poet and a critic. His *Grave* is a masterly production. His *Thirza*, *Inez de Castro*, and *Lady Jane Grey*, exhibit his powers as a tragic poet; while his *Letters*, his *Essay on Heroic Poetry*, &c., place him in a high rank as a prose writer. Helmers, a merchant, born 1764, composed poems which breathe the most noble and generous sentiments. Bilderdyk, born 1756, exhibited his varied powers with equal success upon the most opposite subjects. His *Ondergang der eerste Wereld*, is a very fine poem, but unfinished. Helmers and Bilderdyk both died in 1813. Kinker, born in 1764, is another excellent poet, and has produced admirable translations from Schiller. Loots, Loosjes, Tollens, Immerzeel, Van Hall, Da Costa, Van Lennep, Beets, all of them now, or till very lately, living, are writers who do honour to the literature of their country. We will not, however, conclude, without honourable mention of van Kampen, who died in 1839, author of the *Beknopte Geschiedenis der Letteren*, &c., a most interesting work, from which much of the information above given has been derived.

Language. It is matter of great regret, that the above notice of Dutch writers, short and imperfect as it is, will be found longer and more complete than all but a very small minority of our readers will require as a guide in the selection of authors for their own perusal, owing to the almost universal neglect of the Dutch language by our countrymen. On the subject of this neglect of the language of the Hollanders, the writer just quoted expresses himself in terms severe, but scarcely more so than the case demands. The Dutch is a language derived from the same source with the German, and resembles the Anglo-Saxon in its declension. As spoken indeed by the common people, it sounds rather harsh to English ears, but scarcely more so, we believe, than provincial English does to foreigners. As spoken by well educated persons, it is euphonious and agreeable. It is of homogeneous construction, having great power of forming compounds and derivatives from native words, and not requiring, as English, to borrow terms incessantly from foreign tongues. Its plastic elements have also been most carefully wrought up and polished; nor have any people paid greater attention to purity of style and elegance of diction than the Dutch writers of late years. That devotional fervour, and that regard for the hallowing influence of domestic life, together with nobleness and independence of spirit which generally pervade the poetical and imaginative writings of the Hollanders, ought to have gained for them the attention of the British public.

Fine Arts. Amidst their fierce contests, and their eager pursuit of gain, the Hollanders have been munificent patrons of the fine arts, especially painting; and their artists have powerfully, but in a peculiar manner, rivalled those of Flanders and of Italy. The Dutch school of painting has been praised for the truth of its representation of natural objects, for its perfect finishing, its appropriate shading, and the colouring and delicacy of pencil; but it has been censured for its selection of unworthy objects. The founder of the school was Lucas of Leyden, born in 1494. His most eminent followers were, Van Been of Leyden, born in 1586, said to have been an instructor of Rubens; Bloemart of Gorcum, who painted historical pieces, landscapes, and cattle, and died in 1647; Cornelius Poelenburg of Utrecht, born in 1586, and died in 1663, who was peculiarly happy in his landscapes with figures; and his two distinguished pupils, Bertange and Haensberge; also Rembrandt, who, by his exquisite colouring, was enabled to hide all his other faults. Without enumerating their peculiarities, and without extending the list, we insert the following names, most of which are well known to those who have paid any attention to the history of painting and painters;—Zachtleben, Gerhard Terburg, Swanvelt, Asselyn, Gerhard Dow, Peter van Leer, Wouverman, Waterloo, Berghem, Paul Potter, Backhuysen, Mieris, Schalken, Jardin, Ruysdael, Van der Werff, and Van Hulst. To these we might add many even of recent date. Among the painters of the present day, Kruseman and Pieneman are highly celebrated. An extensive collection of modern paintings is kept in the palace called the Pavilion at Haarlem, itself a very beautiful work. Of ancient paintings there is one great national collection at the Hague and another equally celebrated at Amsterdam, containing most beautiful specimens of Dutch painting, but also rich treasures of Italian art. Holland is throughout very rich in paintings. With these not only the halls of palaces are adorned in profusion, but also those of townhouses, hospitals, and other public buildings, and the apartments of private houses even of middle rank. The Dutch have not equally excelled in statuary and architecture. These arts have been much cultivated among them, however, of late years. (J. I—M.)

HOLLAND, Dr Philemon, the "translator-general of his age," as he was called by his contemporaries, was born in 1551 at Chelmsford, in Essex. He was educated at the grammar-school of that town, and afterwards at Trinity College, Cambridge, of which he became a fellow. On being appointed to the rectorship of the free grammar-school of Coventry, he began that long series of translations from the classics which have saved his name from oblivion even to our own times. He also found time to carry on a very considerable practice as a physician. By a proper use and distribution of his time he reconciled his three professions of schoolmaster, doctor, and translator, fulfilling the functions of all three with undiminished vigour and assiduity till his eightieth year. He died in 1636, in the eighty-sixth year of his age. His chief translations are those of *Livy;* Plutarch's *Morals; Suetonius; Ammianus Marcellinus;* and the *Cyropædia* of Xenophon. He also did good service to literature by his edition of Camden's *Britannia*, to which he made some valuable additions.

HOLLAR, Wenceslaus, a celebrated engraver, was born in 1607 at Prague, in Bohemia. His parents, who were in good circumstances, intended him for the law, but they were ruined by the capture of Prague in the course of the Thirty Years' War; and the young Hollar, who had already given evidence of artistic skill, was apprenticed to Matthew Marian, a pupil of Rubens and Vandyck, to learn engraving. He was only eighteen years old when he published his first pieces, consisting of prints of the Virgin, the *Ecce Homo*, and some other pieces. Leaving Prague in his twenty-first year, he began a wandering life through Germany, taking views of the chief towns and of the most striking scenery of the Danube, Rhine, and other streams, which brought him great fame, but no regular employment. Even at this early period of his life his pieces were known for the exquisitely delicate touch and beauty of finish which they displayed. Hollar's fortunes were at a very low ebb, when he fell in with the Earl of Arundel (then on his way through Germany on an embassy to the Emperor Ferdinand II.), who attached him to his service. Soon after reaching England with his patron he was appointed to instruct the Prince of Wales in drawing; and in 1640 published his *Ornatus Muliebris Anglicanus, or the several habits of Englishwomen from the Nobilitie to the Countrywoman, as they are in these times*, a highly valuable and beautiful work. When the Civil War broke out Hollar was once more left to his own resources; and having incurred the suspicions of the parliament, he was thrown into prison. After a short confinement he made his way over to Antwerp, where Lord Arundel was then residing, and where he wrought quietly and assiduously for printsellers and publishers during several years. His pieces never having fetched prices at all proportionate to their merits he was obliged, in order to make a living at all, to put a value on his time. He fixed his tariff at fourpence an hour, which he marked by a sandglass. So exact was he, that when any one, even his employers, came to speak with him about the picture on hand, he always turned down his glass, charging payment only for the time he was actually engaged with his burin. It was in this humble way that he produced his fine engravings after Da Vinci and the great masters of portrait-painting. On returning to England after the Restoration, Hollar worked with the same unflagging industry, and with no more profitable result, than in his younger days. His plates in Dugdale's *Monasticon* and *History of St Paul's* attest his diligence. In 1669 he was commissioned by Charles II. to take plans and perspective drawings of Tangier and its fortifications, which, on his return to England, he engraved. His last known engravings are his unfinished illustrations of Throton's *Antiquities of Nottinghamshire.* These and other works brought the artist to his seventieth year, but without the independence he had struggled for all his life. On his very deathbed an execution was served upon his house. His last words were a petition to be allowed to die in his bed, and that he might not be removed to any other prison but his grave. It is not known whether this prayer was granted. The day of his death was the 28th March 1677. According to Vertue's *Catalogue* Hollar's works amount in all to about 2400 pieces. The best of these possess great spirit, lightness, and freedom of touch, combined with the most scrupulous accuracy. His delineations of still life in particular are admirable, but his figure pieces are generally not very happy.

HOLOCAUST, a sacrifice which is entirely consumed by fire. See Sacrifice.

HOLOGRAPH, a deed or testament written in the testator's own hand.

HOLSTEIN, a duchy of Denmark. See Denmark.

HOLT, Sir John, the celebrated Lord Chief-Justice of the Court of King's Bench in the reign of William, was born at Thame, Oxfordshire, in 1642. His father, Sir Thomas Holt, had been sergeant-at-law, and his eldest son John followed also the profession of law. After having been entered at Oriel College, Oxford, as a gentleman commoner, he became a member of Gray's Inn in 1658. He soon displayed a decided predilection for the study of law, became an able advocate, and well versed in the constitutional law of England. He was made Recorder of London in 1685, which important office he held with ability for a year and a half, when he became unpopular at court. It had been determined to abolish the test act; but the measure was opposed by Holt, and in consequence he had to retire from the office of recorder. Subsequently, however, in 1686, he was made sergeant-at-law. The ability which he displayed in the *Convention Parliament* raised him so high in the estimation of the Prince of Orange, that, upon the accession of the latter to the English throne, Holt was made Lord Chief-Justice of King's Bench. Upon the removal of Somers in 1700 from the chancellorship, William was desirous that Holt should accept the Great Seal, but he declined. He died in 1709, at the age of sixty-seven.

Sir John Holt as a judge was a model of unbending integrity. He persevered in what he knew to be right, irrespective of the opposition of both houses of parliament. For twenty-two years his great acquaintance with common law, and strict sense of justice, were devoted to the preservation of the rights of his countrymen against invasion from whatever quarter. His understanding was sound, and his skill in seizing the main points of a case amid a mass of details, as well as his great clearness in stating the case, were valuable qualities in a judge. His physical as well as his moral courage was at times exhibited. He had been requested to supply a number of police to help the soldiery in quelling a riot. He assured the messenger that if any of the people were shot he would have the soldiers hanged. He went himself, and prevented bloodshed. On another occasion he had declared in favour of the Aylesbury burgesses, who had been committed to Newgate for complaining about the non-registering of their votes. The House of Commons summoned him to appear before them; but as the summons was disregarded they sent the Speaker to him. Holt peremptorily told the Speaker that unless he returned immediately to his chair he would have him sent to Newgate.

Chief-Justice Raymond has given a report of Holt's decisions. Holt's character as a judge is highly spoken of in the *Tatler* (No. 14), under the name of Verus. The following reports were published by him in 1708, folio, with notes:—"A Report of divers cases in Pleas of the Crown, adjudged and determined in the reign of King Charles II., with directions for justices of the peace and others, collected by Sir John Keyling, knight, Lord Chief-Justice of the Court of King's Bench, from the original manuscript under his hand; to which is added the Report of three modern cases—viz., Armstrong and Lisle, the King and Plumer, the Queen and Mawgridge."

HOLT, a municipal and parliamentary borough of North Wales, Denbighshire, on the Dee, which is here crossed by an old bridge of ten arches. Some traces still remain of Holt Castle, which having been garrisoned for Charles I. was taken and dismantled by the parliamentary forces in 1645. Holt is governed by a mayor, two bailiffs, &c., and is a contributory borough to Wrexham. Pop. (1851) 1029.

HOLY ALLIANCE, The, a league formed by the principal sovereigns of Europe after the defeat of Napoleon at Waterloo. The basis of this alliance was drawn up by Alexander of Russia (Sept. 26, 1815), and received the signatures of Francis of Austria and Frederic William of Prussia. Its name, which was dictated in accordance with the popular religious enthusiasm of the time, was fitly expressive of the vague principles of religious charity and peace on which it professed to be based. It gained strength by the accession of England and France, but thenceforward became an alliance simply for the establishment of existing dynasties in Europe, as may be seen from the declaration of November 1819, and from the results of the congresses of Troppau, Laybach, and Verona. After the secession of England and France the holy alliance became practically obsolete.

HOLYHEAD (Welsh, *Caer Gybi, i. e.*, fort of Gybi), a parliamentary borough, seaport, and market-town of North Wales, on an island at the western extremity of the county of Anglesea. It is connected with the main part of the county by a vast embankment, three-quarters of a mile in length, and of an average height of 16 feet, with a bridge near the centre through which the tide rushes with amazing velocity and force. The town, formerly a small fishing village, has acquired importance in consequence of its being the nearest and most convenient place of embarkation for Ireland. It is the point of termination of the great parliamentary roads from London and Chester, and of the Chester and Holyhead railway, in connection with which steam-packets leave the harbour several times a-day for Kingston near Dublin. The vast amount of labour and money expended on public works connected with the harbour has materially contributed to attract and support an active and thriving population. Holyhead has been selected by government for a harbour of refuge. The works when completed will enclose an area of about 316 acres, with a depth of at least 6½ fathoms water. The church, occupying the elevated site of an ancient monastery, is dedicated to St Gybi; and in the south porch is a rude figure of the patron saint, under a canopy. The churchyard is partly surrounded by a very curious and interesting Roman wall. The pier extends nearly 1000 feet, and upon it is an arch of Mona marble commemorative of the visit of George IV. in 1821. At the extremity of the pier is a lighthouse, exhibiting a white light 50 feet above sea-level. On South Stack (Stack), an isolated rock 3 miles W., is another lighthouse connected with the harbour, and of essential service in facilitating the access. The light, which is 212 feet above high-water mark, is produced by 21 lamps with powerful reflectors. The inhabitants are chiefly engaged in the coasting trade and in shipbuilding. The coast is extremely wild and rugged, presenting numerous wave-worn caverns, which form the haunt of innumerable sea-birds. From the summit of Pen-Caer-Gybi, or the Mountain of Holyhead, 700 feet in height, a good view is obtained of the town and harbour. On the sides of the mountain are traces of extensive British fortifications, and at the top are remains of a circular building 10 feet in diameter, which was probably a Roman watch-tower. Market-day, Saturday. The borough is contributory to Beaumaris in returning a member to parliament. Pop. (1851) 5622.

HOLY ISLAND, an island, or rather a peninsula insulated at high water, on the N.E. coast of England, 9 miles S.S.E. of Berwick-on-Tweed. It was by the Britons called Inis Medicante, and also Lindisfarne, from the small rivulet Lindi or Landia, and *fahreen*, a recess. It received its present name from being the site of one of the earliest monasteries established in this country. It is connected with the mainland by sandbanks dry at low water, and affording a passage to vehicles of all kinds. It has an area of 3320 acres, but about one-half of its surface towards the N. is a sandy waste, abounding in rabbit-burrows. The rest of it, however, is very productive. At the S.W. angle of the island is a small village, formerly a town of considerable size. The ruins of its celebrated abbey still exist, and are aptly termed by Sir W. Scott, "a solemn, large, and dark red pile." Pop. (1851) 908.

HOLY-STONE, a large stone used for cleaning ship's decks. It receives its name from the unwillingness of sailors to submit to the drudgery of using it.

HOLYWELL, a municipal and parliamentary borough, and market-town of Flintshire, North Wales, 15 miles N.W. of Chester. It is pleasantly situated on an eminence near the left bank of the estuary of the Dee. The streets are irregular but spacious and well paved, while many of the buildings are substantial and elegant, and give the town an air of prosperity and opulence. Until the commencement of the present century the town was inconsiderable, but owing to the extension of its mines, and the successful establishment of several manufactories, it has become the largest in the county. The church, erected in 1769, but retaining some columns of a more ancient structure, is a plain edifice, with a strong embattled tower, dedicated to Gwenfrewi or St Winefrid. Holywell has manufactures of cottons and galloons, besides smelting houses and foundries. In the vicinity are collieries, and valuable mines of lead, copper, and zinc. It has a station on the Chester and Holyhead railway. It takes its name from the celebrated well of St Winefrid, long reckoned one of the seven wonders of Wales. The spring is estimated by Pennant to discharge 21 tons of water in a minute; and its temperature is at all seasons several degrees higher than the mean temperature of the district. The well is covered by a beautiful Gothic building, said to have been erected by Margaret, Countess of Richmond, mother of Henry VII. It is a contributory borough to Flint in returning a member to parliament. Pop. (1851) 5740.

HOLZMINDEN, a town of Brunswick, on the right bank of the Weser, at the foot of the Sollinger Mountains, 56 miles S.W. of Brunswick. It is a place of great manufacturing activity, producing largely iron and steel wares, hosiery, flannel, linen, paper, leather, &c.; and has an active river trade. It has two churches, a synagogue, gymnasium, and public library. Pop. about 4000.

HOME, Henry, Lord Kames, a celebrated Scottish lawyer and writer, was born in Berwickshire in 1696. He received his early education in languages and mathematics from the family tutor. He studied civil law and municipal jurisprudence at the University of Edinburgh. Finding it necessary, in order to become a finished barrister, to pay special attention to the forms and business of courts, he attended the chamber of a writer to the signet. His ability and great application rendered him a successful advocate, in which capacity he began to practise in 1724. In 1752 his genius, in addition to his other qualities, elevated him to the seat of judge of the Court of Session. This high office he held under the title of Lord Kames, with distinguished reputation for thirty years. In 1763 he was made one of the Lords of Justiciary. He died 27th December 1782, at the advanced age of eighty-six.

Lord Kames applied his vigorous intellect to metaphysics and criticism as well as to law, and occupied no small portion of his long life in promoting trade and in the improvement of agriculture. His publications on subjects relating to law form a numerous catalogue. In 1728 he published

Remarkable Decisions of the Court of Session during the previous Twelve Years, in 1 vol. folio. In 1732 appeared his essays on *Jus tertii*, *Beneficium cedendarum Actionum*, &c., 1 vol. 8vo. These essays were received with admiration. In 1741 appeared his *Decisions of the Court of Session* during its whole existence, abridged and arranged like a dictionary, extremely useful to the practical lawyer, 2 vols. folio. In 1747 appeared his *British Antiquities*, relating to law, such as the introduction of the feudal law into Scotland, &c., in 1 vol. 8vo. In 1757 appeared his abridgment of the *Statute Law of Scotland, with Historical Notes*, in 1 vol. 8vo. In 1759 he published *Historical Law Tracts*, in 2 vols. 8vo. In 1760 appeared his *Principles of Equity*, in 1 vol. folio. In 1766 he gave another volume of *Remarkable Decisions of the Court of Session from* 1730 *to* 1752, 1 vol. folio. In 1777 he published *Elucidations respecting the Common and Statute Law of Scotland*, 1 vol. 8vo. In 1780 appeared his *Select Decisions of the Court of Session from* 1752 *to* 1768, in 1 vol. folio. These numerous publications within his proper sphere of law, display amazing activity and industry extended to the very close of his life.

But we have now to follow Lord Kames into another domain; for useful as were his law publications at the time, and even still, his fame does not mainly rest on them. He had corresponded with Butler, Berkeley, and Clarke, at an early period, and possessed a decided inclination for metaphysical studies. In 1751 appeared *Essays on the Principles of Morality and Natural Religion*, in 1 vol. 8vo, from his pen. This work gave some offence, because the doctrine of philosophical necessity, as stated by him, was considered as coming into collision with the interests of religion. He altered some of the obnoxious expressions, but adhered to his doctrine in the main.

He refused to reduce all the springs of human action to one principle, and to undervalue reason to the extent to which incautious theologians are sometimes disposed to do. It is said that a Dissenting professor, mistaking the "necessity" of the philosopher for the "predestination" of Calvin, had the hardihood to recommend the treatise to his students. In 1761 Lord Kames published his *Introduction to the Art of Thinking*, 1 vol. 12mo. In 1762 appeared his *Elements of Criticism*, upon which his fame is chiefly founded. This work quickly took precedence of such as had been in more general use before it. Lord Kames, in this able and original work endeavours to analyze the sublime and beautiful. Whatever comes under the one or the other of these denominations must be considered partly as it is in itself, and partly as to the means which we have of receiving the impression, *i. e.*, our faculties. But not only so, the object is to be considered not simply as to itself, but also as to the circumstances and associations connected with it. He encounters and freely admits the difficulty which occurs in the fact, that a pleasurable emotion should be the result of two things so different as the sublime and beautiful. His analysis of the sublime is more successful than that of the beautiful; the latter he sometimes decides from a merely utilitarian point of view.

In addition to all the foregoing labours, Lord Kames was a zealous promoter of the agricultural and commercial interests of Scotland. He had the chief management of numerous boards of fisheries and manufactures, and was one of the first patrons of the Physical and Literary Society—afterwards the Royal Society of Edinburgh. In 1772 he published a work on agriculture, entitled, *The Gentleman Farmer, being an Attempt to improve Agriculture, by subjecting it to the Test of Rational Principles.* His work, *Sketches of the History of Man*, appeared in the following year, but was less accurate than entertaining. His last work was *Loose Hints upon Education*, 1781, 1 vol. 8vo. In this work, written in his 85th year, he earnestly inculcates the importance of training up youth in virtue and industry. He attended the Court of Session to within a short time of his decease. A few days before he died he addressed each of the judges separately, and took an affectionate farewell. He was of an extremely lively disposition, and warm in his friendships. His abiding sense of an intelligent Providence continually led him to trace out evidences of wisdom in nature. For his life, see *Woodhouselee's Account*, in 2 vols. 4to, 1807.

Home, *John*, the author of the well-known tragedy of *Douglas*, was born in 1722 at Leith, of which place his father was town-clerk. He was educated at the grammar school of his native town, and afterwards at the University of Edinburgh. Admitted into the church in 1745, he was in the following year appointed to succeed Robert Blair, author of *The Grave*, as minister of the parish of Athelstaneford. Here he composed that play which has hitherto kept his name from oblivion; and which, when rejected by Garrick, was acted with splendid success on the Edinburgh stage. It is hard for the strictest purists to discover anything in this tragedy that is not perfectly consistent with the most rigid code of morals. Its appearance on the stage, however, raised a storm in the Church; and one clergyman was suspended from his office for having gone to the theatre to see it played. Home was himself threatened with deposition; and many of his friends were loaded with abuse. By the following Assembly, however, he was treated with greater lenity; and though he resigned his charge on the June following, and retired to England, it was without the stigma of ecclesiastical censure. The drama itself is not altogether that piece of empty and sonorous bombast that it is sometimes alleged to be. Its moral tone and purport are high; its plot, if not wrought out with the highest tragic skill, is at least interesting; and the diction is chaste and polished, sometimes even elegant. Home's subsequent plays of *Agis*, *The Siege of Aquileia*, *The Fatal Discovery*, *Alonzo*, and *Alfred*, did not enjoy even a temporary success; and his only historical work, *The History of the Rebellion in Scotland in* 1745-6, was hardly more fortunate. In 1762, the year in which Samuel Johnson was pensioned, Home was similarly rewarded, and to the same amount (L.300 a-year), through the influence of Lord Bute. For ten years after his retirement from the church, Home lived chiefly in London. In 1767 he returned to Scotland, where he spent the remainder of his days, varying the ordinary routine of his life by annual visits to London. He died at Merchiston, near Edinburgh, in 1808, in his 86th year. The character of his only successful play has been already indicated. It only remains to add that in private life he was one of the most amiable men of his age. Though fond of the society of the great, he courted rather than shunned that of his humble friends, and it was one of his chief duties and pleasures to bring forward and encourage rising talent. Many a youth who afterwards rose to wealth and fame owed his first step in life to the good offices of the author of *Douglas*.

Home, *Sir Everard*, an eminent surgeon, was born about the year 1755. He was of Scottish extraction, and his connection with the Hunters brought him into notice at an early period of life. At one time he was held in high estimation as a surgical practitioner. He was one of the surgeons to St George's Hospital; and this circumstance, added to the publication of various works which attained a considerable share of celebrity, contributed to extend his reputation, the advantages of which he lived nearly half a century to enjoy. In 1813 he was created a baronet, and was also appointed serjeant-surgeon to the king. He died August 31, 1832, in the 77th year of his age. He was the author of *Practical Observations on Stricture; Lectures on Comparative Anatomy;* and of various papers in the *Philosophical Transactions.*

HOMER, the greatest epic poet of Greece, and a name of the highest significance, not with regard to Greece only, but to Europe generally, and to the history of the human race. For in Homer we have to do not merely with a poet of the first class, holding the same place in literature that Aristotle and Newton do in science, but with the oldest records, after the books of Moses, that have exercised a permanent influence on the civilization of the west. It is but reasonable, therefore, that we should give a more full and minute consideration to the Homeric poems, than even the high position of their author on the topmost peak of the Hellenic Parnassus would justify.

The life of Homer did not fall within the strictly historical epoch of Greek literature; nor were there any diligent biographers in his day who made it a business to collect and to make public the notable sayings and doings of men of extraordinary genius. The existing literary testimonies for the facts connected with the life of the poet, do not carry us further back than the age of Pindar (B.C. 500); that is to say, to a period more than three hundred years posterior to the age of the great poet, taken at the latest of the various dates to which it is assigned. What we know of Homer, therefore, we know only through the channel of national tradition, uncertain and vague as that must always be in an age when writing was either unknown or little practised, and criticism of literary documents never dreamt of. We shall not, therefore, be surprised to hear that even the birthplace of their great national poet was unknown to the Greeks, and that the period in which he flourished was a puzzle to their ablest chronologers. We are not, however, to suppose that on this interesting subject we know absolutely nothing. However vague popular traditions may be, and however discrepant in minor details, they will generally be found to contain a nucleus of truth which a practised eye can readily distinguish from the fabulous accretions of idle or impudent imaginations; and if the general substance of such traditions regarding the life of a great poet, is not contradicted, or is rather confirmed, by the internal evidence of his reputed works, a reasonable man may take his stand upon them as confidently as he does upon any other conclusion, resting upon evidence which may reach the highest degree of probability, but can in no case partake of absolute scientific certainty.

The authorship of the *Lives* of Homer, printed in Barnes', and other editions, and in Westermann's collection (Βιογράφοι, Brunswick, 1845), is unknown; but their value as literary documents depends not on what the authors say in their own name, which is utterly worthless, but on the ancient authorities and special popular traditions which they quote. From them we know what was the account given by Aristotle of the birthplace of Homer, what Ephorus said was the local tradition of the people of Cumæ, and what Homeric monuments were shown by the islanders of Ios. A very slight consideration of these ancient testimonies thus analysed will suffice to show the vanity of the claims put forth by various Greek cities as having given birth to Homer. Of these, seven is the number commonly mentioned in a well-known distich (*Aul. Gell.*, iii., 11); but the reader who chooses to turn up Suidas will find at least half a dozen more; and to increase learning in this matter will only be to increase scepticism, unless a man carries with him the sound maxim of the lawyers, *ponderanda sunt testimonia non numeranda.* The claims of Athens, for instance, rest, according to a distinct testimony (*Lives* δ and ϵ in Westermann), on the mere fact that the Ionians of Smyrna were a colony from Attica, and that if Homer was a Smyrniote, he might reasonably be called an Athenian, just as a person born in Sydney may say he is a Londoner, because his father or his grandfather, or his great-grandfather was so. In a similar loose fashion the claims of Salamis in Cyprus, are found to be explained by the fact that Stasinus, one of the poets of the *Epic Cycle,* was a native of that island, and that the epic poem called Cypria, written by him, was by some attributed to Homer, from whom Stasinus is said to have received it as a marriage gift with the daughter of the great poet (Ælian, V. H. ix., 15). Colophon, in a similar way, claimed to have produced the poet of the *Iliad,* because of a famous humorous poem called the Margites, of which Homer was generally supposed to be the author (Welcker, *Epic Cycle,* i., 184). But the same critical inspection which enables us to expose the flimsy pretensions of these places, reveals the remarkable fact that those other cities which have most to say for themselves as being the native country of Homer, unite, by the peculiar form of their traditions, in giving to Smyrna at least some share in his birth,—a plain admission that at the time when these traditions were framed, the claims of Smyrna were considered so strong that they could not possibly be ignored. Thus the most detailed and best known *Life,* that attributed to Herodotus, which was for a long time received as authentic, deduces the parentage of Homer from Magnesia, in Thessaly; thence Melanopus is said to have crossed the Ægean, and settled in Cumæ, the principal city of the Æolians, in Asia Minor; here he married a lady of Cumæ, by whom he had a daughter called Critheis; and this maiden having, unknown to her guardians, formed a connection with some unknown individual of the male sex, was, to avoid exposure, sent to Smyrna, where, on the banks of the River Meles, she brought forth Homer, thence called Melesigenes. We have already said that such local traditions are not history; but when we find another of the seven cities, namely, Ios, framing a local legend, which, while differing from that of Cumæ in every other point, agrees with it in bringing the immortal minstrel to the banks of the Meles to be born, we must be altogether blind to the spirit in which local legends are composed, if we do not see here the strongest proof that the real country of Homer was that which is distinctly allowed in the legends of those very cities which are most interested in denying its claims. We say, therefore, that according to all human probability, Homer was born at Smyrna; and when we say, with equal probability, that he died at Ios,—one of the Cyclades in the Archipelago,—for on this point the various accounts also agree,—we have stated all that can be said to be known with regard to the father of epic poetry in Greece. The other events of his life, as given in the longer biographies, are fictions invented, many of them, with the plain purpose of giving a historical existence to certain of the characters mentioned in the *Iliad* and *Odyssey;* or they are mere blunders of which the source is innocent and obvious. That, like all minstrels, Homer was given to wander about from place to place in the exercise of his vocation is probable enough without any voucher, and appears quite certain from the extensive and accurate geographical information displayed in his works; but the details of his travels would be curiously retained in no man's memory; and what we have for them bears all the marks of a vulgar forgery. The much-bespoken circumstance of his being blind, noticed in all the ancient *Lives,* if implying a mere superinduced misfortune, and not a congenital defect, might, as a matter of popular tradition, be probable enough, were the origin of the story not too plain in the double fact that a blind poet is introduced in the *Odyssey* (viii. 64), and in the famous hymn to Apollo, which Thucydides (iii. 104) and other ancients accepted as the productions of the genuine Homer. This hymn, indeed, must be regarded as the main authority of those who claimed Homer as a Sciote: for the lines run expressly—

Τυφλὸς ἀνὴρ, ὀικεῖ δε Χίῳ ἔνι παιπαλοέσσῃ.
The blind old man who dwells in Chios' rocky isle;

and there is certainly no evidence so strong in favour of Smyrna, provided only it could be proved—what no scholar now dreams—that these lines were really so said and sung by the veritable singer of the *Iliad* and *Odyssey*. But after this line is rejected, there remains no ground for the claims of Chios, save that weak one expressly mentioned by Strabo (xiv., p. 645), that in this city there flourished the famous guild or brotherhood of minstrels (of whom more anon), known by the name of the Homeridæ; a fact of no more power, when critically examined, to prove that Homer himself was a Chiote, than the fact of Calvinistic theology being very dominant in Scotland would prove that the author of the doctrine was born in Edinburgh.

The age of Homer is a matter about which less that is satisfactory can be stated, than with regard to his country. That if not a Smyrniote he was at least a native of that part of Asia Minor, is proved not merely by the traditional evidence just adduced, but by the internal evidence of the poems themselves—by their rich tone, colour, and style, and also by many well-known facts relative to the early rise and growth of poetic literature among the Greeks. But chronology is, in the nature of the thing, a matter with which popular tradition has nothing to do: and the internal evidence of the poems themselves on this head, though strong enough, perhaps, to exclude certain extreme suppositions, affords a pretty wide range to a merely conjectural chronology. Herodotus, in a well-known passage (ii., 53), places Homer about four hundred years older than himself; that is, in the year 850 B.C., or thereabout; Aristotle, in the account given by him of the legend of Ios, makes the birth of Homer contemporary with the great Ionic migration (1044 B.C.); while Dionysius of Samos, the cyclographer, threw him back as far as the Trojan War, which he describes. To determine exactly between these contending dates, and at least a dozen more given in a very full scheme by Lauer (*Homerische Poesie*, p. 124), is of course hopeless; but the circumstances of the case warrant us in refusing to allow any date for Homer, so early as that assumed by the cyclographer, or later than that given by Herodotus. For such an extensive collection of myths as that connected with the Trojan War requires time to grow; and Homer manifestly talks of the heroes of the *Iliad* as belonging to some age not altogether identical with his own. The mingled elements, also, of Ionian and Æolic Hellenism, which appear in the Homeric poems, did not exist in Asia Minor at the early date supposed by Dionysius, or those who come near to him. As little, on the other hand, can we go beyond Herodotus, in bringing Homer nearer to the date of the Olympiads than the year 850, for the very uncertainty in which the wisest Greeks were as to the age of the poet, proves that he lived at a period considerably more ancient than the first year (776 B.C.) of their recognised national chronology.

Perhaps some reader may have been content that we should allude to these disputed points in a manner even more perfunctory than we have done; but in these days of rampant historical scepticism, imported wholesale from Germany, it is absolutely necessary to make some attempt to mark distinctly where the cloud-architecture of mere imagination ends, and the mainland of actual tradition, hazy and yet indubitable, commences. In reference to these sceptical views of the Germans, we cannot avoid noticing here that some of them have even gone so far as to deny the existence of such a man as Homer altogether; and, what is of more consequence to us, the language, which some of the more wild of that sect are still in the habit of using, has been adopted by some of our own scholars whose name is sufficient to make even their incidental errors dangerous. Mr Grote, for instance, uses the following language:—"The name of Homer—*for I disallow his historical personality*—means the *Iliad* and the *Odyssey*, and nothing else;" and again, "Homer is no individual man, but the divine or heroic father of the Gentile Homerids" (vol. ii., p. 179); that is to say, while the whole of the Greek nation believed they had once had a great epic poet to whose extraordinary genius, as to a natural and adequate cause, they attributed their two great epic poems (just as the ordered world finds the best explanation of its existence in a God); we, the learned of modern times, are bound to doubt whether that poet had any existence, and to treat these poems as if they were not productions of a great poetic genius at all, but the creation of some half dozen or a score of second-rate rhymers, whose names no person ever cared to know, but who were cunning enough to raise themselves into a fictitious historical consequence by the creation of a symbolical head of their corporation called Homer, whom the silly world has, for nearly 3000 years, been willing to take for a substantial reality! Now, it ought at once to be granted to Mr Grote, and those Germans whose nebulous notions he has in this matter imported, that there was a tendency in the earliest times of the Greeks, as perhaps of all highly imaginative nations, to represent in the historical form certain favourite ideas and theories, theological and ethnological; which allegorical or mythical narratives, a modern reader of a prosaic temper may be apt to mistake for realities. Of the religious myth in particular, the historic was the generally accredited form, to such an extent that the original physico-theological ideas which these narratives were invented to convey, are now but dimly discernible behind the motley company of human incarnations by which they are impersonated. Nay, more, it may even be true in some cases, according to a favourite notion of the Germans (Uschold and others), that the religious symbols of one century became the anthropomorphic gods of another, and dwindled down to the merely human heroes of a third. Further, it is not to be denied that beyond the sphere of religion the practice seems to have prevailed among the Greeks to a certain extent of inventing names of characters, apparently historical, to symbolize the origin and the connection of certain notable races of men. Thus Hellen, in whose personality the most critical of ancients believed (see Thucyd. I. 3), is taken by almost all modern writers, even by Clinton, for a mere name invented as a symbol of the common nationality of the people whom he represented. But even with regard to national genealogies, we are in nowise entitled to assume that because they are peculiarly liable to forgery, therefore no national genealogy is in any case to be accepted as true. Much less are we to make a general rule of evaporating all the most deeply-rooted local traditions of a country into mere misty imaginations and unsubstantial symbols, and to assume that the "manufacture of fictitious personalities" (Grote), was the only or the main function of the popular intellect of any people, at any stage of their civilization. Man is a real creature, and he deals with realities; and of all realities, those which he is least disposed to lose hold of are the great men whose energy fathers any extraordinary product of the national life, and whose name marks any great national epoch. In conformity with this real tendency of human nature we find that in all popular poetry the actions of famous men—the national heroes—form a much more prominent element than symbolized religious or physical philosophy (see some admirable remarks in Lauer, p. 131–174); and the periods of intellectual and political advancement marked by such names as Homer and Theseus are precisely those in which a great reality would be more powerful to seize the minds of men than the most significant symbol. Extraordinary and even miraculous stories in the life of a historical personage ought not in the very least to shake our credit in his fundamental reality; for it is precisely because his reality was so striking and so overpowering that these miraculous stories were invented, and naturally found credit. The Israelites carried back the genealogy of their nation to the son of Isaac, from whom they sprung. Had the books of Moses, with all their circumstantial details and life-like reality never been written, a German philologer might have said that Jacob was merely a symbol. In the same way the Athenians ascribed certain great political changes in their country to the son of Ægeus, of whom various wonderful and superhuman stories are told; but these stories no more justify us in throwing him into the limbo of symbols, than the ridiculous lies about Abraham and the other patriarchs, current in the Koran and other Eastern books, would entitle us to disallow the historical reality of the father of the faithful. In the same way—though there are some things of a plainly mythical nature in the traditional legends of Homer—to conclude from these that Homer himself is a myth, is to argue with the precipitation of a whim-intoxicated German, not with the deliberation of a sober-minded and judicious Englishman. Indeed, it is only doing the Germans justice to state that the "disallowance of the personality of Homer," to use Mr Grote's phrase, is by no means so common among them now as in the first fever of intemperate Wolfian enthusiasm it might have been without offence. William Müller, the most popular champion of Wolfian ideas, says distinctly, in his *Vorschule* (p. 51), that "we are not called upon to question the personal existence of Homer;" and Professor Welcker (to whose learned labours all students of Homer are so much indebted), Nitsch, C. O. Müller, Dr Ihne (in Smith's *Dictionary*), Baümlein, Lauer, and others who have written recently on the subject, show a moderation of temper, and a soundness of historical judgment, very far removed from what we are accustomed to designate as "German extravagance." It is becoming evident to a thoughtful observer that even among that most speculative, sceptical, and, intellectually speaking, most anarchical nation of Europe, the conflict of extreme views is beginning to produce its natural result in the recognition of the great human realities which lie at the bottom of the strong though unpurified historical convictions of the masses.

So much for the poet. The next question that presents itself in connection with the name of Homer is that of the authenticity of the works which go under his name. What security have we that the poems we now read with such delight and instruction are the identical works which Aristotle analysed, which Plato denounced, which Thucydides and Strabo quoted as the best authority for some of the earliest and most important facts in Greek history and topography? What guarantee, further, that the works which the great writers of the classic age of Greece, received as genuine works of the great Ionian bard, actually were so; and how far they might not have been made subject to various interpolations and mutilations in the three or four centuries that elapsed between the heroic age, when they were composed, and the historic age, when we find them made the subject of literary study and criticism? The importance of these questions will appear the more strongly when we bear in mind that the celebrity of Homer naturally led to the national practice of stamping with his name many poetical works of a popular character, in which the stern tests applied by a severe criticism refuse to find any marks of so illustrious a paternity. Prominent among these are the Homeric hymns, treated as authentic by Thucydides, and published as undoubted works of the great bard in the *Editio Princeps* and other notable editions by modern scholars. Of the same kind are the *Cypria* already mentioned, of the contents of which a short account is given by Proclus the grammarian. To Homer also was very generally attributed by the ancients the Colopherian poem called *Margites*; and the *Battle of the Frogs and Mice* is an example of one of the many *πάιγνια*, or humorous popular pieces, with the composition of which the singer of the wrath of Achilles is supposed to have amused his mighty mind in his hours of relaxation. With regard to all these it may be sufficient to state that the ancients themselves were very far from exhibiting a serious agreement as to their authorship; and their being attributed to Homer must be viewed as rather a favourite floating popular belief than a strong national conviction. Such being their character, it could not be expected that they should stand muster before the scrutinizing glance of modern criticism, and the sceptical analysis of the Germans. In talking of the Homeric poems we must therefore remove these minor works altogether from our view; but the fact of their having been for a long period so generally received as genuine works of the poet, leads us to treat with the greater consideration the caution of those who demand the severest proof for the real authorship of the *Iliad* and the *Odyssey*. Now, with regard to these two great works, there is, in the first place, not the slightest reason to doubt that we possess and use them, so far as the contents and the text are concerned, exactly as they were possessed and used by the Greeks of the classic ages; and with regard to their authorship the faith which we have that these identical works were the genuine works of the great Ionian epopœist was the general faith of the whole ancient world, both Greek and Roman; and in the case of the *Iliad* at least (for there were some difficulties started by a few curious inquirers with regard to the *Odyssey*), a faith for centuries unshaken by a single breath of contradiction. That the *Iliad*, which we now read, is substantially the *Iliad* of Pindar and of Plato, can be proved to the satisfaction of any sane man, exactly in the same way that the Christian Scriptures read now in the Christian churches are proved to be substantially the same as those expounded by the earliest bishops, and sanctioned by the most authoritative councils of the Church. To the Greeks Homer was in fact a bible, and guarded with all the care and all the piety that belongs to such a book; a fact which at once explains the extravagant, and, to our feeling, illiberal zeal with which Plato denounces it in his ideal polity, and at the same time puts into our hands a guarantee of the surest and most sacred kind for the general authenticity of the poems as we now read them. No person who is even superficially read in the Greek classics can fail to have observed how constantly all writers of note, from the severe and stern Aristotle to the light and sportive Lucian, refer to Homer as to a writer of whom a universal knowledge might be presupposed in all their readers, and to whom a universal respect was paid. The consequence of this frequent reference is, that there is no writer of antiquity of whom we are more sure that we possess his genuine words as current in the mouths of the ancients, than we are with regard to the author of the *Iliad* and the *Odyssey*. But more than this. In the time of the Ptolemies, and when the productive power of Greek literature had begun to faint and die away, there was a special band of learned critics and commentators, who made it their business to collate the various recensions of the Homeric epics, and to transmit their text to us with as much conscientious fidelity as was possible. Prominent among these were Aristarchus and Zenodotus, of whom the first has transmitted his name to modern times as a popular appellative for the literary man who exercises the higher sort of documental criticism as a vocation; and not only do we know that such men existed, and exercised their philologic care on the great national treasure of the Homeric text, but we have in the Venetian scholia, first published from the St Mark's library by Villoison (1788), a series of notices of their method of critical procedure, and a list of their asterisks and obelisks, sufficient to dispel all doubts as to the unadulterated transmission of the *Iliad* and *Odyssey*, at least from the period when letters began to be a study and an occupation in Greece. But when did this period begin? and what have we to say for the nature of the guarantees of authenticity, whatever they were, that existed before this period? These are the really serious questions, the answers to which have raised difficulties that have made wise men pause and foolish men stumble, not without observation. On all hands it is allowed that Pisistratus, the well-known Athenian tyrant (B.C. 560), was the first, so far at least as Athens is concerned, to collect together the various books or rhapsodies of the Homeric epics, which were generally sung or recited separately, and to arrange and publish them—to use a modern phrase—in the form in which they now exist. Pisistratus, therefore, or rather his literary coadjutors, among whom Onomacritus is prominently named, must be regarded as our first historical guarantee for the text of the *Iliad* and *Odyssey* as we now possess it; but the details of his literary labours are unfortunately not in the least known to us; so from this point backward we are left to conjecture, to historical probabilities and internal evidence, and to the hundred and one small sceptical doubts and sceptical solutions of those doubts, which will never cease to exercise the wits of those who are born to torment themselves in this way. The question whether the *Iliad* as arranged by Pisistratus was, both in point of matter and arrangement, exactly the same as the *Iliad*, of which Homer was then the reputed author, is a question that in the nature of the case admits of no perfectly satisfactory answer. *Absolutely* the same of course in the nature of human things it cannot be; for even the Christian Scriptures, guarded as they have been by the double sanction of individual and corporate authority, have not been transmitted through eighteen centuries of literary record without being made subject to several very notable interpolations: nor can it even be said that any man at the present day can feel the same degree of certainty with regard to the text of Homer that he does with regard to that of Milton, Tasso, Dante, or even Virgil. Why? Not only because of the greater lapse of time; for in a question of documentary criticism this is often a point of comparatively small moment; but because of the different conditions under which these works were composed, and the different medium through which, in their earliest stage, they were transmitted. We read of no Pisistratus that first collected the scattered books of the *Æneid;* the very MS. which Dante gloried in, or something as good, is no doubt lying in the Grand Duke's library in Florence at the present hour. In the case of these poets people may be vexed with various readings and doubtful lines—such questions as curious editors will raise even with regard to modern Scotts and Byrons; but there is no talk about cutting out whole books, and the strange process with which learned Germans are so familiar, of restoring a great poem to its integrity by depriving it of some of its most beautiful parts. Let us endeavour then to fix a steady eye on the real state of the Homeric text at the time when it was collected by Pisistratus. What reason have we to suppose that it was then to any considerable extent interpolated, or changed in any way from its original condition as it came from the mouth of Homer? The answer to this question depends upon another. Who were the conservators of that trust previous to the time of Pisistratus; and what safeguards were they provided with against those invasions of spurious matter to which all works of extensive circulation, and general popularity, are especially subject? The conservators of the trust are, in the first place, the national ἀοιδοὶ, minstrels or bards, who, like Homer himself, made a profession of singing songs and epic poems for the amusement of the people; and, when these had begun to wane, they were succeeded by the rhapsodists or popular reciters, who performed the same functions, but with less original genius and less social dignity in an age when historians, and orators, and philosophers, and rhetoricians, had usurped many of the functions that had originally been exercised by the ἀοιδὸς. Now it is of immense importance in the criticism of Homer to ascertain clearly if possible what was the moral position of the original minstrels' profession with regard to the great poet: for on this depends the likelihood of their either loosely interpolating or conscientiously respecting the integrity of his works. That they cannot have felt the same religious sort of respect for him that arose in the Greeks of a later age, seems pretty evident; they were minstrels by trade as well as he, and could only look upon him in the exercise of their profession as *primus inter pares.* Nevertheless, they did respect him very much; of which we have ample evidence in the existence of the famous guild or institution of poets in Chios, known by the name of the *Homeridæ*, or sons of Homer, concerning whom we have the most distinct testimony in Harpocration. Whether any of the actual descendants of the poet formed the original nucleus of this fraternity we cannot tell; but its existence under that designation is ample proof of the extraordinary respect in which Homer continued to be held in the parts of Asia nearest to his birthplace, and affords a sufficient practical guarantee that the professional minstrels who were incorporated under this name would not, from mere rash conceit, be inclined to tamper with the tradition of the Smyrnæan muse of which they were the select depositaries. On the other hand, it must not be forgotten that a poem like the *Iliad*, made not to be read as a continuous book, but to be sung in separate parts for the public amusement, was peculiarly liable to have such additions made to it or variations as the occasion might require. Of this our own ballads (see Chambers' *Songs and Ballads of Scotland*, p. 106, note) supply everywhere abundant proof, the existing version of which is often pieced together from a variety of different texts, presenting all sorts of deficiencies and redundancies. That something of this kind should not have taken place with regard to the Homeric poems in general circulation through the scattered tribes of the Greeks, would have been positively miraculous; and we must suppose that the principal business of Pisistratus, in collecting these poems, was not, as some have strangely supposed, to create an order which never existed, but to fix an order which was in danger of being lost. Whether in doing so he had the advantage of any complete correct text derived from the Homeridæ of Chios, with which to compose and correct the scattered rhapsodies in popular currency, we cannot say; but it is not at all unlikely;—at any rate he would have little difficulty in restoring the original arrangement of the books, partly because that order in the generality of cases shines out manifestly from the inherent character of the plot, and the progress of the story, partly because there could not fail to exist among the more literate and accomplished of the rhapsodists some one who could recite by memory not merely single books, but the whole concatenation of books, as the Homeridæ of Chios had received them from their great father. Most assuredly, as has been insisted on both by Baümlein and Grote, he never could have set himself seriously to make extensive modern interpolations in poems, the contents of which were well known over the whole of Greece, and had in Athens been made the subject of a special public regulation by their great lawgiver, Solon. (See *Diog. Laert.* in Solon 9.)

In the view here given of the respective functions of the Homeridæ, and of Pisistratus, in the transmission of the Homeric poems, we have said nothing about the famous question, *whether the art of writing was known in Homer's time?* because a little reflection will show that this question has really very little bearing on the genuineness of the poems as we now possess them, and besides is a question that does not admit of a satisfactory answer. At the first blush, indeed, when a modern who is the slave of pen and ink, hears it stated that in all likelihood the great bard of the *Iliad* could neither read nor write, he is apt to feel very much as if the whole foundation for his critical faith in the poet was removed from beneath his feet, and there was no longer any ground for him to stand on. How many an eloquent modern speaker might be struck dumb if pen, ink, and paper were suddenly removed from the category of things that be! But they managed these matters differently on Parnassus and Helicon in the days when Memory was the mother of the Muses, and the Muses could sing sweetly without help from a goose quill. We have the most distinct testimony of Julius Cæsar (B. C. vi. 14), to the effect "that the pupils of the Druids learn by heart a great number of verses; and some continue twenty years in a course of instruction. *Nor do they think it right to commit their doctrines to writing, though in other matters they use the Greek alphabet. This they appear to me to do for two reasons; first, that they may not make their religious mysteries too common and profane by general publication, and again, that they may not weaken the power of memory in their scholars by teaching them to trust to written notes; for nothing is more common than that the abundance of literary helps teaches persons to remit their exertions in committing their knowledge to memory.*" This remarkable passage reveals to us in the most striking manner the real secret of the transmission of the Homeric poems without the help of written manuscripts; the memory of the minstrels was not more uncertain, but more true and trustworthy for this very reason, that they were not accustomed to depend for the faithful recollection of the poems which they recited, upon a leaf of papyrus or a library itself. In estimating the memorial powers of these men we must never forget not only that they exercised their art under intellectual conditions exactly the reverse of those which now exist, but also that they had no other business or interests by which to distract their attention, and so could perform certain feats with ease, that bear the same relation to our common exercises of memory, that tumbling and rope-dancing do to common walking. It is always in our power, by exclusive and persevering exercise of a favourite faculty in a favourite sphere, to perform apparent prodigies. We shall therefore readily disabuse ourselves of the superficial modern notion that written memoranda are necessary to the faithfulness of versified tradition; the "wonder," as it has been called by Grote, of the "preservation" of such long poems from such early ages will become part of the common intellectual drill of an age eloquent without paper, and poetical without ink; and the question will only remain, as a matter of legitimate curiosity with regard to the *Iliad* and *Odyssey*, whether their author was acquainted with those useful arts of literary conservation, the knowledge of which is in our days justly accounted a necessary element in the lowest stages of popular education. Now with regard to the use of letters in Greece, the general voice of Hellenic antiquity pointed to Cadmus as having imported these cunning symbols from Phœnicia at a period far antecedent to the age of Homer, or even the supposed date of the Trojan War; and this tradition is consistent not only with the philological analysis of their letters of the alphabet, but with the then general state of the civilization, and the admitted intercourse between Asia and the West as having taken place in various forms at a very early period of the history of the world. There is every probability, therefore, in favour of the belief that letters, in some shape or other, were known in Greece, at whatever date, between the Trojan War and the year 850, which may be assumed as most convenient for the age of Homer. But from this probable belief with regard to the epoch of the knowledge of letters in Greece, the distance to a reasonable conviction, with regard to the practice of Homer himself in composing and preserving his poems, is very great, and not lightly to be overlooked. That letters, when first introduced, were used only in great public matters, and for inscriptions in wood, stone, lead, and other heavy materials, not for writing a long concatenation of poetic rhapsodies, is conformable to the nature of the thing, and to every testimony that we have on the subject. According to the usual slow progress of human affairs, three centuries at least may well have been required to transfer letters from the rare service of temple-porticoes and monumental pillars, to the common use of literary conservation; so that, even assuming the use of letters for public purposes in the days of Homer, the probability may be considered very small that they were actually used by the poet or his immediate successors for any merely literary purpose. This probability becomes even less, when we consider that there is not a single allusion in the whole forty-eight books of the two poems to writing or books as a part of the civilization which they describe (the *σήματα λυγρὰ*, in *Iliad*, vi. 168, being ambiguous); and though this in itself were no conclusive argument, as any poet who uses pen and ink is not even in these days obliged to make his heroes do so, yet taken in connection with the general character of the poems, and the circumstances of the time, as ascertained by historical analogy, it is in nowise to be looked on as an altogether indifferent circumstance.

So far we have confined our remarks to the external aids and authorities, by means of which the poet and his works are in the first place commended to our attention. It now remains from this general basis of outward historical probabilities and presumptions, to direct our inquiry into the character and genius of the poems themselves, and from this investigation either to transmute our probabilities into certainties, or throw them aside as unsupported, or contradicted by a higher, and the highest sort of evidence. For no mere array of authorities, however venerable, can in the long run support an incoherent tradition that carries its own contradiction in its face. This eternal superiority of immanent and inherent, to merely accredited evidence, has, since Bentley's famous dissection of the epistles of Phalaris, banished from the shelves of authentic classical tradition, many a hoary tome that had long held an honoured place there, along with the most venerated worthies of the Greek and Roman pantheon. How stands the case with regard to the *Iliad* and *Odyssey?* Are these works what they have for nearly three thousand years been reputed to be—the great poems of a great old Ionian poet—or do they bear the trick of forgery on their face, and show the patch-work of a bungling fabricator on the phylacteries of their outer garment?

The severe ordeal which the Homeric poems, in the way of internal analysis, have undergone, takes its rise in modern times from the publication of a famous edition, by F. A. Wolf, a German professor of extraordinary talent, in the year 1795. This scholar, partly following the bent of his own genius, partly no doubt carried along by the general revolutionary tendencies of the age, did, in the Prolegomena prefixed to his edition, set forth an extremely sceptical doctrine with regard to Homer and his poetry, with such rare learning, vigour, and taste, that it was impossible for German minds to resist him; and though the whole tendency and tone of English scholarship runs in a directly contrary direction,[1] as the great work of Clinton sufficiently testifies, it cannot be denied that beyond the pale of mere Oxonians the Wolfian views have exercised no small influence in forming the critical opinions of some of the best educated minds in England. The critical spirit of the age, the sceptical researches of Niebuhr with regard to Roman history, and the increasing action of German scholarship on the learning of this country, have all tended to produce this result. The theory of Wolf, founded not merely on a minute critical analysis of the poems, but, as he imagined also, on satisfactory external evidence, was to the effect, that whether a great poet called Homer ever existed or not, the two great poems generally attributed to him are no homogeneous works created by the plastic power of a presiding genius, but mere aggregates of various origin, gathered together from the great floating element of popular poetry in Greece, and cunningly licked into shape by certain expert literary artizans in the days of Pisistratus. Now, with regard to the external evidence on which this paradox is founded, it seems at this hour generally agreed, even among the Germans, that the authorities relied on by Wolf do in no wise support his extreme conclusion—do not in fact go beyond the historical statement of the matter which we have just made, a statement perfectly consistent both with the personal existence of one great poet, and the organizing action of his presiding spirit on the two great poems that go by his name. The advocates of the Wolfian theory, therefore, are now driven to confine themselves to a series of arguments drawn from the minute critical examination of the text of the poems, by means of which they think they have evolved such an imposing array of inconsistencies, as is utterly incompatible with the belief in the presiding control of one great mind. Among those who have distinguished themselves in this field of what we may call Homeric histology, is Carl Lachmann, lately deceased, a Berlin professor of great erudition and subtilty, as attested by well-known works in various departments of philological investigation. It behoves us, therefore, to inquire, on what presumptions and on what principles the analytic criticism of this school is founded; and when we have shown that these presumptions require to be inverted, and that these principles are either altogether false or altogether misapplied, we may spare our readers the trouble of a minute and curious refutation of the individual objections. Those who wish to pursue the question into its details may consult the little tract of Lachmann (*Betrachtungen über Homer's Ilias*, Berlin, 1847), or the English work of Colonel Mure (*A Critical History of the Language and Literature of Ancient Greece*, 2d edition, London 1854, vols. i. and ii.)—a book replete with the best German learning, and, what is of greater consequence, animated throughout with a spirit of good sense, and a fine poetical appreciation, which very few Germans can boast of.

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[1] It is remarkable that the germs of the Wolfian theory travelled from this country over to Germany; and Wolf, in his *Prolegomena*, honestly recognizes Wood and Bentley as valuable pioneers of the doctrine which he so eloquently enforces. Bentley's well known utterance with regard to Homer is found in his *Remarks on a late Discourse on Freethinking*, by Phileleutherus Lipsiensis (*Works* by Dyce, iii., 304). "To prove Homer's universal knowledge, our author says, '*he designed his poem for eternity to please and instruct mankind;*' but take my word for it, poor Homer, in those circumstances and early times, had never such aspiring thoughts. *He wrote a sequel of songs and rhapsodies to be sung by himself for small earnings and good cheer, at festivals and other days of merriment;* the *Iliad* he made for the men, and the *Odyssey* for the other sex;" from which passage, thrown out incidentally, however, be it remembered, and not deliberately

In an investigation of this kind the presumptions with which a man starts, though not always distinctly set forth, are of the utmost consequence in determining his procedure. The false historical presumptions from which Wolf proceeded, naturally led him to seek for flaws in the texture of the Homeric poems; and it is manifest that even Mr Grote, who justly considers the extreme Wolfian theory as quite untenable, in propounding his wild scheme of resolving the *Iliad* into two distinct parts, has been influenced, partly by his desire to mitigate what he calls "the wonder" of the creation, and the preservation of two such long continuous poems, bearing the stamp of one mind, in an age when writing was altogether unknown. That there are no external historical presumptions of this kind we have already attempted to show; a presumption of a different kind we shall now state. It is not to be presumed that Homer would be anxiously accurate about the mere articulation or joint-work of his epic poems, for several reasons. *First*, because he was a poet, and aimed, as all true poets do, mainly at producing an effect on the feelings and imaginations of his hearers, not on their mere cognitive capacity. Small mistakes in incidental matters taken cognizance of by the curious understanding only, might, without offence, be committed by a great singer of poetry, as they would certainly not be observed by a healthy-minded hearer; and that mistakes of this kind actually have been made, and are even now daily made by poets and novelists of the highest order, has been shown by Colonel Mure in the most effective manner. *Second*, because he was a popular poet, a wandering minstrel with a lyre in his hand, as he is truly represented in all the old biographies, and not a learned Southey sitting in a library, with books, and desk, and pen and ink, printers' proof sheets, publishers' quarterly reviews, and every sort of literary apparatus of the newest and most approved description. In judging of the *Iliad* as a whole, we must never forget, though it seems to be very generally forgotten, that it was not, could not be, Homer's immediate object to compose a great whole, for the plain and simple reason that he had comparatively few opportunities of using such a whole. His art, therefore, was to concatenate a series of parts, which, while they might be used with effect on a few great festive occasions as a whole, were meant to produce their general and most appreciable effect, in the shape of parts either absolutely complete in themselves, or admitting of being easily supplemented by the indwelling traditional lore, which the poet could legitimately presuppose in the minds of his hearers. Something analagous to this we have in the great historical plays of Shakspeare, consisting of several parts, in any of which if there happened to be some small inconsistencies with the other parts, none but a curious person making a business of criticism would ever notice it, as the parts, though connected in conception, are so constructed as to give the impression of completeness, when they are represented as separate wholes. If this point be duly considered, and there is nothing more certain or more duly attested in the history of these poems, the weakness of a great number of the objections made by Lachmann and Grote to the concatenation of the *Iliad* will instantly appear. The tenth book, for instance—that in which the midnight expedition of Diomedes and Ulysses is described,—has, it is said, no necessary connection with the parts of the poem that precede or follow, and might be cut out without injury. Of course; because it was the object of the poet so to string together a number of little wholes, originally independent, that they might still remain little wholes, and yet become parts of a great whole—an exquisite trick of art plainly, and which, as the whole history of popular poetry teaches, it required precisely a mighty genius like Homer to perform. And this brings us to the third presumption, with which we must start in judging of the alleged inconsistencies of the *Iliad*. We must bear in mind that Homer did not make his materials, but received them; the little wholes which he had to recast and organize into a great whole, already existed in the minds and in the mouths of the people whom he addressed, just as the Romaic ballads that arose out of the war of independence in 1821–7, exist in the minds and mouths of the Hellenes of the present day, waiting for some second Homer, it may be, to fuse them into a great epos of Messolonghi, when the day may

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measured in every word, one thing seems plain, that by using the word "Sequel," the great critic gives us plainly to understand that he held there was an essential unity of plan going through both works, which puts him plainly out of the roll of thorough-going Wolfians, and advocates of what Nitsch calls the "Klein-lieder-theorie." Among other notable anticipators of Wolf's theory, the case of the Neapolitan philosopher Vico has often been mentioned. See *Scienza nuova libro terzo; della discoverta del vero Omero,* first published in the year 1725, and repeatedly reprinted.

at length have come for that reconstruction of that Byzantine empire which the late Czar of Russia said he would on no account tolerate. In the same way, an epic poem of Caledonian loyalty, were the times favourable, might be made out of the materials contained in the Scottish jacobite songs; and a grander epos still, called "The Fall of Napoleon," might be constructed containing many finely dramatic materials from the war songs composed by Körner and others in the great German rising of 1813. Now, if the rich materials of popular traditionary song, out of which Homer constructed the *Iliad* (and no person who knows anything about such matters will think it more probable that he made it out of nothing), contained, as they could not but contain, certain elements that would be incongruous, when the different parts were worked up into a new whole; and if Homer did not care—as the practice of his art did not require him to be particularly curious—whether every line or phrase that marked the original independence of these parts, was nicely obliterated, it is manifest that the small flaws in the concatenation which may here and there be visible to the curious eye, prove, not, as Lachmann imagines, that one poet did not organize the whole, but that Homer gave himself no concern to disguise the fact, that the several parts of his poem, both in the popular tradition and in the actual practice of his art, had a complete and independent existence apart from the magnificent whole into which his genius had organized them.

These considerations will enable the student of Homer to make short work, not only with the hypercritical captiousness and the peeping anatomy of Lachmann's *Betrachtungen*, but also with the more large and philosophical analysis of Mr Grote. We must not start in our inquiry into the unity of the *Iliad*, with the strong inclination to magnify the importance of small inconsistencies, but with the most charitable desire possible to overlook them. This poet, as compared with Virgil, Dante, or Milton, demands the special indulgence of the critic; and yet it does rather seem that from Wolf down to Grote, the whole army of objectors are keenly set upon being particularly severe, in many cases positively ill-natured, and, from a poetic point of view, as Colonel Mure has triumphantly shown, positively unjust. For not only do they pay no regard to those kindly considerations which we have stated, arising out of the peculiar position of the poet, and the nature of his materials, but with a perverse ingenuity pardonable scarcely in Germans, they insist on judging poetry by rules applicable only to works composed with a strictly practical, or a purely scientific view. If an experienced soldier like Napoleon could criticise with such a cutting eloquence the description of the taking of Troy by the polished and learned Virgil, which yet speaks admirably to the imagination—(see *Classical Museum*, vol. i., p. 205),—how strange and how unreasonable that a gentleman of Mr Grote's discernment should urge as a strong proof against the authenticity of the seventh book of the *Iliad*, the circumstance that it represents a ditch or dyke, as having been made in the ninth year of the war, which, according to all principles of military tactics, should have been made, as Thucydides (I. 11.) seems to have taken the liberty of supposing it was made, in the first year! The answer to all such very scientific cavils is this, that Homer was neither a soldier nor a critic, but a poet; and that when composing the seventh book of the *Iliad*, he had before his mind's eye not a future Vegetius or a Grote, but only the wrath of Achilles, and the place which that occupied in the popular traditions of Æolia. If critical spectacles were not used when popular poems were composed, their correct appreciation can allow no place to scientific microscopes. Many things may be discovered by scientific eyes,—wonders in the white rock, and wonders in the blue cheese,—but the character and effect of popular poetry does not come within the laws of that particular kind of vision. Even Mr Grote, who has so ably exposed the absurdity of the Wolfian "small song theory" (*Klein-lieder-theorie*), which resolves the *Iliad* into an aggregate of separate ballads, implying no common authorship on the ground of alleged inconsistencies, has, in attempting to resolve the same great work into two separate works, the *Achilleid* and the *Iliad*, adopted a principle of criticism, which every man who has any practical knowledge of poets and poetry, must feel to be quite out of place. "The last two books of the poem," he says, "were probably additions to the original *Achilleid;* for the *death of Hector satisfies the exigencies of a coherent scheme*, and we are not entitled to extend the oldest poem beyond the limits which such necessity prescribes." And in the spirit of this criticism, he cuts out the whole books, from the 2d to the 7th inclusive, because the coherent scheme of an *Achilleid* is sufficiently satisfied without them, and there is no necessity for extending the oldest poem beyond the limits which such exigency requires. But a great poet is not influenced in the selection or the arrangement of his material by any exigency of this kind; that nude coherency of scheme which satisfies a mere logical mind, may omit precisely those elements which work most powerfully on his own mind, and that of his hearers; not imaginative meagreness and parsimony, but luxuriance and exuberance is his law. On the whole, the candid student of Lachmann and Grote, if he be a person of native poetical appreciation, will have no difficulty in coming to the conclusion, that the great mass of the recent sceptical objections against the organic unity of the *Iliad*, proceed on essentially perverse and oblique principles, and that the brave old minstrel has assuredly fallen on evil days, when men are eager to judge him for whose judgment he never wrote, and by canons which he never acknowledged.

The current of these remarks by no means implies that there are no interpolations in the received text of Homer. They are merely to the effect, that the sharpest scrutiny of modern criticism and hypercriticism has failed to point out any such gross incongruities in the component parts of the poem, as would distinctly indicate the separate authorship of those parts. In other words, the positive impression of an organic unity which the unlearned reader receives from the perusal of these poems, can in no wise be considered to have been nullified by the multiform endeavours of learned men to prove, that these famous poems are, to any considerable extent, an aggregation of independent and unharmonized integers. That those integers once existed in that crude state, may be assumed as most certainly true; but the poems, as we now have them, prove, in the face of the most cruel analysis, that these crude elements did, in the earliest ages of Greek culture, come under the fusing and formative influence of a great poet-mind so completely, that any attempt to resolve them into their primitive elements by the method of mere analysis must prove a failure. With this understanding, every reasonable man must be willing to admit that there are, and must in the nature of the case be, not a few extraneous additions to a work, which was a sort of public property in every body's hands for several hundred years before it was finally fixed down to the literary form in which we now have it. Some of these interpolations, of course, may be pointed out, with more or less success, according to the general laws by which incongruities in literary documents are exposed; but in addition to the presumptions for leniency of treatment already stated, the critical reviser of the Homeric text must bear in mind, that there prevails in the popular poetry of all countries a certain current tone, and common property in thought and in expression, which makes it extremely difficult, from mere internal evidence, to distinguish the original work of the great master-mind from the additions made by a skilful interpolator. Under these extremely delicate and dubious conditions, it does appear extremely strange, that Lachmann and so many other learned Germans, should talk with as much dogmatic decision about the original constituent elements of the *Iliad*, as if they had been present at their creation, and personally superintended their manufacture; and a plain man can only conclude with regard to the whole matter, that in philology, as in metaphysics, these minute investigators have, by an intense special devotion, worked themselves into a sort of chronic insanity, from which only time and the gradual operation of certain potent political and social causes may ultimately achieve their redemption.

Before we leave this part of the subject a few words may be allowed to the famous question, Whether, assuming Homer's authorship of the *Iliad*, there be not reasonable grounds for assigning the *Odyssey* to the plastic powers of a different and less mighty minstrel? Now, if this were altogether an open question, and there were no distinct and intelligible Hellenic traditions as to the common authorship of these two wonderful poems, not a few things might be urged in favour of a separate authorship which might have weight with a reasonable critic. There is a certain more mild and subdued tone in the *Odyssey*, which, along with certain points of difference in incidental matters, might be sufficient, were there no contrary evidence, to authorize the supposition of a different intellectual origin. But the great error of those who, in modern times, take upon themselves to assert the separate authorship of these works, is the groundless assumption that the general voice and tradition of Hellenic antiquity is to be taken as an element of no weight soever, in the critical estimate of such a matter. On this point we differ *toto cœlo* from the Germans, and are nothing ashamed to believe, with our learned countryman Colonel Mure, that Aristotle, Plato, and the overwhelming majority of the highest intellects in Greece, had very sufficient reasons for placing a wide gulph between the two epic poems which they agreed to stamp with the name of Homer, and the very inferior works of a cognate character, known afterwards under the name of the *Epic Cycle*. Nature did not produce twin Homers in those old Greek days, we may depend on it, any more than she has produced in these days twin Dantes or twin Shakspeares.[1] If there had been a second Homer of genius large enough to produce a counterpoise to such a work as the *Iliad*, no doubt the Homeridæ of some second Chios would have been equally eager to stereotype his memory in their composition, and to immortalize themselves with his name. But precisely, we imagine, because there was only one Homer, was there only one guild of gentile Homeridæ, and one uniform undisputed authorship of the *Iliad* and the *Odyssey* among the Greeks, till some pragmatical grammarians in meagre Alexandria (among whom a certain Xenon and Hellanicus are specialized), the prototypes of our modern Wolfians, began to nibble at imagined incongruities, and to moot the question of separate authorship. Such being the historical conditions under which the question is raised, it is manifest that the presumptions, as in the question about the unity of the *Iliad*, are all against the disintegrators; and a detailed examination of their array of minute and microscopic objections to the common authorship will, in all likelihood, bring the intelligent student, as it has brought Colonel Mure, to a distinct verdict of *not proven*. One may, indeed, urge the same objection against all the objections of the Separatists—Χωρίζοντες as they were called—that Mr Grote has urged against Lachmann and the minute dissectors of the *Iliad*. "The Wolfian theory," says that eminent scholar, "explains the gaps and contradictions throughout the narrative, but it explains nothing else." In like manner, we may say the theory of the Separatists explains the small incongruities between the *Iliad* and the *Odyssey*, but it leaves out of account altogether a more difficult matter to explain—the very remarkable congruity that exists between the whole style, tone, colour, and materials of these poems. This congruity has been pointed out with great skill and effect by Colonel Mure, also by a recent French writer, Alexis Pierron (*Littérature Grecque*, Paris, 1850), whose words, after so much heavy discussion with the Germans, the English reader will doubtless accept as a welcome relief:—

> "Mais le style, les tours de phrase, l'ordre et le mouvement des pensées! mais la versification! mais les formules consacrées! mais les épithètes traditionelles! c'est là ce que les chorizontes nègligent de comparer dans les deux poemes. Je n'hèsite pas à dire, que cent vers pris au hazard dans l'un ne ressemblent pas moins à cent vers pris dans l'autre, et pour la facture, et pour la tournure, et pour le mouvement général, que ceux-ci ne ressemblent à tous les vers qui les précèdent et les suivent. Si le style est l'homme même, comme dit Buffon, le même style c'est le même homme. Il n'y a qu'un Homère. Le style ne s'enlève pas: et, malgré tous les efforts, on ne prend pas le tour d'esprit d'un autre: on n'écrit qu'avec soi-même, mieux qu'autrui ou plus mal, aussi bien peut-être, mais toujours autrement. Sans doute c'est une grande merveille, que le même homme qui a composé l'Iliade soit aussi l'auteur de l'Odyssée. Mais le phénomène de ressemblance admis par le chorizontes est bien plus inouï encore. Le vieux Pythagoricien, Ennius, disoit que l'âme d'Homère avoit passé dans la sienne; et l'on sait quel Homère c'étoit qu'Ennius. C'est bien une autre métempsycose qu'il nous faudrait admettre, pour donner raison à ces Pythagoriciens nouveaux. Il y a une chose cent fois plus extraordinaire que l'existence d'un Homère unique, c'est l'existence de deux Homères."

After having cleared our way through this dreary accumulation of critical briars and brambles, it only remains that we state shortly what is the real character and worth of the Homeric poems, as we have them, and what is their proper and enduring place in the poetical literature of the world. And here we must start with a grateful recognition of the point of view on which our judgment of the Homeric poems has been placed by the labours of Wolf and his followers. Their error did not lie in their blindness to the true character of these productions, but in their attributing to a dozen or a score of Homers a phenomenon which finds a more obvious and satisfactory explanation in the time-honoured recognition of one. But the genuine character of the *Iliad* and the *Odyssey* as the poetry of the people, composed to be sung, not the poetry of the individual, written to be read, though previously discovered by Bentley, Vico, and Wood,[2] was never generally acknowledged and felt till it was brought forward by Wolf, and scattered over Europe by the host of enthusiastic disciples whom his genius roused into a new and vivid consciousness of a great truth. All the errors of that school, in fact, which we have been obliged to criticise in severe language, were but exaggerations and caricatures of the great truth which Wolf propounded in his *Prolegomena* of the essential generic difference between *Paradise Lost*, the epos of the scholarly man Milton, and Homer's *Iliad*, the epos of the rude Greek people. Homer lived in an age when the individual poet had not yet commenced to separate himself from the general culture of his people, after such a strange fashion as we see in the Shelleys, the Byrons, the Wordsworths, and the Tennysons of modern times. The poetry of Homer, therefore, represents the age of Homer more completely than the most popular of our highly cultivated modern poetry represents the age to which the poet belongs. The reason of this plainly is, that in the earliest ages of society, the minstrel was the only and the universal exponent of the highest moral and intellectual life of his age, and had an existence only as expressing this culture in a popular and effective way. Whereas, in later times, the man of genius rose into an independent existence, and often expressed merely his own culture, and that of a select body—more or less numerous—of literary sympathizers and admirers whom he might have the power to attach. The intimate relation that existed between the heroic ἀοιδὸς and his hearers may perhaps be best understood by comparing that sort of action and reaction which exists between the writers of leading articles in a newspaper like the *Times* and the public to whom their daily appeals are addressed. A similar case occurs in the weekly addresses of a popular preacher to a religious people like the Scotch, whose faith has not degenerated into decent formalism or unmeaning ceremonial. Herein, therefore, lies the invaluable excellence of the Homeric poems, which Wolf profoundly felt, and which made him careless about the mere personality of their reputed author—in the fact that, whether these poems be the composition of one, or of half-a-hundred minstrels, they are equally inspired by the breath of a great poetic soul, and that soul the highest life of the Greek people, at one of the most poetic periods of its existence. Recognizing this fundamental truth, the great German critic could readily let loose from his grasp a great many much-bespoken excellencies of the mere man Homer, apart from the Greek people, which were either quite imaginary, or not at all necessary to the main fact of the essentially popular and national character of the poems. In room of a great mass of foolish indiscriminate eulogy heaped up by various famous critics both ancient and modern, Wolf enunciated the peculiar excellence of the great king of Hellenic ballad-singers in the following simple and significant words:—"*Hæc carmina paullo diligentius cognita admirandam ostendant vim naturæ atque ingenii minorem artis, nullam reconditæ doctrinæ et exquisitæ*" (*Prolegom.* 12). The first great excellence of Homer's poetry, as here expressed, undoubtedly lies in its complete naturalness, simplicity, and healthiness, with an entire absence of all those faults which are the natural product of over-stimulated art in a high stage of intellectual culture. In thought, Homer exhibits nothing strained, far-fetched, or affected; in sentiment, no morbid groping, no curious over-nice sensibility in particular favourite directions; in moral tone, neither prudery nor wantonness; no uncomfortable strife between the real and the ideal, between poetry and life, between rhyme and reason. With the bard of the *Iliad*, as indeed to a great extent with all the Greek poets in the best ages, the ideal is only the highest step in the ladder of the real. In style again, we find in Homer, as in the Old Testament, nothing that smacks of the artist; there is no forced and studied concentration as in Thucydides and Tacitus; no stringing together of brilliant antitheses as in Velleius Paterculus; much less any theatrical turgidity and prepared pomp of words as in Lucan, and not a few of the later classics, both Greek and Roman, who flourished at a period when language had lost its native modesty and become vitiated, as a conceited beauty does by an assiduous contemplation of her own perfections. Closely connected with this complete naturalness of Homer, is his remarkable objectiveness, as the German critics call it—that is to say, the extraordinary clearness, breadth, accuracy, and vigour of his impressions of the external world; or, as an artist would say, his fine eye both for minute delicacy of detail and grandeur of general effect in his pictures. The reason of this lies in the fact that Homer lived in a perfectly natural state of society, when all men, and especially poets, were constantly called upon to use their eyes, not upon grey parchment and spotted paper, but upon the fresh and ever-changing variety of those soul-seizing pictures which nature and life are continually pouring in upon those whose eyes are quick and open to her fulness. In Homer there is found not the least trace of the anxiously subtle thought, the loose-floating sentiment, the cloudy imaginations, the dim speculations, the grey intangible abstractions that never fail to characterize the poetry of a later age, when the particular mental character of the poet assumes an undue prominence, and the writer wastes himself in a painful struggle to find adequate expressions for certain infinite longings and indefinite desires that have no counterpart in the external world, or in the bosom of any healthy-minded reader. Not a less remarkable consequence of the nice harmony between Homer and his audience was the honest faith and unaffected religiousness that breathes through every page of his two great works. Poets, indeed, are naturally a religious race, and, except under peculiar, harsh influences, readily harmonize with the theological belief of the country to whose highest human aspirations it is their high mission to give utterance. But in ages of high intellectual culture, when the individual often runs aside into strange tracks of private speculation, the leading minds of the day, including poets, often find themselves forced into a state of strange and uncomfortable protest against the religious convictions of the masses whom they are destined to lead; and in this way strange phenomena become visible in the literary heaven—as in the case of Euripides, Lucretius, Lucan, Lucian, Goethe, Byron, Burns, Shelley, and many more. With difficulties of this kind, which always interfere to a great extent with a poet's popular influence, Homer had nothing to do. The theology of his day was no doubt full of puerilities, and not free from contradictions; but philosophy yet unborn had not brought these puerilities and inconsistencies into a distinctly felt collision with the higher sentiments of a healthy piety in the mind of the great minstrel. Homer's piety is accordingly thoroughly serious, but withal playfully cheerful. Calvinistic readers might think him jesting sometimes; and grave German critics have been offended at the tone of the love affair of Ares and Aphrodite in *Odyssey* viii., which they confidently pronounce an interpolation;[1] but they are mistaken—Lucian did not live till 1000 years afterwards, and he wrote many clever comic sketches indeed, but not an *Iliad*. The epic poet, or great popular minstrel of a heroic age, is always a believer.[2]

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[1] "Some people believe in twenty Homers; we in one. Nature is not so prodigal of her poets." (John Wilson, in *Blackwood's Magazine*, April 1831.)

[2] An Essay *On the Original Genius and Writings of Homer*, by R. Wood, Esq., London, 1770.

The extraordinary excellence of the *Iliad* and *Odyssey* as pattern specimens of the popular epos, may be most readily discerned by comparing them with the Niebelungen-lay of the Germans, a poem composed in a similar stage of society, and so much under the same circumstances that Lachmann actually set himself to analyse it after the Wolfian fashion, and resolve it into what he considered its constituent "small songs." In this Teutonic epos the unprejudiced reader will, along with many quiet beauties, discover an utter want of that equestrian vigour, manfulness, and fire, which never remit in the sinewy and bracing course of the *Iliad*. Homer sometimes seems to take his subject easily,—either sleeps himself, no doubt, or some interpolated Homerid is sleeping in his chair,—but he is never flat, never thin, never weak. Of the Niebelungen-lay, on the other hand, we may say that breadth, dilution, and weakness, are the characteristics; it is a German *Iliad*, and a *very* German *Iliad* indeed, as Coleridge said of the *Messiah* of Klopstock—an *Iliad* composed by an old German in his easy chair, enveloping his ungirt muse in a loose-floating atmosphere of tobacco smoke;—Homer in his slippers. But besides vigour, the Greek asserts his proud pre-eminence over the German by the healthy hilarity, and the rich sunny luxuriance of his fine Ionic temperament. One feels that these poems were written in a clime where, next to Olympian Jove, the shining Apollo was the great object of local worship. His variety and many-sidedness have been equally praised; for, though it is certainly true that there is, for our modern tastes, a very considerable superfluity of mere fighting in the *Iliad*, we must bear in mind that Homer wrote in an age when the soldier was the only hero, and for a people to whom the recital of the military exploits of their ancestors was as full of moral significance, as the trials of the Apostle Paul are to a modern Christian. Not less admirable, finally, than his vigour, his sunniness, and his luxuriant variety, are the sobriety, sense, and moderation—the truly Greek *σωφροσύνη*—that everywhere regulate, and keep within chaste limits, the billowy enthusiasm of the old minstrel. Occasionally, perhaps, when a patriotic feeling interferes, there may be discerned a little ludicrous exaggeration—as, for example, in the manner in which Hector is made to comport himself before the might of Achilles, in the 22d book; but, generally speaking, the poet's thorough naturalness and truth, keep him by a safe instinct within the nicest limits of good taste. In the Niebelungen-lay, on the other hand, as in Klopstock's *Messiah*, there is a plentiful exhibition, in the author's way, of the most appalling exaggeration. The catastrophe of the *Odyssey*, no doubt, is sufficiently bloody; but this is the divine retributive vengeance of a goddess for a long series of offences of a very gross and wanton description; and, besides, it may well be called sober and moderate when contrasted with that gigantic Cyclopean architecture of terrors cemented with streaming blood, and wrapt in flames of portentous conflagration, which forms such a grim catastrophe to the grim epos of the Niebelungen.

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[1] On this point, and on the subject of Homeric interpolation generally, see some admirable remarks in a paper by W. Watkins Lloyd. *Classical Museum*, vol. vi., p. 387.

[2] On the interesting subject of the *Theology of Homer*, see Nägelsbach's *Homerische Theologie*, Nürnberg, 1840; and *Classical Museum*, vol. vii., p. 414. The work of Granville Penn—"*An Examination of the Primary Argument of the Iliad*, London, 1821—contains some ideas on this subject that must be regarded as high-flown and hyperbolical, and remote from the simple truth.

The works of Homer have been translated into all the notable languages of the west; seldom, however, or never, it is to be feared, with the pervading perception of his true character as a great popular minstrel, the general understanding of which great truth, as we have stated, dates in Europe only from the publication of Wolf's *Prolegomena* about 60 years ago. The best Italian translations are by Cesarotti and Monti; French, by Dacier, de Rochefort, Bitaubé, and Dugas-Montbel; German, by Stolberg and Voss; English, by Chapman, Hobbes, Pope, Cowper, Sotheby, and Newman. The principal editions are that of Florence, 1488, *curâ Demetrii Chalcondylæ;* the *Editio Princeps*, a rare and beautiful book in 2 vols. folio, of which there is a copy in the Advocates' Library, Edinburgh, and about 60 copies altogether dispersed in various parts of England; Francini, Venice, 1537; H. Stephani, Paris, 1566; Barnes, Cantab., 1711; Clarkii, London, 1729; Foulis, Glasgow, 1756-8; Ernesti, 1759; Alter Vindob, 1789; Villoison, 1788; Wofilus, Hal., 1794; Heyne, 1802; Payne Knight, London, 1820; Spitzner, Gotha, 1836; Bekker, Berlin, 1843; Baümlein, Leipzig, 1854.

For other details with regard to Homeric literature, which forms a library in itself, the student, besides Colonel Mure's great work, may consult Bernhardy's *Griechische Literatur*, Halle, 1845; Lauer's *Homerische Poesie*, Berlin, 1851, and Dr Ihne's article in Smith's *Dictionary*. (J.S.B.)

HOMER, or *Omer*, the largest dry measure amongst the Hebrews. It was in later times replaced by the *Cor*, and is estimated at 7,398,000 Paris grains. See CORUS.

HOMICIDE, the killing of a human being, is accidental, culpable, or justifiable.

Accidental, in law, implies not merely the absence of intention but of fault. A man employed at some lawful operation, and taking due care, is not responsible for unforeseen fatal consequences—as, if a gun burst; a child unexpectedly runs in the way of a carriage; or two friends wrestle for amusement, and death ensues. Such death is excusable. It is sometimes termed a misadventure. In judging, after the event, of the degree of caution which should have been used, it would be unreasonable, in every case, to require the very utmost that was possible. If two men are felling a tree, which unexpectedly falls, and one of them is killed, or if a man lays aside his unloaded fowling-piece, and, in ignorance of its being reloaded, handles it and kills his friend, it may be easy to say what would have averted the calamity; but the law is not so exacting, seeing that, in the language of an English judge, "accidents of this lamentable kind may fall to the lot of the wisest and best of men." If, however, the neglect or inattention amounts in any degree to what a jury regard as reprehensible, the case becomes

Culpable homicide, or manslaughter, meaning not accidental, and yet not amounting to murder. Cases of this kind vary from the faintest degree of culpability deserving only of nominal punishment, to guilt of the deepest dye. In them there is the absence of the intention to kill, and yet the party is amenable to punishment on account either of carelessness or wrong doing. To administer wrong medicine, neglect a fence, leave a horse on the streets unattended, or to inflict bodily injury, may happen without any intention to kill; but, if death ensue, the obvious culpability, high or low as it may be, cannot, on account of the interests of the public, be allowed to go unpunished. The last of these cases approximates to murder. If a man go a step farther, intending to inflict some severe injury, reckless of the consequences, such as beating with the declared intention of just sparing the life, or giving violent medicine to a woman to procure abortion, and death ensues, it is murder.

Murder consists in acts committed with the intention of killing, or at least of inflicting some grievous bodily injury which obviously puts life in hazard, followed by death; as, if a man strike another on the head with a hatchet, or treat him with such cruelty as denotes utter indifference whether he die or not, and he die. To chastise an infant excessively, regardless of his cries and the remonstrances of bye-standers; to shoot, intending to kill one person, and hit another; to fire a loaded gun along a street on which people are passing, though aiming at no one in particular; to cut the rope of a scaffold, by which a man is precipitated from a great height; and many such cases, where life is lost—have been found to amount to murder, as they show a determination either to kill or to do a serious wrong at the hazard of all consequences. The nature of the weapons, or means employed, such as a knife, a gun, or poison, are often conclusive; and when such is the case, jurors should, according to their oaths, do their duty to the law and to their country. Where the crime is proved, it is not sufficient to say that the manslayer was excited to frenzy by some fancied wrong or inadequate cause, and acted with little premeditation, because he was bound to maintain the mastery of his passions,—though no doubt his moral guilt is exceeded by that of the assassin, who, for hire or revenge, waylays and stabs his victim. On the other hand, if it appear that a man acted under a sudden impulse, occasioned by some intolerable wrong, he will not be held guilty. On the contrary, the killing will be regarded either as culpable or justifiable homicide, according to its circumstances. For example, if a man be unwarrantably assaulted with violence and indignity, as, by a horse whip, pulling his nose, or the like, and he inflict, in the sudden transport of passion so excited, a mortal wound on his assailant, the killing will be attributed to human frailty, rather than to recklessness or malice, and may be regarded merely as culpable homicide; but he will not be allowed after the assault is over to take satisfaction at his own hand, and kill his assailant. To do so is to commit murder. In no case will the law, after almost the briefest lapse of time, permit the indulgence of revenge. An adulterer, detected by the husband in the act, may be killed; but if he escape, and be afterwards met and killed by the husband, such killing is murder. The shortest interval, after any provocation, destroys such a defence; as, if a man, injured even to the effusion of blood, should search for a gun, and follow and shoot the party who had assaulted him; because the interval afforded an opportunity for the exercise of reason, and the law could have been appealed to. An English judge expressed what is the law both of England and Scotland when he said, "in all possible cases homicide, upon a principle of revenge, is murder." One thing is quite fixed, that as contumelious words will not justify blows, so neither will blows with the hand justify the use of a knife, or other lethal weapon. Wherever the use of a lethal weapon is not justified by dire necessity, in order to preserve a man's own life, killing by its use is murder. Accordingly, the law both of England and Scotland agree in this, that no attempt to steal or to trespass will justify a man whose life is not in imminent hazard, in the taking of life. On a similar principle, to kill a poacher, or to place a spring-gun to protect a garden, and it kills, is murder. It would, indeed, be strange if the law permitted a private party to take the life of another, for an offence which, on conviction after a legal trial, it would not punish with a penalty so dreadful.

To warrant a conviction, it is necessary that death result directly from the injury, or from its natural, and not remote or merely probable consequences. If a wounded man die from grossly erroneous treatment, or from unnecessarily exposing a wound, so as to irritate it into a mortal complaint, it would be hard to visit his assailant with the penalty of murder. On the other hand, if the wound be the direct cause of death, though if a surgeon could have been got on the instant, the life would probably have been spared, the assailant must take the consequences, because he had no right to put life in hazard; and, on the same principle, it is murder to kill a man apparently dying from some mortal disease, because no man has a right to abridge the life of another even by a moment, or to cut off the feeblest chance of recovery.

It is not necessary, in order to warrant a conviction, that a man perpetrate murder with his own hand. If he hire or assist another to commit it, or if he furnish the means, or watch for the protection of the murderer while the crime is being committed, he is, both in law and in reason, accessory to the commission of the crime, and is most righteously amenable to punishment as a murderer.

The appropriate punishment of murder is death. Long before the moral law was given from Sinai, the Divine Being declared that "whoso sheddeth man's blood, by man shall his blood be shed;" and we think that the natural dictate of the well-regulated mind is to repel the sophistries by which this solemn declaration is sometimes sought to be evaded. So repulsive is murder to the Great Author of life, that, under the law which He gave to Moses, He allowed no sacrifice to be provided, nor ransom to be taken, for the life of a murderer—and even the accidental manslayer was compelled, for the safety of his own life, to remain within one of the cities of refuge while the high priest of the time was alive. It is sometimes questioned whether capital punishment should take place publicly, or within the precincts of the prison, in presence of a number of witnesses provided to attest its execution. The latter opinion is approved by some, as having a less hardening tendency on the minds of the populace. To remove the felon from the bar of earthly judgment, to immure him within the walls of the prison, from which he is not to return alive, and to detain him till the determinate moment at which he shall find himself at the bar of the Judge of all the earth, may produce in the minds of the thoughtless something more fearfully solemn than the parade of a public execution, during which, in our sympathy for the sufferer, his crimes may be forgotten. But however that question may be settled, and so long as the declaration of the Divine Being, "I will put my laws into their mind, and write them on their hearts," is respected by his creatures, we believe that the punishment of death for the most fearful of all crimes cannot be relaxed without multiplying the number of victims hurried into eternity, without even the murderer's privilege of time to prepare for their final account.

The punishment for manslaughter or culpable homicide is, fine, imprisonment, or transportation, in the discretion of the judge according to the degree of guilt; and the offender is further left to the issue of an action of law for civil reparation at the instance of the widow and next of kin of the person whom he has killed.

Homicide is *justifiable* when it is occasioned by unavoidable necessity. Illustrations of this are daily afforded by soldiers and sailors in battle, or in the necessary defence, when on duty, of their post or their arms—judges pronouncing, and inferior officers executing legal sentences of death—and magistrates or other officers killing when such is the only mean of suppressing a riot or breach of the peace. In the case of private individuals also, the infliction of death becomes justifiable when no other means of defence remain against highway robbery, housebreaking under night, or assaults involving danger of life, or in the case of a woman as a last resource in defence of her chastity. The justification, however, will only avail when matters have come to an extremity—and certainly not either before the danger has reached that point, or after it has passed away. If the danger be over, killing becomes revenge, and is justly regarded as murder. Even the clearest necessity of killing in defence will be unavailing, if it was brought about by a man's own criminality, as by his culpably irritating and rousing another by wanton and unwarrantable provocation or cruelty to attack him. It becomes, therefore, always of importance to ascertain all the circumstances connected with the beginning and progress of an assault, and by whom the first blow was given.

Very delicate questions have arisen in the cases of officers of the law bound on behalf of the public to execute a legal warrant. Their position is different from that of private individuals, in this respect, that they incur responsibility if they fail to do their duty. Of course, if in the discharge of their duty their lives are brought into peril, they are justified, like any private individual, in killing; but they differ from private individuals in this, that they may be required to do the very thing, under the sanction of law, that puts their lives in danger. If persons in a smuggling vessel do not desist from attempting to escape when hailed by a known revenue cutter, it is lawful to enforce compliance by firing, for in such a case the fleeing to defraud the revenue is just that resistance which it is the duty of the officers of the law to overcome by the only means in their power. But if, on coming in contact with those whom they are required to apprehend, they be the first to resort to lethal weapons, or if, under any circumstances, they use them unnecessarily, they will be liable for the consequences. It is murder for an officer to kill a person flying from the execution of a civil process, or even of a criminal warrant for an offence not capital, or for an assault not at the time known to involve danger of life. It is only the deep interest which the public has in the punishment of those who commit the highest crimes, that justifies an officer armed with a criminal warrant (if indeed the law of Scotland will justify him) in killing such a criminal when fleeing, who might otherwise altogether escape. The requirements of military law are necessarily more strict, but these may be noticed in another place.

In the preceding remarks we have abstained from taking any notice of the absurd and criminal practice of duelling, that subject having been already fully treated. See DUEL.

(M. L.)

Homily || Homœopathy.

HOMILY (ὁμιλια, an assembly), a plain and homely discourse upon some point of religious faith or duty. This term was adopted in the church to indicate the practical nature of Christian discourses as contrasted with the speculative and purely ostentatious harangues of the philosophic schools.

All the homilies of the Greek and Latin fathers are from the pens of bishops, because, in the first ages, they alone were permitted to preach. The privilege was not ordinarily allowed to priests till towards the fifth century. St Chrysostom was the first presbyter who preached regularly. Origen and St Augustin also preached, but it was by a peculiar license or privilege.

Photius distinguishes a *homily* from a *sermon* in this, that the homily was delivered in a more familiar manner, the prelate interrogating and talking to the people, and they in their turn answering and interrogating him, so that it was properly a conversation; whilst the sermon was spoken continuously in the pulpit, after the manner of the orators.

The practice of compiling homilies, which were to be committed to memory, and recited by ignorant or indolent priests, commenced towards the close of the eighth century, when Charlemagne ordered Paulus Diaconus and Alcuin to form homilies or discourses upon the Gospels and Epistles, from the ancient doctors of the church. This gave rise to the famous collection entitled the *Homilarium of Charlemagne*, which, being followed as a model in many productions of the same kind, composed by private persons, contributed much to nourish the indolence, and to perpetuate the ignorance, of a worthless clergy.

The English book of homilies is a collection of plain sermons on the doctrines of the gospel, especially with a view to illustrate the principles of the Reformation. The first part was published by Cranmer during the reign of Edward VI.; and the second was added by order of Convocation during the reign of Elizabeth.

HOMŒOPATHY, a system of medical practice, introduced by Samuel Hahnemann into Germany in the end of last century, and having, in the present day, adherents in most European countries. The homœopathic system was reduced by its founder to a very simple expression, or elementary therapeutical law, *similia similibus curentur—i.e.*, let like things be treated by like. In other words, it is asserted that a disease, having certain external manifestations or symptoms, is to be treated by the administration of a remedy, or a succession of remedies, which have the power of originating similar symptoms in the healthy body. The name *Homœopathy* (from the two Greek words ὁμοῖος, *like*, and πάθος, *a morbid state*, or perhaps from the compound word ὁμοιοπάθεια, *a similarity of feeling*), is expressive of this relation between the effects of the remedy and those of the disease for which it is presumed to be a cure. Hahnemann was fond of contrasting the simplicity of the homœopathic system with the complexity of the prevailing medical doctrines, which, he alleged, instead of following the indications of nature by regarding disease as a collection of symptoms, was engaged in a fruitless search into its proximate or essential causes; remedies being administered, not from their bearing any relation to the evident symptoms, but from a presumed power over the hidden causes of disease. The system so characterized, Hahnemann termed allœopathy, or allopathy (from ἀλλοῖος, *different*, and πάθος). He admitted also another possible therapeutical system, viz., *Antipathy* (from ἀντὶ, *opposed to*, and πάθος), comprising those cases in which a remedy was selected on account of its producing in the healthy body symptoms of a kind opposed to those of the disease. Of this method, Hahnemann professed to find numerous examples in the practice of medicine in all ages. He even found it laid down as a rule (*contraria contrariis curentur*) in some of the Hippocratic writings, and constantly refers to it as an established method against which he protested as fallacious, ineffective, or, at best, only palliative. Homœopathy, according to Hahnemann, is not merely a more certain or more effective method of cure than either of these competing systems; it is, on the contrary, the only method by which disease ever has been, or ever can be, truly eradicated by art. It is in theory a universal as well as an exclusive method; and all the other principles on which medical men have from time immemorial been accustomed to act in the treatment of disease stand condemned by its acceptance.

It would be easy to show that with Hahnemann himself the homœopathic theory was expressly set forth as waging an internecine war with all previous medical doctrine. The vilification of ancient and contemporary medicine as a system or a science, and the almost equally unlimited condemnation of its results as an art, form in fact the key to his doctrine, the corner-stone of his system. Medicine is to him a "fatal art," which has never, except by accident, rendered a service to suffering humanity. It can be continuously practised only by those whose conscience is seared, and whose mental discrimination is destroyed by long-continued persistence in mischief; in all others, it reduces itself to the administration of *placebos* without efficacy, and of which the best that can be said is that they do little harm. But it was inconsistent with the justice and mercy of Divine Providence to leave mankind in this miserable plight. The discovery of a sure and simple way of treating all diseases must be possible, if God is a beneficent being, and not a ruthless tyrant. Now, there are only three possible ways of using remedies. For, *firstly*, all that we know of diseases, and of remedial agents, is founded on a knowledge of their palpable effects or symptoms; and, *secondly*, the symptoms of the remedy (its effects upon the sound body) must be either similar to (*similia similibus*), or opposite to (*contraria contrariis*), or different altogether from, those of the disease. Of the systems founded on these data, the last two alone have been hitherto tried; and multiplied experience having proved that allopathy and antipathy are equally erroneous and equally destructive, homœopathy follows as an inevitable consequence; and was thus, in fact, as Dr Henderson says, reasoned out by Hahnemann "before a single testing experiment had been tried."

We carefully avoid exaggerating, though undoubtedly we greatly condense, the argument of Hahnemann, as it appears in several of his works, when we thus state it. Were we to enter on what might be called the metaphysics of his system, we should greatly exceed our limits; still more so were we to devote any space to the consideration of individual instances, or to the quotation of individual passages. It must be apparent to any intelligent reader, that the system blocked out above is that of a fanatic, not of a severe inquirer into nature; that it begins and ends in assumptions, of which it is difficult to say whether the first or the last be the more extravagant. It is surely not too much to suppose, in opposition to Hahnemann, that an art which has existed, and has been accumulating the elements, at least, of science, in the experience of several thousand years; which has laboured assiduously wherever there has been sickness and suffering, with certainly not less of disinterested feeling, and certainly not more of wickedness or of stupidity among its professors, than falls to the common lot of humanity in almost all professions and callings—that such an art may have had some little foundation in truth, some glimpses of principle, some insight into the laws which regulate the human frame in health and disease. Equally certain is it that these principles and laws have not been asserted (like those from which Hahnemann endeavours to deduce his philosophy) to be final and universal. If the choice be only between "allopathy" or "antipathy" and "homœopathy," as Hahnemann asserts, we feel little disposition to pronounce any comparative opinion; but we place ourselves

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readily on the side of limited but reasonable knowledge, and experience tried by ages, against extravagant credulity and bombastic self-assertion.

The writings of Hahnemann are, for the most part, violent and outrageous polemics, not always without plausibility, against the systems which he caricatures under the names of allopathy and antipathy, followed or accompanied by statements of an equally extravagant kind in favour of the law "similia similibus curentur," which he everywhere treats as a pure and unadulterated truth, admitting neither of qualification nor of question. The practitioners who act upon an uncertain or imperfect apprehension of this truth, and who attempt, in any degree, to reconcile their practice with the traditional doctrines of the art, Hahnemann treats with a contempt and dislike to which even his dislike of allopathy itself is obliged to yield. This "bastard homœopathy" is, in his view, as discreditable as it is dangerous. Those who practise it are in no sense homœopathists, and are deserving of the strongest condemnation. It is a crime against homœopathy to give even the semblance of an allopathic remedy; and Hahnemann does not hesitate to confess that he has on this account given up the use of some of those simple palliatives, whose value he had attested by his own experience before he embraced homœopathy, but whose use he considered as being at once superseded by the new system, and inconsistent with its principles.

A system like this must of course be tried as a whole. It must stand or fall by its own tests. If true, it demands nothing less than that all previous systems shall give way to it. But, on the other hand, if it errs in one point, it is guilty of all. Hence the question between the homœopathists and their opponents cannot be settled by an array of instances on the one hand, or an array of authorities on the other. A thousand instances of like curing like will not prove the law universal in the face of half a dozen opposing facts. But all the authorities in the world will not disprove homœopathy, unless they can succeed in establishing a system or a fact which is at variance with it.

Tried by this simple issue, the strength and the weakness of homœopathy (or at least of Hahnemann's homœopathy) are at once apparent. Its strength lies in the confessed inability of ordinary medicine to oppose to it any system as simple, and apparently as complete, as its own; its weakness, in the total insufficiency of its alleged instances to support the enormity of the postulate. To the mind which must at all hazards have a complete and universal system, it may be conceded that homœopathy is no worse than any other, and, in connection with its ordinary practice of infinitesimal doses, less hurtful than many systems. But to the mind which regards all systems as subject to the rigid criticism of facts homœopathy must ever appear one of the most unfounded and monstrous of delusions.

In saying that "like cures like" Hahnemann uses a form of expression which (especially in Latin) bears a very respectable resemblance to the enunciation of a great natural law. But examine that expression, and, still better, try it by instances. What is "like," and what unlike? Polonius thought that Hamlet's cloud was like a camel, a weasel, and a whale, in turn; it was probably as like the one as the other. One man sees a likeness between certain members of a family; another cannot see it; a third sees it at one time, and fails at another. In one sense all men are more or less alike; in another infinitely varied and dissimilar. In the region of ideas, the poet and the wit equally see resemblances which duller minds fail to appreciate. The naturalist discovers likeness in those objects which to the ordinary sense are the most dissimilar; while flowers and minerals, birds and fishes—so like that the common eye cannot distinguish them from each other, or can distinguish them only with effort and by dint of instruction—are found to be placed far apart among the genera and species of the careful and analytic observer. In short, no feature of objects is more liable to be differently appreciated from different points of view, and by different minds, than precisely this one of external resemblance.

The force of this argument, in its application to the homœopathic law, is all the greater that Hahnemann does not admit *identity* between the symptoms of the disease and the effects of the remedy as constituting a reason for its therapeutical employment. On the contrary, identity is destructive of the alleged homœopathic action, which is found to exist only in connection with great similarity. But it may well be asked if absolute identity be not, in such a case, merely the greatest possible amount of similarity.

It is well known to the man of science that nothing is so apt to mislead the mind as the tracing of analogies. Yet the whole basis of the law, *similia similibus curentur*, is nothing but a series of analogies so vague, and sometimes so preposterous, that in any department of natural history they would be rejected as unworthy the name of science. The truth of this assertion will be admitted by almost any man (not being a professed homœopathist), who will examine the assertions recorded in regard to only a few articles of the homœopathic materia medica. But as our limits forbid this inquiry, it may suffice for the present to mention that a large proportion of Hahnemann's instances of the homœopathic law are adduced from the writings of physicians who not only were unaware of the resemblance between the symptoms of the remedy and those of the disease, but, according to Hahnemann, prescribed those very remedies upon the antipathic or allopathic principle. Were it true (as it is not) that ordinary medical practice was founded on either of these alleged principles, there would be little or no difficulty in defending one or both of them by a reference to the very same remedies and the very same diseases as are adduced by Hahnemann to prove the homœopathic law. But in placing his so-called therapeutical law upon a basis of mere analogy, Hahnemann has scarcely betrayed a greater misconception of true science than he has of medical history, in ascribing to his opponents a practice founded on "allopathy" or "antipathy,"—names as entirely unknown to medical science as "homœopathy" itself.

It may safely be alleged that the favour shown to homœopathy as a system by a certain portion of the public depends much more on the supposed success of its practice than upon the validity of the evidence adduced in support of its law. Homœopathy is embraced, not as a philosophical truth, but as a method of dealing with the minor ills which flesh is heir to, certainly much more agreeable, and presumed to be not less safe, than that of ordinary physic.

This idea is not entirely without foundation, if ordinary physic be conceived to be nothing else but a succession of bleedings, purgings, and blisterings. That medical resources have often been abused, and that a large amount of suffering and inconvenience, if not of disease and death, have sprung from the too active use of remedies having acknowledged power both for good and for evil, no one will be disposed to deny. The employment of infinitesimal or very minute doses by the homœopathist has undoubtedly tended to make that system the natural refuge of those who have suffered from the *nimia diligentia medici*. And as a very considerable portion of diseases require little else than dietetic and hygienic means for their cure, when cure is possible, even the pure homœopathist does not always fail so notoriously as to discredit his system. Many diseases, besides, are well known to be self-curative; as the most ancient and celebrated of the Greeks has expressed it, "Our natures are the physicians of our diseases." And in those cases which plainly require the assistance of active remedies there are now-a-days few homœopathists who are not found willing to cast aside their system so far as to employ at least the simpler and safer varieties of active drugs after a

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fashion confessedly not homœopathic. With such practitioners, homœopathy, with its infinitesimal doses, qualified by the administration of active drugs in cases of emergency, becomes merely ordinary practice reduced to the minimum of activity; and, as such, may be a much better practice than the opposite extreme. But, on the other hand, such "bastard homœopathy" would, as we have seen above, have been most severely condemned by Hahnemann. It is, in fact, homœopathy in nothing but the name.

The doctrine, or rather the practice, of infinitesimal doses, is undoubtedly one of the most curious aspects of homœopathy, as it is one of the most singular phases of human opinion in matters medical. The ordinary and universal persuasion that remedial substances act upon the system in something like a direct proportion to the quantity in which they are introduced into it, is not indeed opposed by Hahnemann, so far as the physiological effects of these substances are concerned. It is not denied that one hundred grains of arsenic, for instance, are more likely to kill than the hundredth part of one grain. But it is maintained that the powers of remedies over disease are so distinct from all their physiological, and, indeed, all their material properties, as not to be subject to the same conditions of increase and diminution. The curative property of a remedy is, according to Hahnemann, developed in a much higher degree by an inconceivably minute than by a palpable dose. The latter, indeed, interferes directly with the cure; because the *symptoms* developed by the remedy, being similar to those of the disease, invariably tend to its aggravation in a degree corresponding with the amount of the dose and its homœopathicity. It was, indeed, this constant aggravation of the disease under homœopathic remedies which first led Hahnemann to reduce his doses to impalpable quantities as an indispensable condition of safety in their use. So bigoted was he to his system that he did not see even in this contradictory result of his own experience an argument against his alleged universal law!

The extent of these infinitesimal dilutions is such as to be inconceivable by the human intellect; they can only be expressed in the technical abbreviations of the arithmetician, and even then are with difficulty carried in the memory. Thus in the thirtieth dilution one grain of the resulting liquid contains one decillionth of a grain of the remedy, or 1,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000th part of the whole. If one entire grain of medicine were thus diluted, it may be shown, by accurate mathematical computation, that the quantity of fluid required for the purpose would form an ocean *one hundred and forty billion times as large as our whole planetary system;* or if a solid substance were used, so that a single globule might contain a decillionth of a grain of the remedy, the original grain thus diluted with inert matter would be equal in weight to "*one hundred and forty billion spherical masses extending from limit to limit of Neptune's orbit*," or to "*many hundred spheres, each with a semidiameter or radius extending from the earth to the nearest fixed star.*" With which calculations from Dr Simpson's work on homœopathy, revised and corrected as they are by Professor Kelland, we trust our readers will be satisfied. Yet the homœopathic dilutions recommended by some of the more modern homœopathists far exceed the thirtieth in minuteness; and Hahnemann himself often recommended the simple smelling (olfaction) of a globule diluted as above!

Hahnemann was born in 1755, at Meissen, on the Elbe, near Dresden. His father was a painter on porcelain; and his early education, as well as his medical studies, were pursued under considerable pecuniary pressure. He began thus early the occupation which for a long time afterwards was one of his chief sources of emolument, viz., translating from the English. He graduated at Erlangen in 1779, and soon after this he commenced practice and married. He did not at first succeed in gaining public confidence; and indeed, for a good many years before the great arcanum was discovered he had almost no actual practice, and occupied himself chiefly with translations, and with chemistry, of which latter science he made some useful and profitable applications. He himself said, years afterwards, that he had retired from practice from conscientious motives, finding that he could not reconcile the responsibilities of medicine with his scepticism as to the remedies in use. It is rather inconsistent with this view of the matter, however, that he was busily engaged in propagating with his pen those very therapeutical doctrines which he thought it a sin to apply in practice. He was still translating very largely, and in 1790 was engaged on Cullen's *Materia Medica*, which had appeared in England the previous year. During that previous year, too, he had written his original work *On Syphilis, and on the Mercurius Solubilis Hahnemanni*, a work which presents no trace of scepticism, but, on the contrary, an all-devouring faith in the drugs then in use. It was from Cullen's *Materia Medica* that he obtained the suggestion as to the homœopathic use of Peruvian bark. After some temporary engagements he removed to Königslutter to begin practice in 1795. He continued as before to be a copious writer, and in 1796 produced his first attempt to expound the homœopathic law. In 1799 his practice of dispensing his own medicines brought him into collision with the apothecaries of the place, who managed to bring the laws to bear on a method of practice so much opposed to their vested interests as tradesmen. The consequence was that Hahnemann left Königslutter, and that the unjust restrictions to which his practice had been subjected produced the usual fruit of persecution—sympathy and notoriety, both for the man and for the doctrines, which he now began to put forward with a bolder front than hitherto. From Königslutter he went to several places in succession, and ended by settling in Leipzig in 1810. In this year he published the *Organon der Heil-Kunst;* and in the next a volume on *Materia Medica*, containing numerous "provings" of drugs on himself and on others. The completion of this work occupied him till 1821. He became at Leipzig a successful practitioner, and left it only in consequence of a persecution like that to which he was subjected at Königslutter. He next went to Anhalt-Coethen, where the reigning prince was one of his warm partizans. He remained here, occupied with practice and with his pen, till 1835, when, at the age of eighty, he married a second time, or rather was married and carried off to Paris by an enthusiastic young lady, Mlle. Mélanie d'Hervilly, who was anxious to secure for the French capital the benefits of homœopathy and the person of its founder. He died at Paris on the 2d July 1843, having engaged in a large practice during the eight years he resided there, in which he was assisted by his wife and daughter. Madame Hahnemann continued to practise homœopathy after the death of her husband, notwithstanding an attempt in the French courts of law to restrain her as an unlicensed practitioner; on which occasion she received the powerful support, in the Chamber of Deputies, of M. Montalembert, who argued, in a speech of great eloquence and power, against restrictions on medical practice. (W. T. G.)

Homonyms || Hondekoeter.

HOMONYMS, words agreeing in sound, but differing in signification.

HOMOOUSIANS, a name applied to the orthodox, indicating that they held the Father and Son in the Trinity to be of the same nature, thus distinguishing them from the Arian party, who were called Homoiousians, and who held only a similarity of nature to subsist between them.

HONDEKOETER, Melchior, a distinguished Dutch animal-painter, was born at Utrecht in 1636. His father and grandfather had both made for themselves a considerable name in that walk of art, but their fame was soon totally eclipsed by his. Though he painted most kinds of animals, his favourite subjects were cocks, hens, ducks, and peacocks, which he delineated with wonderful correctness and truth to nature. It is said that he trained a cock to stand in whatever attitude he desired, and to remain in that posture for several hours at a time without moving a muscle. The landscapes which he introduced as back-grounds to his pictures were like them wonderfully true to nature, and finished with a delicate lightness and transparency of touch that harmonized admirably with the subject of the piece. In his walk he has never been rivalled, and his genuine pictures, of which the best are in English collections, often fetch high prices. Connoisseurs have less difficulty in detecting copies or forgeries of his pieces than of any other of the old masters. Hondekoeter died in 1695 at the age of fifty-nine.

HONDURAS, British, *Belize* or *Balize*, a British settlement on the east coast of Central America, between N. Lat. 15. 54. and 18. 30., and W. Long. 88. and 89. 30. It is bounded on the N. by Yucatan, W. and S. by Guatemala, and E. by the Bay of Honduras. It has a coast line of about 200 miles between the mouths of the Hondo and Sarstan, and is about 100 miles in breadth.

This coast was discovered by Columbus in the year 1502, but little that can be relied upon is known of its early settlement. The abundance and fine quality of the wood, particularly mahogany and logwood, seem first to have drawn attention to it; and at a pretty early period it was occasionally resorted to by wood-cutters. But the first permanent establishment of British wood-cutters was made at Cape Catoche by some adventurers from Jamaica, whose numbers increasing they extended as far S. as the River Belize, and as far W. as the neighbourhood of Campeachy. The Spaniards, however, did not quietly submit to this usurpation of their territorial dominion. Several expeditions were fitted out against the settlers, but they were uniformly unsuccessful; and on two occasions, in 1659 and 1678, so complete was their discomfiture, that the town of Campeachy itself was taken by the logwood-cutters, with only the assistance of the seamen engaged in the trade. This last repulse occurred eight years after a treaty had been concluded with Spain, by which the territorial right of Britain to the occupancy of Honduras was generally, although not specifically, embraced. The successes of the settlers aroused the jealousy of the Spaniards, and led to a renewed discussion of their right to the territory which they occupied. This would appear to have been again generally admitted; but the Spaniards finally succeeded in driving the woodmen from the Campeachy shore, and confining them to the limits of the present settlement. An attempt was again made in 1718 to dispossess the British of the territory on the River Belize; but the firmness of the woodcutters deterred the Castilians from effecting anything, except the erection of a fortification, which in a few years they abandoned. In 1754 an expedition was undertaken to exterminate the colony; but by a treaty of peace concluded in the year 1763, the Spaniards were compelled to admit the right of occupancy to the British colonists, which, however, they subsequently attempted to annul. In 1779 the Spaniards again attacked the settlement, and after destroying property to a considerable amount, they took a number of the colonists prisoners, and marched them off in irons to Merida, whence they were shipped to the Havannah, and there confined till 1782. In 1784 Britain obtained from Spain a specific grant of "the lands allotted for the cutting of logwood;" and in 1790 an act of parliament conferred on Belize all the privileges of a British colony. The last attack on the settlement was made during the war in 1798, but the expedition, which consisted of 3000 men, was gallantly repulsed; and since that period the colony has remained undisturbed by foreign aggression.

The coast of the Bay of Honduras is low, and the shore is studded with a number of low islands or keys, which, however, are verdant. As we recede from the coast, the land rises into a bold and lofty country, interspersed with rivers and lagoons, and covered with gigantic forests. The lagoons or sheets of water, and the falls and rapids of the rivers, constitute sublime and beautiful features in the general aspect of the country. The Hondo River, which forms the northern boundary, is a fine stream. A few miles S. of it is the New River, which has its source in an extensive lagoon. The Belize has a N.E. by E. course of above 200 miles, and discharges itself into the Bay of Honduras by two mouths about 3½ miles apart, the southern branch dividing the town of Belize into two parts. The river and lagoon of Manatee, which is situated 10 leagues S. of Belize, is considered as extremely grand. At about a mile from the mouth of the river is the lagoon, a magnificent sheet of water, extending for several leagues in a northerly direction. In many places lofty hills ascend from its margin, overtopping large valleys and wood ranges of great extent, where the jaguar, capybara, armadillo, large weasel, opossum, racoon, and several species of deer, abound. Amongst the feathered tribes there are numbers of quails, plovers, pigeons, pheasants, and wild turkeys. The deficiency of streams amongst the mountain ridges is supplied by the presence of large marshy spots or shallow ponds, the banks of which are frequented by almost every species of water game. Fish abound during a great part of the year in these ponds, but the latter dry up in the season of drought, and then vast flocks of sea-fowl congregate around them to prey upon the fish which have been left dry by the evaporation of the waters. The alligator is also a frequent visitor; and, to partake of this repast thus yearly provided for him, he has been known to traverse trackless wilds, and make long journeys into the interior. The rapids of the Manatee commence about 8 or 10 miles from the lagoon, and the high rocky banks of the river assume a romantic and beautiful appearance. Further on there is a rapid of about a quarter of a mile in length, and of considerable acclivity. A cluster of beautiful caves, through which the river winds its way, and beneath which the traveller must pass, is next reached. They have been described as equally singular and grand. "These magnificent natural excavations of the mountains are semicircular at the entrance, and about five yards in diameter. Within the cave the arch rises to the height of 100 feet, and leads to another low arch, which being passed, a second cavern of large size opens, beyond which is a third with a circular orifice, through which the river enters. During the floods the mouths of the caverns are filled with water, which boils up with prodigious fury, and thus detains travellers many days before they can pass through the caves or tunnels. In the rainy season, as the water increases on the upper or inland sides of the mountains, the river forces its passage through the interstices and openings in its sides with tremendous noise, forming an indescribably grand cascade of from 40 to 50 feet high, issuing from an hundred orifices." Of the other rivers of Honduras little is known.

The country is technically divided into the Pine and the Cahoun ridges. The soil of the former has a substratum of loose reddish sand, and its indigenous products consist of those varieties of vegetation the assimilative powers of which are strong and perennial. Extensive prairies expand over this soil, and the pine, from which it derives its name, is extremely abundant. The soil of the Cahoun ridge consists of a deep loam, capable of growing every species of European as well as of tropical aliment. Its fertility occasions the growth of much brushwood, and it is covered with the wild cotton tree and other giants of the forest.

Fruits, spontaneously produced, are exceedingly abundant, and consist of oranges of excellent quality, shaddocks, limes, mangoes, melons, pine-apples, water-melons, avocato pears, cashew, cocoa-nuts, and many others. They are all found in the neighbourhood of Belize, but are sometimes brought in large quantities from more elevated plantations. The mahogany and logwood trees are at present the staples of Honduras. The former is found best in elevated situations; and growing generally solitary, it is discernible at a great distance from the yellow hue of its foliage. It is cut down at about 12 feet from the ground, and when felled the logs are dragged to the banks of the streams and floated down in rafts. The boughs and limbs are said to afford the finest wood, but it is the size that is principally looked to in Britain. The logwood is found in low swampy grounds, growing contiguous to fresh-water creeks and lakes, on the edges of which the roots, the most valuable part of the wood, ramify. They are felled during the dry season, and carried off when the wet season has laid the ground under water. There is another valuable tree called the *Pinus occidentalis*, which grows to the height of 60 feet, and covers many thousand acres of country. The pine-wood contains an immense quantity of tar and turpentine, and is consequently highly inflammable. In this respect it is very valuable to the poor, who make torches of it. It likewise powerfully resists decay, and is in consequence much used by builders. The cahoun or cohoon tree yields a valuable oil, which, when unadulterated, is almost colourless, destitute of any disagreeable taste, and when burned as a lamp oil it emits a beautiful palish flame without smoke or smell. There are various other kinds of wood of beautiful vein and close texture, such as iron-wood, clay-wood, rose-wood, palmaletta, and the like. Amongst minerals, strata of fine marble and formations of alabaster are known to exist. Several valuable specimens of crystals have been found, and gold has occasionally been detected in some of the streams. Labouring Creek, which lies on the Belize, about 100 miles inland, is remarkable for the petrifying properties possessed by its waters. They have also a powerful cathartic effect on strangers, and when applied externally to an ulcer have a healing property.

The country abounds with all kinds of animals fit for the food of man. Except in very rough weather, the supply of salt-water fish of excellent quality is abundant. The common green turtle, when in a healthy condition, is a staple commodity in the market. The hawksbill turtle is often five feet long, and weighs from 200 to 250 lbs.

Belize, the capital of the settlement, stands on a low flat shore immediately open to the sea, and guarded by numerous small islands, densely covered with trees and shrubs, and so similar as to render the navigation extremely difficult. It is farther divided into two parts by the river, which is crossed by a substantial wooden bridge of 220 feet span and 20 feet in length. The part of the town which is situated upon the S. or right bank of the river, along the eastern edge of a point of land, is completely insulated by a canal on its western side, which runs across from a small arm of the sea, and bounds the town on its S. side. The houses are about 500 in number, and are in general well built, spacious, and even elegant. They are for the most part constructed of wood, and raised 10 feet from the ground on pillars of mahogany. The streets are regular, and cross each other at right angles. The main one runs in a north-easterly direction to the bridge from the government-house, which is situated on the S.E. point or angle of the island on the right bank of the river, and bounded on the S. and E. by the sea. Behind the government-house is the church, on the E. side of the main street. The whole town is embowered in groves and avenues of the cocoa-nut and tamarind trees. Fort-George is situated about half a mile from the river, on a small low islet.

In the neighbourhood of Belize the natural heat of the climate is tempered by the sea breezes that prevail during nine months in the year, so that, even in the hottest season, the thermometer seldom rises above 83° Fahr., and during the wet season it sinks to 60°. In June, July, August, and September, heavy and frequent rains fall, and these are the most unhealthy months of the year, from the decomposition of animal and vegetable matter in the adjacent lowlands and swamps.

There are various classes of society in this settlement, including Europeans, coloured people, Indians, and Mosquito men. The blacks of Honduras are distinct from the aborigines of the country, being of African descent. In general they are inclined to indulge those low propensities which are exhibited in a state of barbarism. Having been derived from various regions, they still retain all their national peculiarities, and keep themselves distinct from every other tribe. The blacks, as a body, have upon the whole little intelligence, and their dulness of comprehension is remarkable. It is asserted, however, that some of them exhibit an originality of talent and a degree of mental activity little inferior to their European brethren. They are much attached to their country, and with a native of his own land a Honduras black will share his last plantain. The *coloured* population has resulted from the intercourse of Europeans with Africans or Indians. They of course, morally speaking, assume a medium status, and partake more or less of the qualities of black and white, according to their distance from either. The *Mosquito Indians* abound in the colony. They are remarkable for a fine muscular formation of body, but in their countenances they exhibit an utter destitution of intelligence, and their habits are most barbarous. They acknowledge the existence of a good and evil spirit; and the little power of thought which they possess is displayed in their conduct towards their deities. The good spirit is neglected, because, say they, his goodness is so great that nothing is to be feared from his wrath, whilst, on the other hand, the evil spirit is propitiated, in order to deprecate his malevolence. The whole wealth of a Mosquito man consists in his canoe, paddle, and harpoon. With these he satisfies the cravings of nature, and his grovelling nature asks for no more. The *Indians*, the real aborigines of the place, are a timid, inoffensive race, apparently more under the influence of instinct than of reason. They perform the most astonishing journeys through woods, as trackless as the sea, and impervious to all but themselves with infallible correctness of direction and amazing rapidity. Although free from vindictive or malicious propensities, they are addicted to drunkenness to an excessive degree. The population of the colony is estimated at about 12,000.

The present constitution of Honduras is based upon an act passed in 1853. By this act the legislature consists of the superintendent and a legislative assembly of twenty-one members, eighteen of whom are elected, and three appointed by the government. Members are required to be of full age, of native birth, or naturalized, and in the possession of personal property within the settlement to the amount of L.400. Electors must be owners or occupiers of real property to the amount of L.7 per annum. The assembly lasts for four years, subject to prorogation or dissolution. The superintendent has also the assistance of an executive council of six members, three of whom are designated official, and three are appointed by the superintendent, with the approbation of the crown. The superintendent of Honduras is under the control of the governor of Jamaica, from whom he receives his commission. In religious matters, too, Honduras forms part of the bishopric of Jamaica. There are two parish churches in Belize, a free Scotch church, and chapels for Wesleyans and Baptists. There is also a grammar school, founded in 1846, and having, in 1847, 175 pupils. Petty larceny and misdemeanours resulting from intemperance frequently occur, but atrocious crimes are happily seldom perpetrated. In the mechanical arts the blacks display little or no ingenuity, but the coloured people are considerably above the negroes in this respect.

The exports consist chiefly of mahogany, logwood, rosewood, hides, tortoise-shell, fustic, cochineal, indigo, sarsaparilla, and cocoa-nuts; the imports chiefly of manufactured goods from Britain. Much of the exports are brought hither from the neighbouring states in small coasters. The total value of exports in 1851 was L.411,443; in 1852, L.399,223; in 1853, L.345,377; and in 1854, L.452,313. The imports in 1854 amounted to L.2,417,642. (Martin's *British Colonies, Parliamentary Reports*, &c.; Capt. Henderson's *Honduras.*)

Honduras, one of the republican states of Central America, lying between W. Long. 83. 20. and 89. 30., and N. Lat. 13. 10. and 16.; and bounded on the N. and N.E. by the Bay of Honduras and the Caribbean Sea, S.E. by Nicaragua, S. by the Gulf of Fonseca and San Salvador, and W. by Guatemala. On the N. it has a coast-line of about 400 miles from the mouth of the Rio Tinto, in W. Long. 88. 30., to Cape Gracias á Dios, at the mouth of the Rio Wanks or Segovia, in Long. 83. 11. The boundary line follows the Wanks for about two-thirds of its length, and thence deflects in a south-westerly direction to the sources of the Rio Negro, which there forms its boundary to the Gulf of Fonseca, along which it has a coast-line of about 60 miles, to the mouth of the Rio Goascoran. It follows the course of that river, due N., for about 30 miles to the mouth of one of its affluents from the N.W., called Rio Pescado. From the head of this stream it strikes a branch of the Rio Torola, along which it continues to the mouth of the latter, in the Rio Lempa. The Lempa, and subsequently its affluent the Rio Lumpul, constitute its boundary to a point near the source of the latter, where its waters approach those of the Rio Paza. From this point it runs nearly N.E., along the mountain chain of Merendon and Grita to the head waters of the Rio Tinto.

The general aspect of Honduras is mountainous. Ranges of mountains and hills radiate towards the N. and E. from the common base of the Cordilleras. This great chain does not in Honduras approach within 50 or 60 miles of the Pacific, and on that side presents the general appearance of a great natural wall. A lower range of mountains, relieved by volcanic peaks of wonderful regularity of outline, intervenes between it and the ocean. It seems as if the waters of the Pacific had at one time washed the foot of this great mountain barrier, and the now intervening coast range had resulted from subsequent volcanic forces. The great chain of the Cordilleras does not throughout maintain its general character of an unbroken range, but occasionally forms interior basins or valleys, within which are collected the head waters of the large streams that traverse the country in the direction of the Atlantic. The northern and eastern coast of Honduras presents several bold groups of mountains, the terminations of ranges radiating from the Cordilleras. From the high plateaux of Guatemala the great range of the Cordilleras pursues a nearly eastern course to the frontier of Honduras, where it is deflected to the S.E., while a higher range, not inferior in height to the main chain, runs off E. by N. to the Bay of Honduras. At the point of separation this range is called the mountains of Merendon, afterwards Grita, and nearer the coast, Espiritu Santo. On the coast, where it attains the great height of 7000 or 8000 feet, it takes the name of Omoa. The main chain, at the distance of a few leagues from the mountains of Merendon, forms a mass or group known as the mountains of Selaque; and intermediately lies the great valley or plain of Sensenti, which is about 30 miles in length by from 10 to 20 in breadth. It is almost wholly enclosed by mountains, the only outlet being the narrow valley or gorge through which flows the Rio Higuito or Talgua, subsequently the Rio Santiago. The mountains of Selaque constitute one of the principal centres of elevation in Honduras, rising to the height of 8000 or 10,000 feet. The Rio Mejicote or Rio Grande de Gracias, a branch of the Santiago, separates them on the E. from the mountains of Paca with their lofty peak, and from the terraced mountains of Opalaca or Intibucat with their truncated summits and elevated plains. The valley of the Rio Sta Barbara, one of the principal affluents of the Santiago, intervenes between the mountains of Opalaca and the group of the Montecillos. This group is formed by the true range of the Cordilleras, which turns abruptly from its previous course, E. by S., to a direction due N., and finally loses itself in diverging ranges toward the coast. The divergences form another mountain-bound valley, in the centre of which lies the Lake of Yojoa. At the eastern base of the Montecillos range, where the interruption of the Cordilleras is complete, lies the plain of Comayagua, about 1900 feet above the sea, from which, extending due N. to the Atlantic, is the valley of the Rio Humuya, and due S. to the Pacific is the valley of the Rio Goascoran—thus constituting a great transverse valley reaching from sea to sea. The plain of Comayagua is probably about 40 miles in length from N. to S., with a general width of from 5 to 15 miles. It slopes almost imperceptibly toward the N., where a range of low hills separate it from the plain of Espino. These two plains, both of great beauty and fertility, occupy nearly one-third of the distance between the Bay of Honduras and that of Fonseca. Beyond the plain of Comayagua the Cordilleras again form a great group or mass of high mountains, the northern part being known as the mountains of Comayagua, the southern as the mountains of Lepaterique. They extend about 80 miles from N. to S., and near the centre send off a high range known as the mountains of Ule. Nearly to the westward of the mountains of Comayagua, and separated from them by the valley and river of the Sulaco, is the Sulaco group, standing almost in the centre of the state, and forming the nucleus of several extensive ranges little inferior to itself in elevation. That which extends to the N.E. is called the mountains of Misoco; that to the N. the mountains of Pija, terminating its numerous spurs in the high peaks of Congrehoy, which frown over the Bay of Honduras; while that called the mountains of Chili pursues a tortuous south-western course, and finally skirts the northern border of the transverse valley of the Nicaraguan lakes. At the base, and to the E. and N.E. of the mountains of Sulaco, are the broad and elevated plains or terraces of the Olancho and Yoro, celebrated for the number and excellence of their cattle. Most of that wide region between the Sulaco mountains and the Atlantic, comprising nearly one-half of the territory of the state, is uninhabited except by detached Indian tribes, and is but little known, except that it is very diversified and rich in the nature of its soil and the variety of its minerals. The northern coast of Honduras presents a diversified surface. A portion is flat, and covered with vast growths of timber. In other places the mountains extend to or very near the coast. Those of Omoa overshadow the Bay of Amatique, and those of Congrehoy and Poyos form conspicuous landmarks from the ocean, which breaks almost at their feet. Honduras thus presents the greatest diversity of surface; fertile valleys, wide and elevated plains, and mountains terraced to their summits, affording almost every variety of soil, climate, and production.

The rivers of Honduras are numerous, and some of them of great size. The principal are the Chamelicon, Ulua, Aguan or Roman, Tinto or Black River, Patuca, and Wanks or Segovia, flowing into the Atlantic; and the Choluteca, Nacaome, and Goascoran, flowing into the Bay of Fonseca. The Chamelicon rises in the mountains of Merendon, and pursues a generally N.E. course to the Atlantic. It is of great length and rapid, but as it drains only a small section of country, its body of water is small. The Ulua, on the other hand, drains a vast expanse of territory, comprehending nearly one-third of the entire state, and is the largest river in Central America, the Wanks perhaps excepted. The principal tributaries are the Santiago, Sta Barbara, Blanco, Humuya, and Sulaco. It has a bar at the mouth with only 9 feet of water, but steamers of light draught may ascend to the mouth of the Humuya. The Rio Aguan or Roman River is a large stream rising in the mountains of Sulaco, and falling into the sea a little to the E. of Truxillo, after a course of about 120 miles. The Rio Tinto or Black River, which at a short distance from the coast takes the name of Poyer or Poyas, is a considerable stream, said to have a course of about 120 miles. The Patook or Patuca River is the largest on this coast, between the Ulua and the Wanks. It takes its rise in the department of Olancho, in the vicinity of the town of Juticalpa. The principal streams which unite to form the Patuca are the Jalan, Tinto de Olancho, Guyape, and Guallambre. The principal mouth of the Patuca is obstructed by a shifting bar, on which there is generally from 8 to 10 feet of water. An arm of the Patuca, called Toomtoom Creek, diverging from the main stream at a short distance from its mouth, connects it with Brus or Brewer's Lagoon, which communicates with the sea by a wide mouth, but only accessible to vessels of six or seven feet draught. Eastward from the mouth of the Patuca is the Carataska or Cartago Lagoon, about 36 miles in length by about 12 in breadth, and varying in depth from 6 to 12 or 18 feet. The Rio Wanks or Segovia is certainly the longest if not also the largest river in Central America. It rises in the department of Nueva Segovia, in the extreme N.W. corner of Nicaragua, within 50 miles of the Bay of Fonseca, and flows N.E. into the Caribbean Sea at Cape Gracias á Dios. Its length is estimated at not less than 350 miles. The three principal rivers flowing into the Pacific are the Goascoran, Nacaome, and Choluteca, of which the last named is the largest. It rises in the Lepaterique Mountains, at the head of the plain of Comayagua, flows eastward until it reaches the meridian of Tegucigalpa, then turns abruptly N., passes that city, and after describing a circuitous route, runs nearly S. into the Gulf of Fonseca, having a total length of 150 miles. The Rio Nacaome collects its waters on the S. side of the Lepaterique Mountains, while the Choluteca drains their northern slope. It is not a long stream, but is very rapid, and carries along a considerable body of water. The River Goascoran rises among the low hills which lie at the head of the great plain of Comayagua, and has a course due S. of 70 or 80 miles. During the rainy season it is of considerable size, but in the dry season it is fordable without difficulty at any point. The only lake of importance is that of Yojoa or Taulebé. It is closely shut in by mountains, and is probably about 25 miles in length, by from 3 to 8 in breadth. The River Blanco, a narrow but deep stream, flows from its northern extremity into the Ulua. The Bay of Fonseca, the greater portion of which belongs to Honduras, is upwards of 50 miles in length, by about 30 in average breadth, with an entrance 18 miles wide, between the volcanoes of Conchagua (3800 feet in height) and Coseguina (3000 feet in height). Across this entrance lie the two islands of Conchaguita and Mianguera, and a collection of high rocks called *Los Farellones*, forming four distinct channels, each having sufficient depth of water to admit the largest vessels. On the island of Tigre, near the centre of the bay, is the free port of Amapala, belonging to Honduras. The largest island in the bay is the Sacate Grande, 7 miles in length, by 4 in breadth, and of great fertility, in some parts densely wooded with cedar, mahogany, and other valuable trees; in others covered with luxuriant pasture.

The principal ports of Honduras on the Atlantic are Puerto Caballo, Omoa, and Truxillo. Puerto Caballo, the first port established by the Spaniards on the northern coast, is in N. Lat. 15. 49, W. Long. 87. 57. Cortez, in his expedition into Honduras, founded a settlement here for the purpose of making it the grand entrepôt of New Spain. For upwards of two centuries it was the principal establishment on the coast; but during the time of the buccaneers it was removed to Omoa, because of the large size of the bay, which could not be properly defended. This bay is not less than 9 miles in circumference, of ample depth—two-thirds of it being from 6 to 12 fathoms—and has secure holding ground. It is perfectly protected from the N.N.E. and N.W. winds, which are those that prevail on this coast. The port of Omoa, in N. Lat. 15. 47., W. Long. 88. 3., is small but secure, and is defended by a strong fort, called El Castillo de San Fernando. The anchorage is good, in from 2 to 6 fathoms. The town stands about a quarter of a mile from the shore, and contains about 2000 inhabitants. Truxillo is situated on the western shore of a noble bay, in N. Lat. 15. 55., W. Long. 86. Young estimated the population in 1842 at 2500, of whom 1000 were whites and Ladinos, and 1500 Caribs. The latter are described as tall, athletic, hardy, and industrious.

The coast alluvions of Honduras are generally densely wooded, the elevated valleys of the interior spread out in broad savannahs, and the mountain plateaux are covered with forests of scattered pines, relieved by occasional clumps of oak. Upon the northern coast, in the broad plain through which the Ulua and Chamelicon flow, the country is so low as to be occasionally overflowed for considerable distances. Here grow immense forests of cedar, mahogany, caiba, India-rubber, and other large and valuable trees, thickly interspersed with palms. Farther to the eastward on the same coast the heavy forests are confined chiefly to the river valleys, and give place at short distances inland to sandy savannahs, covered with coarse grass and clumps of pines and acacias. The alluvions of the Pacific coast are also densely wooded, but not extensive. At short distances inland they give place to numerous savannahs, studded with clumps of acacias, and covered with grass; but the pine does not appear here except upon the slopes of the hills at an altitude of about 1200 feet. The valleys of the rivers on both coasts are thickly wooded; but as they ascend towards the interior, vegetation diminishes, and is reduced to a narrow fringe of trees and bushes upon their immediate banks. These valleys in the high interior country often expand into broad and beautiful plains—half savannah, half woodland—where the palm and the pine flourish side by side. The mountains which rise around these valleys are ascended by terraces crowned with forests of pines and oaks, and covered with grass. The summits of the mountains sometimes rise in peaks, but generally constitute broad table-lands, more or less undulating, and often spreading out in savannahs, traversed with long ridges of verdure and green belts of trees.

Of the vegetable productions of Honduras the mahogany tree stands first in importance, and, from its vast size and magnificent foliage, is deservedly entitled "king of the forest." It is to be found in nearly all parts of Honduras, in the valleys of the various streams. It is, however, most abundant upon the lower valleys of the rivers flowing into the Bay of Honduras, where the *cortes* (cuttings) are chiefly carried on by the Spaniards. A fixed sum is paid to the government for each tree cut down. Rosewood is common on the northern coast, where it is beginning to form an article of commerce. Lignum vitæ abounds in the valley of the Ulua, on the river banks in the plain of Comayagua, and in other parts. Among the numerous dyewoods for which Honduras is celebrated, may be mentioned fustic, Brazil wood, yellow sanders, dragon's-blood tree, Nicaragua wood (a variety of Brazil wood), and the anotta. Among the gum and medicinal trees, are the gum-arabic tree, copaiba tree, copal tree, liquid amber, castor oil, ipecacuanha, and the *Hevea elastica*. Among the more common of the others are the long-leaved or pitch pine, cedar, *ceiba* or silk-cotton tree, live oak, mangrove, iron-wood, calabash, various kinds of oak and palm, lime, lemon, orange, cocoa, pimento, citron, tamarind, and guava. Sarsaparilla is obtained in great abundance, and of superior quality. The sugar-cane grows luxuriantly on the plains and among the mountains, at elevations of 3000 to 4000 feet. Coffee, indigo, tobacco, maize, wheat, rice, and potatoes are also grown.

The domestic animals are the horse, ass, ox, sheep, goat, hog, dog, and cat. The wild animals comprise the deer, tapir, racoon, opossum, squirrel, ant-eater, armadillo, and various species of monkey; also the jaguar, black tiger, tiger-cat, and the cougar. Numerous varieties of parrot abound everywhere; and the macaw and toucan are common on both coasts. Among the birds of prey are hawks, vultures, owls, and sea-eagles. The crow, blackbird, Mexican jay, rice-bird, swallow, rain-bird, and numerous varieties of humming-bird are common. Of water birds the pelican, Muscovy duck, black duck, curlew, plover, spoonbill, teal, darter, heron, ibis, and crane, are abundant on the banks of the lagoons and rivers. The *Crax alector*, *Crax rubra*, *Pauxi galeata*, Guan, Mexican partridge, quail, snipe, and several varieties of wood-pigeon are most numerous in the interior. Alligators are common in the lagoons and rivers of both coasts. Of the lizard tribe there are numerous varieties; the most remarkable is the iguana. Serpents of several kinds are common on the coasts, but they are mostly harmless. The tortoise and turtle are numerous, and of several kinds.

Honduras, in point of mineral resources, ranks first among the states of Central America. Silver, the most abundant and valuable of the ores existing in the state, is found in various combinations—with iron, lead, copper, and in some instances with antimony. Chlorides of silver are not uncommon. The silver ores are chiefly found upon the Pacific ranges or groups of mountains, while the gold washings, if not the gold mines proper, are most numerous on the Atlantic slope. The mineral district of Yuscuran, in the department Tegucigalpa, is noted for the number and value of its mines. The ores are for the most part an argentiferous galena yielding from 63 to 1410 oz. per ton. The mines throughout this department and that of Choluntica yield a similar ore, generally occurring in a matrix of quartz with varying proportions of brown blende, and sulphurets of zinc and iron, and oxides of iron. The mines of the department of Gracias are equally celebrated with those of Tegucigalpa. Gold mines are not uncommon in Honduras; but, with the exception of those of San Andres in the department of Gracias, and those in the vicinity of San Juan Cantaranas in Tegucigalpa, they are no longer worked. The principal supplies of this metal are drawn from the gold-washings of Olancho, which are exceedingly productive. The River Guyape has always enjoyed great celebrity for the amount of gold contained in its sands; but since the early period of Spanish occupancy washing has not been carried on, except on a very small scale by the Indians, and even with them the process is generally left to the women and children. There are also very valuable mines of copper; the ores containing also considerable proportions of silver. Those of Coloal in Gracias contain about 58 per cent. of copper, besides about 80 oz. of silver to the ton. The mine of Guanacaste, in Olancho, gives upwards of 80 per cent. of pure copper, besides about 2·9 per cent. of silver. Iron-ore is common, but no mines of it are worked except those of Agalteca in Tegucigalpa. Platina is said to exist in the departments of Choluteca and Gracias; but the mines have never been worked. Cinnabar has also been found in several places, but probably not in sufficient quantities to admit of being reduced with profit. Zinc, antimony, and tin also exist. The opal mines of Gracias are worked to a large extent, and have been very productive; and beds of coal have been discovered in several localities. An abundance of fine white, blue, and veined limestone is scattered throughout every department of the state; while the hills and mountains at the back of Omoa have exhaustless quarries of a fine compact white marble, well adapted for statuary and ornamental use.

The N. and E. coast of Honduras has unquestionably a higher temperature than any other portion of the state. It diminishes, however, rapidly as we proceed inland, the modifying influence of the neighbouring mountains being felt even before the increase of altitude becomes perceptible. The table-lands have of course a climate varying with their elevation and their exposure to the prevailing winds. The climate at the mouth of the Rio Tinto, or Black River, in N. Lat. 16., W. Long. 85., is said to be pretty equable, varying only throughout the year from 62° to 86° Fahr. The heats are tempered during the greater part of the year by the grateful sea-breeze, and sometimes by the invigorating dry N. wind.

Honduras has an area of 39,600 square miles, and its population in 1855 was estimated at 350,000, exclusive of the Indian tribes. It is divided into seven departments as follows:—

Departments.	Estimated pop. in 1855.
Comayagua	70,000
Tegucigalpa	60,000
Choluteca	50,000
Santa Barbara	50,000
Gracias	55,000
Yoro	20,000
Olancho	45,000
	350,000

The department of Comayagua occupies the centre of the state. Tegucigalpa, the smallest and most populous, may be described as occupying a great interior basin or plateau, bounded on the N. and W. by the mountains of Sulaco and Comayagua, and on the S. and E. by those of Ule and Chili. Choluteca occupies the extreme S. fronting on the Bay of Fonseca. Santa Barbara lies northward of Gracias and Comayagua, between these departments and the Bay of Honduras. Gracias lies in the N.E. angle of the state touching upon Guatemala and San Salvador. Yoro comprehends all the northern portion lying E. of Ulua. Olancho lies immediately E. of Tegucigalpa.

The Indian or aboriginal population predominates in Honduras, as in Central America generally. In the eastern portion of the state, within the district which lies between the Rio Roman and the Segovia River, an area of not less than 15,000 square miles, the country is almost exclusively occupied by native tribes, known under the general names of Xicaques and Payas. Portions of these tribes have accepted the Catholic religion, and live in good understanding with the white population. The large town of Catacamas, and some others of less note in the vicinity of Juticalpa, in Olancho, are exclusively inhabited by Christianized Payas and Xicaque Indians. Apart from these, there are considerable numbers who live among the mountains, and who follow more closely their original modes of life, but who are also friendly in their intercourse with the Spaniards. They tacitly recognize the authority of the government, but it does not interfere with their modes of life. The names Xicaques and Payas may be regarded as general designations. The *Toacas* or *Towkas*, some of whom live on the banks of the Rio Patuca, and the *Secos*, found on the Rio Tinto or Black River, probably belong to the Payas. They are described by Young as having "long black hair hanging over their shoulders, very broad faces, small eyes, with a peculiar expression of sadness and docility, which prepossesses the beholder in their favour." "They are short, but remarkably strong, and capable of carrying heavy burdens over the rocky passes of their steep mountains without appearing to suffer much fatigue. Their character for faith and honesty stands high." The coast around Carataska Lagoon, and westward as far as Brewer's Lagoon, was for many years occupied by Sambos or Mosquitos, a mixed race of Negroes and Indians; but the Caribs spreading rapidly eastward from Truxillo and Black River, have now nearly displaced them, and driven them to the southward of Cape Gracias á Dios into the Mosquito territory. The Caribs are peaceable, active, and industrious, and are much employed by the mahogany cutters on the coast. The government of Honduras is popular and representative, all power emanating from the people, and all public functionaries being held responsible to the people for the faithful discharge of their duties. The executive power is vested in a president, who must be thirty-two years of age, a native of Central America, a citizen of the state for five years, and proprietor of real estate to the value of L.1000. He holds office for four years, and is incapable of being elected to serve for two consecutive terms. The legislative body is composed of fourteen deputies, half of whom retire annually. A deputy must be twenty-five years of age, a citizen of the department which he represents, and a proprietor to the value of L.100, or in the exercise of a profession or art yielding that annual return. The senators, seven in number, must be thirty years of age, proprietors each to the value of L.200, or licentiates in some of the liberal professions. The legislature imposes taxes; nominates, in joint session, the magistrates of the supreme court of justice; grants the annual appropriations; fixes the military contingent; controls the educational system; makes war or peace; ratifies treaties; and has the power of impeaching and trying the executive officers of the state. The supreme court of justice is divided into two sections of three members each, one of which is established in the city of Comayagua, and the other in that of Tegucigalpa. They must be advocates of established reputation, of at least twenty-five years of age, and proprietors to the value of L.200. Each department is presided over by a chief officer, named by the executive, who must be twenty-five years of age, and a proprietor in the department over which he is appointed. All persons born in the state, or in any of the other states of Central America, and resident in Honduras, are recognized as citizens; and foreigners may acquire the rights of citizenship by legislative act. The right of suffrage belongs to all citizens above twenty-one years of age, "but after 1870 it shall be limited to such only as may then be able to read and write." The press is free; and capital punishment is abolished. The established religion is Roman Catholic. There are two universities, one at Comayagua, the other at Tegucigalpa, with professorships of law, medicine, and theology.

Comayagua, formerly Valladolid, the capital of the state, is situated on the southern border of the plain of the same name, in N. Lat. 14. 28., W. Long. 87. 39. It was founded by Alonzo Caceres in 1540. In 1827 it was taken and burned by the monarchical faction of Guatemala. It then contained about 18,000 inhabitants, and was embellished with fountains and monuments; but has never since wholly recovered. It is the seat of a bishopric, and has a large and elegant cathedral, and a university. The trade of the city is small. Pop. about 8000. Tegucigalpa, the largest and finest city in the state, stands on the right bank of the Rio Choluteca, which is here crossed by a fine stone bridge of ten arches, connecting the town with the suburb of Comayaguita. The town is substantially and regularly built, and contains six large churches, one of which is scarcely inferior in size to the cathedral of Comayagua. Its trade was formerly chiefly carried on through Omoa and Truxillo, but since the establishment of the free port of Amapala, it has taken that direction. Pop. about 12,000.

The coast of Honduras was discovered by Columbus in 1502. It subsequently formed part of the Spanish kingdom of Guatemala, which comprised the provinces of Guatemala, Honduras, San Salvador, Nicaragua, and Costa Rica. These threw off their allegiance to Spain in 1821, and assuming the rank of sovereign states soon after united in a confederacy called the "Republic of Central America." This union, in consequence of internal dissensions, became practically dissolved in 1839, and since that time Honduras has continued to be an independent republic. (See *Notes on Central America*, by E. G. Squier. New York, 1855.) An American work having been chiefly followed in the preparation of this article, it is necessary to explain that a considerable portion of country described under Honduras is claimed by the English for the king of Mosquito; but otherwise the work quoted is the principal authority on the subject.

HONE, or Hone-Slate. These are various slaty-stones wrought into the form of straight slabs, and used for whetting or sharpening the edges of tools after they have been ground. They consist chiefly of the following:—1. *Norway rag-stone*, the coarsest variety of the hone-slates; it gives a finer edge than the sandstones. 2. *Charnley Forest stone*, which is used as a substitute for Turkey oil-stone. 3. *Ayr stone*, *Scotch stone*, or *slate stone*, used for polishing marble, and copper plates, but the harder kinds for whetstones. 4. *Idwall*, or *Welsh oil-stone*, used for small articles of cutlery. 5. *Devonshire oil-stone*, for sharpening thin-edged broad tools. 6. *Cutlers' green-stone*, from Snowdon, which is very hard and close, and is used for giving the last edge to lancets, &c. 7. *German razor-hone*, used almost entirely for razors. It is obtained from the slate mountains near Ratisbon, where it forms a yellow vein in the blue slate. It is sawn into thin slabs, and cemented to a slab of slate which serves as a support. 8. *Blue polishing stone*, a dark slate of uniform texture, used by workers in silver and some other metals, for polishing off the work. 9. *Gray polishing-stone*, somewhat coarser than the blue. 10. *Welsh clearing-stone*, a soft variety of hone-slate used by curriers for giving a fine edge to their broad knives. 11. *Peruvian hone*, for sharpening large tools. 12. *Arkanzas stone*, from North America. 13. *Bohemian stones*—used by jewellers.

Turkey oil-stone is superior to every other substance as a whetstone; it will abrade the hardest steel, and is sufficiently compact to resist the pressure required for sharpening a graver. The black variety is somewhat harder than the white. These stones are imported from Turkey in irregular masses, seldom exceeding three inches square, and ten inches long, and are cut up by means of the lapidary's splitting-mill, and diamond powder, then rubbed smooth with sand or emery on an iron plate, inlaid in wood, and secured by glazier's putty. Sperm or neat's foot oil, or some oil which does not readily thicken, should be used with them. Oil-stone powder is used for grinding together the brass or gun-metal fittings of mathematical instruments, and also instead of pumice-stone for polishing superior brass-work.

The following analyses throw an interesting light on the nature of polishing stones:—

	Alumina.	Silica.	Lime.	Iron.	Water.	Magnesia.	Carbonic Acid.
Polishing slate	4·0	83·5	8·5	1·6	9·0	...	...
Do. do.	7·0	66·5	1·25	2·5	19·0	1·5	...
Bohemian stone	1·0	79·0	1·0	4·0	14·0	...	...
Turkey hone...	3·33	72·0	13·33	...	...	...	10·33

(C. T.)

HONE, William, the author of the *Year Book*, *Every-Day Book*, &c., was the son of a dissenting minister of Bath, where he was born in 1780. Abandoning the law, to which he was originally trained, he began business as a bookseller and publisher, and acquired a great name by his vindication of popular rights in a newspaper which he edited under the title of the *Reformist Register*. His popularity was greatly extended by his famous series of political satires called *The Political House that Jack built*, which ran through upwards of fifty editions, and contributed greatly to bring into disrepute the government of the day. Encouraged by his success, he next published a series of parodies of the liturgy, also directed against the ruling powers, who determined to prosecute him for blasphemy. His defence, which lasted for three days, was conducted by himself with a courage, temper, and ability that recalled the days of Horne Tooke, and resulted in a triumphant acquittal. His subsequent publications of the *Every-Day Book*, &c., forming a kind of calendar of popular English amusements, sports, pastimes, ceremonies, manners, customs, and events incident to every day in the year, though they rendered good service to an important department of literature, involved him in debt, and at last landed him in jail, where he remained for some time. Released by the kindness of some friends, he opened the Grasshopper Coffee-house; and to eke out his scanty means, published his *Year-Book*, which was equally unfortunate with its predecessor. Towards the close of his life a complete change took place in his religious views; and from having been a scoffer, and as nearly an atheist as a man can be, he became a humble and anxious Christian. One result of this change was his appointment to the sub-editorship of the *Patriot* newspaper, which office he held till his death in 1842. After his death his collection of pamphlets, believed to be the best private collection then extant in England, was sold and dispersed. An interesting account of his conversion was published in London in 1853.

HONFLEUR, a seaport-town of France, department of Calvados, and arrondissement of Port l'Evêque, on the southern shore of the estuary of the Seine, 8 miles S.E. of Havre, with which it has regular steam communication. The town is old and ill built. The harbour is accessible only at high water, and is chiefly frequented by fishing or small coasting craft. The herring, mackerel, and whiting fisheries are actively prosecuted; and numerous vessels sail annually for the cod, whale, and seal fisheries. Honfleur sends weekly to England about 7000 dozens of eggs, besides butter, fruit, &c. Its commerce, formerly considerable, has been almost entirely absorbed by Havre. The chief manufactures are hosiery, lace, chemical products, and hardware. There are also shipbuilding yards, ropewalks, and saw-mills. The chapel of Notre Dame de Grace, on the hill above the town, is much frequented by sailors, and filled with their votive offerings. Pop. 9580.

HONG KONG, a small island, now a British colony, lying off the coast of China, at the mouth of the Canton River, about 40 miles E. of Macao, in N. Lat. 22. 16. 30, E. Long. 114. 14. 45. It is about 9 miles in length by 8 in breadth, and is separated from the mainland by a narrow strait varying from less than a mile to 4 or 5 miles in width. The appearance of the island is barren and unprepossessing. It consists for the most part of ranges of rocky hills, rising sometimes to the height of 1700 or 1800 feet above the sea. The highest peak is 1825 feet in height. There are no trees of any size on the island, and few valleys of any extent. The rocks of Hong Kong consist of granite intermixed with quartz, mica, and felspar, affording excellent materials for building. Among the vegetable productions of the island are mango, lichee, longan, orange, pear, rice, sweet potatoes, and yams. A small quantity of flax is grown, and prepared for household uses by the villagers. Since the occupation of the island by the English the potato of Europe and the fruits of Canton and Macao have been introduced, and lately many European seeds have been sent out. The land tortoise, a few small deer, and armadillos, and several kinds of snakes, are found on the island.

The climate of Hong Kong, like that of Macao, is not generally unhealthy, though from the numerous deaths that occurred in 1842 and 1843, this was supposed to be the case. Subsequent years, however, have shown that the climate here is no more prejudicial to health than that of any of our other eastern tropical possessions.

Hong Kong was first ceded to Britain in January 1841, and again by the treaty of Nanking in August 1842. The government is administered by a governor, aided by an executive council of three members, including the commander of the troops. There is also a legislative council, presided over by the governor. The government offices are at Victoria. The following table exhibits the progress of Hong Kong from 1848 to 1853, inclusive:—

	Pop. exclusive of Troops.	Revenue.	Parliamentary Grant.	Expenditure.
1848	21,514	L.25,091	L.25,000	L.62,658
1849	29,507	23,617	25,000	38,286
1850	33,292	23,526	20,000	34,314
1851	32,983	23,721	15,500	34,115
1852	37,058	21,331	12,000	34,765
1853	39,017	24,700	9,200	36,418

With reference to these six years the governor remarks "that the call on the home government for parliamentary grant has been reduced from L.25,000 to L.8500 (L.9200?) for the current year; that the expenditure has been reduced from L.62,658 to L.36,418; that the number of square-rigged vessels frequenting the port has increased from 700 to 1103, while their tonnage is nearly double; and that the population has in like manner advanced 82 per cent. during the past six years. In conclusion, I have no hesitation in saying that were this colony taxed in the same way as are the settlements in the straits under the government of the East India Company, it could in a year or two be made to pay its own expenses without the efficiency of the government being impaired."

In 1844 the total population (consisting of Chinese) was 19,463; while on 31st December 1853, the Chinese population was 37,536; Europeans and Americans, 476; other races, 1005. In 1853, 1103 square-rigged vessels, carrying in all 447,053 tons, arrived in Victoria harbour. Of these vessels 201 imported, and 154 exported goods into and from the colony, being an increase over 1852 of 74 and 79 vessels respectively; while the total tonnage of vessels arrived as compared with the preceding year shows an increase of 13,670 tons.

HONITON, a municipal and parliamentary borough and market-town of England, county of Devon, near the left bank of the Otter, 16 miles N.E. of Exeter. It consists of one wide and well-paved street, along which runs a small stream, supplying the town with water. The houses have generally a neat and respectable appearance, having been mostly built since the destructive fires of 1745 and 1765. The parish church, about half-a-mile from the town, was built by Courtenay, Bishop of Exeter, about 1482, and is remarkable for a curiously carved screen. A modern Gothic church stands in the centre of the town. It has a free grammar school, national school, hospital, and several charities. The serge manufacture was formerly extensively carried on here, but now its chief manufacture is "Honiton lace." Honiton is governed by a port-reeve, and returns two members to parliament. Pop. (1851) 3427.

HONOLULU, or Honoruru, the principal town of the Sandwich Islands, and the residence of the king, is situated on the S. side of the island of Woahoo, in N. Lat. 21. 18. 12., W. Long. 157. 55. It forms an entrepôt for European and Indian goods, whence they are re-shipped to America. It is also a general rendezvous of whaling vessels,—and sometimes 80 sail of them, each from 300 to 500 tons, are at anchor here together. In 1851, 446 merchant ships arrived at the port; in 1852, 235; and in 1853, 194. The imports in 1853 amounted to L.256,400, and the exports to L.56,320. Pop. about 7000.

HONORIUS, Flavius, son of Theodosius the Great, was born, probably at Constantinople, A.D. 384. His elder brother Arcadius was Emperor of the East, and in A.D. 395 Honorius himself came into possession of the West. Being only in his eleventh year, Stilicho, an able and ambitious general, was made guardian to the young prince. He fought the battles of the empire against the countless hordes of barbarians who now poured down from the north. In A.D. 398 Stilicho's daughter Maria was married to Honorius, but they were both mere children. The close of the century was marked by the efforts to destroy paganism within the empire. All temples, altars, and property of any kind, used in the service of paganism were ordered to be demolished. During the first years of the fifth century Stilicho was occupied in driving back the hordes of Alaric. The latter was routed on the Tanaro, and driven across the Alps. About A.D. 404 the cruel exhibitions of gladiators were suppressed in Rome. The frequent ravages committed by the Goths, Huns, Alans, and other tribes, induced Honorius to change the seat of government from Milan to the strong fortress of Ravenna. He had scarcely done so when Rhadagaisus appeared in Italy with several hundred thousand barbarians, ravaging all before them. They were ably met, however, and defeated by Stilicho at Fesulæ. Gaul was next ravaged by the barbarians, including Vandals, Sueves, and Alans; and Stilicho is suspected of having been concerned in instigating them to this step. Meanwhile great confusion was created in Britain. The troops revolted, and appointed successively three emperors. The last of these, named Constantine, passed into Gaul, and defeated the forces sent against him. Honorius now became suspicious of Stilicho. The emperor wished to marry Thermantea, Stilicho's other daughter (Maria being dead), but Stilicho objected. Moreover the empire of the East had devolved upon a child, and it was thought that Stilicho wished to get the guardianship of the East as he had had of the West. He and several other officers were seized and put to death. Whether Stilicho cherished any traitorous designs or not, it is certain that his death was an irreparable loss to the empire. Alaric now came and besieged Rome itself, A.D. 408. In the following year he took it, and appointed Attalus emperor. Shortly after Rome was plundered by Alaric. Constantine, the usurper, having surrendered on condition of having his life spared, Honorius broke faith, and had him put to death. Ataulphus, the successor of Alaric, married Placidia, the sister of Honorius, and made a treaty with Honorius. After the death of Ataulphus, Placidia was married to Constantine, the colleague of Honorius in the consulship. Honorius was thirteen times consul. He died of dropsy, A.D. 423, in the twenty-ninth year of his reign, at the age of thirty-nine.

Honorius I., the successor of Boniface V. to the see of Rome, was born in Campania, raised to the pontificate in A.D. 626, and died A.D. 638. The beginning of his pontificate was marked by the disturbances of the Welsh clergy, who resisted both the pretensions of the Bishop of Rome, and the erection of Canterbury and York into archbishoprics. Honorius has been accused of inclining towards the heresy of the Monothelites. The justice of the allegation has been denied by Baronius and others. Still the opinion that Honorius held on the subject was pronounced heresy in the 6th Council of Constantinople, A.D. 680. The existing letters of Honorius to Sergius, the patriarch of Constantinople, indicate a leaning towards Monothelism—*i.e.*, the doctrine that our Lord had only a single will; yet Honorius was not disposed to press the question so as to raise discussion.

Honorius II. was born in the county of Bologna, and raised to the see of Rome A.D. 1124. He had been elected Bishop of Ostia by Pope Pascal. His name was Lambert de Fagnan. His elevation was opposed by the partizans of Tebald, who had been elected and invested with the pontifical robes. Tebald, however, withdrew when he saw a tumult arising. Honorius in effect, did the same, but was again invested by the cardinals. A dispute arose between Honorius and Roger Count of Sicily; and Robert Prince of Capua was induced by Honorius to oppose him, but Roger came off victorious. Honorius was no more successful in his interference with the Bishop of Paris. The bishop, wishing to introduce some reform, was opposed by the clergy and the king, Louis VI. The bishop put the royal lands under interdict. At first Honorius annulled the acts of the bishop; but owing to the powerful assistance of St Bernard, who supported the bishop, Honorius withdrew his opposition. He died A.D. 1130.

Honorius III., successor to Innocent III., was elected Pope A.D. 1216. His name was Cencio Savelli. He began at once to take part in the affairs of the East and the West. He assured the king of Jerusalem of his willingness to support the crusades. He wrote to the French bishops to kindle the ardour of the pilgrims, and promised the Emperor of the East his co-operation in subduing schism. He took part in the election of Peter of Courtenay, and crowned him Emperor of the West. Honorius was very anxious to organize a crusade to the Holy Land. Frederick II. was crowned for the express purpose of undertaking one, and promised, upon oath, to be ready in two years. But great difficulties were encountered, owing to the disturbed state of Europe. Spain and Portugal were devastated by the Moors, as well as by the wars of succession between the Houses of Castille and Leon. In the south of France there was already a crusade against the Albigenses; and differences existed between the House of Montfort and the Counts of Toulouse. Honorius died A.D. 1227, in the eleventh year of his pontificate, and without accomplishing anything important.

Honorius IV. succeeded Martin IV. in the Papal chair in A.D. 1285. His name was Giacomo Savelli. Having the gout both in his hands and feet, he is said to have required the help of instruments in celebrating mass. He induced Philippe-le-Hardi to wage war against Pedro of Aragon, who held Charles II. of Sicily in prison, but without succeeding. He died A.D. 1287.

HONOUR, Legion of, an order instituted (3d June 1802) by Napoleon I., when first consul, for civil and military merit. See France, § xiii.

HONOURABLE, a title conferred on the younger sons of earls, and on all the children of viscounts and barons. It is also conferred on persons holding certain situations of trust and dignity, such as the maids of honour to the Queen, &c., and to members of certain public bodies, as the House of Commons, East India Company, &c. The title of Right Honourable is given to all peers and peeresses of the United Kingdom; to the eldest sons and all the daughters of peers above the rank of viscount; to all privy councillors; and to various civic functionaries in the different capitals of the kingdom.

HOOD, Robin, a celebrated outlaw, who lived in the reign of Richard I., about the close of the twelfth and beginning of the thirteenth century. He dwelt principally in Sherwood Forest, in Nottinghamshire. At the period during which Robin Hood performed his exploits the forest laws were enforced with great rigour by the Norman kings; and, as a consequence, numbers fled to solitudes and natural strongholds. Having a common interest, they banded together; and by their acquaintance with unfrequented localities they were able to elude the vigilance of pursuers, as well as at times to present a bold front even to a numerous enemy. Stow mentions that Robin Hood had a hundred companions, able-bodied men, and skilful archers, who were so formidable that four hundred would not attack them. But Robin pursued a certain system in his robberies. He

Hood, Samuel.

spared the poor, and plundered the rich. Stow says, "He suffered no woman to be oppressed, violated, or otherwise molested. Poor men's goods he spared, *abundantly relieving them with that which by theft he got from abbeys and rich old carles.*" Hence it is not wonderful that Robin became a very great favourite with the lower classes of people. His exploits have been celebrated from early times in great numbers of popular ballads, setting forth his courage, strength, skill in deer-hunting, chivalry towards the fair sex, and humanity towards his poorer neighbours. The poems, songs, and ballads relating to him have been brought together in Ritson's *Robin Hood Collection*, 8vo, 1795, London. Not much can be gathered regarding Robin Hood's real history from these poems, many of them being written long after his time. He appears to have been a yeoman, though Ritson gives some credit to the epitaph at Kirklees in Yorkshire, which represented him as an earl of Huntingdon. As to the MS. in the *Sloane Collection*, which speaks of Robin as an earl, the question is at once raised regarding the antiquity and value of the MS., which probably belongs to a period long subsequent to Robin Hood. Of his companions Little John and Friar Tuck, his chaplain, were the most notable. Robin is said to have been bled to death by a nun, near Kirklees, A.D. 1247. See Ritson's *Robin Hood Collection*, and Percy's *Reliques of Ancient English Poetry.*

Hood, *Samuel*, better known as *Viscount Hood*, belonged to a family of which several members have earned a lasting name in the naval annals of England. He was born in 1724 at Butley, in Somersetshire, of which parish his father was rector. Entering the navy at an early age, he passed rapidly through the inferior grades, and in 1757 was made captain of the Antelope, a 50-gun ship, with which he captured a French ship of equal size. After serving in the Mediterranean and on the American coast with such distinction as to earn a baronetcy, he was sent in 1780 to the West Indies to co-operate with Sir George Rodney, and while there fought some indecisive actions with the Comte de Grasse. In the course of the American War he again engaged that commander off the mouth of the Chesapeak, and with a similar result. In the actions of the 9th and 12th April, which followed the capture of the island of St Christopher by the French, Hood had the brunt of the battle to bear, and distinguished himself so much that he was created a peer of Ireland with the title of Baron Hood of Catherington; and on Rodney's return home was promoted to the chief command, which he held till peace was proclaimed in 1783. When the war of the French Revolution broke out Hood was sent to the Mediterranean, where the royalists in Toulon received him with open arms, and surrendered that city to his care. When the republicans, under the command of Napoleon, were on the point of regaining possession of the city, Hood destroyed the arsenal, and burned fifteen sail of the line, besides carrying off eight; and in the following year signalized himself by expelling the French from Corsica. Soon after this exploit he returned home, and was rewarded for his numerous services with the governorship of Greenwich Hospital, an English peerage with the title of Viscount Hood of Whitley, and finally with the Grand Cross of the Bath. He was in his ninety-second year when he died at Bath, June 27, 1816. In Viscount Hood were combined the finest qualities of the English sailor. He certainly had not the genius of Blake or Nelson; but among the men of talent who have contributed to raise the British navy to its present pre-eminence, few stand higher than he. To great nautical skill he joined high courage, a prompt decision of movement, and a sagacity of judgment that won the confidence of the nation as well as of the fleet. With all his daring he was cautious enough to avoid risking his ships or men unless the prize were a very tempting one, or unless, with the means at his command, he felt himself justified in trying to secure it.—The career of Lord Hood's younger brother Alexander, afterwards Viscount Bridport, was very similar to his own. Passing rapidly through the lower grades of the service, he rose to be second in command of the fleet which was sent out in 1782 under Lord Howe to relieve Gibraltar. In that commander's great victory with the Channel fleet on June 1, 1794, Hood was again his second in command, and contributed greatly to the successful result of the action. In the following year, while enjoying an independent command, he encountered a French fleet off L'Orient, and took three sail of the line. When Lord Howe retired from the service Hood succeeded him in the command of the Channel fleet, which he retained till 1800. In 1801, his numerous and valuable services were rewarded with an English peerage under the title of Viscount Bridport. He died at Bath in 1814.—Hardly less distinguished than either of the above was their cousin Sir Samuel Hood, who earned his laurels at Toulon, Corsica, and the Nile. In 1806 he greatly signalized himself by the capture of three French frigates in an action off Rochefort, for which exploit he was rewarded with the Order of the Bath. Soon after the battle of Copenhagen, in which he took part, he was promoted to the highest naval command in India, where he died in 1814. To the remarkable nautical talents that seemed hereditary in the family to which he belonged, he superadded a great knowledge of science, of which he was an arduous student.

Hood, Thomas.

Hood, *Thomas*, humourist and poet, born 1789, the son of Mr Hood, bookseller, of the firm of Vernor and Hood, a man of intelligence, and the author of two novels. "Next to being a citizen of the world," writes Thomas Hood in his *Literary Reminiscences*, "it must be the best thing to be born a citizen of the world's greatest city." The best incident of his boyhood was his instruction by a schoolmaster who appreciated his talents, and, as he says, "made him feel it impossible not to take an interest in learning while he seemed so interested in teaching." Under the care of this "decayed dominie," whom he has so affectionately recorded, he earned a few guineas—his first literary fee—by revising for the press a new edition of *Paul and Virginia.* Admitted soon after into the counting-house of a friend of his family, he "turned his stool into a Pegasus on three legs, every foot, of course, being a dactyl or a spondee;" but the uncongenial profession affected his health, which was never strong, and he was transferred to the care of a relation at Dundee. He has graphically described his unconditional rejection by this inhospitable personage, and the circumstances under which he found himself in a strange town without an acquaintance, with the most sympathetic nature, anxious for intellectual and moral culture, but without guidance, instruction, or control. This self-dependence, however, suited the originality of his character: he became a large and indiscriminate reader, and before long contributed humorous and poetical articles to the provincial newspapers and magazines. As a proof of the seriousness with which he regarded the literary vocation, it may be mentioned that he used to write out his poems in printed characters, believing that that process best enabled him to understand his own peculiarities and faults, and probably unconscious that Coleridge had recommended some such method of criticism when he said he thought "print settles it."

His modest judgment of his own abilities, however, deterred him from literature as a profession, and on his return to London he applied himself assiduously to the art of engraving, in which he acquired a skill that in after years became a most valuable assistant to his literary labours, and enabled him to illustrate his various humours and fancies by a profusion of quaint devices, which not only repeated to the eye the impressions of the text, but, by suggesting amusing analogies and contrasts, added considerably to the sense and effect of the work.

In 1821 Mr John Scott, the editor of the *London Magazine*, was killed in a duel, and that periodical passed into the hands of some friends of Mr Hood, who proposed to him to take a part in its publication. His installation into this congenial post at once introduced him to the best literary society of the time; and in becoming the associate of such men as Charles Lamb, Cary, De Quincy, Allan Cunningham, Proctor, Talfourd, Hartley Coleridge, the peasant-poet Clare, and other contributors to that remarkable miscellany, he gradually developed his own intellectual powers, and enjoyed that happy intercourse with superior minds for which his cordial and genial character was so well adapted, and which he has described in his best manner in several chapters of *Hood's Own*. *Odes and Addresses*—his first work—were written about this time, in conjunction with his brother-in-law Mr J. H. Reynolds, the friend of Keats; and it is agreeable to find Sir Walter Scott acknowledging the gift of the work with no formal expressions of gratification, but "wishing the unknown author good health, good fortune, and whatever other good things can best support and encourage his lively vein of inoffensive and humorous satire." *Whims and Oddities*, *National Tales*, *Tylney Hall*, a novel, *The Plea of the Midsummer Fairies*, followed. In these works the humorous faculty not only predominated, but expressed itself with a freshness, originality and power, which the poetical element could not claim. There was much true poetry in the verse, and much sound sense and keen observation in the prose of these works; but the poetical feeling and lyrical facility of the one, and the more solid qualities of the other, seemed best employed when they were subservient to his rapid wit, and to the ingenious coruscations of his fancy. This impression was confirmed by the series of the *Comic Annual*, a kind of publication at that time popular, which Mr Hood undertook and continued, almost unassisted, for several years. Under that somewhat frivolous title he treated all the leading events of the day in a fine spirit of caricature, entirely free from grossness and vulgarity, without a trait of personal malice, and with an under-current of true sympathy and honest purpose that will preserve these papers, like the sketches of Hogarth, long after the events and manners they illustrate have passed from the minds of men. But just as the agreeable jester rose into the earnest satirist, one of the most striking peculiarities of his style became a more manifest defect. The attention of the reader was distracted, and his good taste annoyed, by the incessant play upon words, of which Hood had written in his own vindication,—

> "However critics may take offence,
> A double meaning has double sense."

Now it is true that the critic must be unconscious of some of the subtlest charms and nicest delicacies of language, and which would exclude from humorous writing all those impressions and surprises which depend on the use of the diverse sense of words. The history, indeed, of many a word lies hid in its equivocal uses; and it in no way derogates from the dignity of the highest poetry to gain strength and variety from the ingenious application of the same sounds to different senses, any more than from the contrivances of rhythm or the accompaniment of imitative sounds. But when this habit becomes the characteristic of any wit, it is impossible to prevent it from degenerating into occasional buffoonery, and from supplying a cheap and ready resource, whenever the true vein of humour becomes thin or rare. Artists have been known to have used the left hand in the hope of checking the fatal facility which practice had conferred on the right; and if Mr Hood had been able to place under some restraint the curious and complex machinery of words and syllables which his fancy was incessantly producing, his style would have been a great gainer, and much real earnestness of object, which now lies confused by the brilliant kaleidoscope of language, would have remained definite and clear. He was probably not unconscious of this danger; for, as he gained experience as a writer, his diction became more simple, and his ludicrous illustrations less frequent. In another annual called the *Gem* appeared the poem on the story of "Eugene Aram," which first manifested the full extent of that poetical vigour which seemed to advance just in proportion as his physical health declined. He started a magazine in his own name, for which he secured the assistance of many literary men of reputation and authority, but which was mainly sustained by his own intellectual activity. From a sick-bed, from which he never rose, he conducted this work with surprising energy, and there composed those poems, too few in number, but immortal in the English language, such as the "Song of the Shirt," the "Bridge of Sighs," and the "Song of the Labourer," which seized the deep human interests of the time, and transported them from the ground of social philosophy into the loftier domain of the imagination. They are no clamorous expressions of anger at the discrepancies and contrasts of humanity, but plain, solemn pictures of conditions of life, which neither the politician nor the moralist can deny to exist, and which they are imperatively called upon to remedy. Woman, in her wasted life, in her hurried death, here stands appealing to the society that degrades her, with a combination of eloquence and poetry, of forms of art at once instantaneous and permanent, and with a metrical energy and variety of which perhaps our language alone is capable. Prolonged illness brought on straitened circumstances; and application was made to Sir Robert Peel to place Mr Hood's name on the pension list, with which the British state so moderately rewards the national services of literary men. This was done without delay, and the pension was continued to his wife and family after his death, which occurred on the 3d of May 1845. Nine years after, a monument, raised by public subscription, in the cemetery of Kensal Green, was inaugurated with a concourse of spectators that showed how well the memory of the poet stood the test of time. Artizans came from a great distance to view and honour the image of the popular writer whose best efforts had been dedicated to the cause and the sufferings of the workers of the world; and literary men of all opinions gathered round the grave of one of their brethren whose writings were at once the delight of every boy, and the instruction of every man, who read them. Happy the humorist whose works and life are an illustration of the great moral truth that the sense of humour is the just balance of all the faculties of man, the best security against the pride of knowledge and the conceits of the imagination, the strongest inducement to submit with a wise and pious patience to the vicissitudes of human existence. This was the lesson that Thomas Hood left behind him, and which the people of this country will not easily forget. (R. M. M.)

HOOFFT, Peter Cornelius, an eminent Dutch poet and historian, and, with his great contemporary Vondel, the real founder of the Dutch stage, was born in 1581, at Amsterdam, of which city his father was burgomaster. After finishing his education at Leyden, he spent three years in foreign travelling, chiefly in France, Germany, and Italy. In the latter country in particular he devoted much time to the study of the mechanism of verse, which he mastered so thoroughly that his drama of *Granida*, published soon after his return home in 1601, is reckoned to this day one of the masterpieces of Danish literature, both for the harmony of its rhythm and the graceful elegance of its diction. In 1609 Hoofft was appointed *drossard* of Muiden, a village about 5 miles from Amsterdam, where he spent the remainder of his life. During the whole of this period his house was the rendezvous of all the cultivators of polite letters in Holland, who were attracted to it both by the literary renown and the great social and moral worth of the host. Hoofft was twice married, and on both occasions very happily. His first wife died in 1624; his second survived him.

Unlike most writers, Hoofft's fame is twofold. His merits as a historian and prose-writer are nowise inferior to his merits as a poet; and the services which he rendered to the prose literature of his country are both in kind and in degree as memorable as those which he rendered to the poetical. His *History of Holland*, one of the earliest, remains to this day one of the best of the Dutch classics, and is proudly pointed to by the countrymen of the author as a model of grace, purity, and vigour, both of thought and style. Hoofft displays most originality, however, in his *Minnedigte*, a collection of miscellaneous pieces in the style of Anacreon, whose grace, lightness, and fancy, have been very happily caught. In this vein he is still without a rival in Holland, unless perhaps Poot may claim the honour of that title. Hoofft died May 21, 1647, at the Hague, whither he had gone to attend the funeral rites of the Stadtholder Frederic Henry.

HOOGEVEEN, Heinrich, a Dutch scholar and philologer of considerable note, was born at Leyden in 1712. His parents, who were miserably poor, were hardly able to send him to the school of his native town, and when at length they procured the means their son made at first little or no progress in his studies, chiefly, it was believed, through the severity of his teacher. A change of masters, however, developed his latent abilities, and he soon distinguished himself so much that at the early age of twenty he was made co-rector of the school of Gorcum. In the following year he was called to organize the gymnasium of Woerden, which, despite his youth, he brought to a high state of prosperity. From Woerden he was transferred to Breda, and from Breda to Dordrecht, and at length found a permanent abode in Delft, where he died in 1791. His best work is a treatise on the *Greek Particles*, Leyden, 1769 (of which an excellent abridgment was published by Schütz, Leipzig, 1806), and his edition of Vigiers' work on *Greek Idioms*, which has been several times reprinted. Hoogeveen also wrote a large number of odes and elegies in Latin, in which kind of composition he had great facility and no mean talent. None of these works, however, display either high scholarship or very refined taste. Perhaps his most useful contribution to literature in his *Dictionarium Analogicum Linguæ Græcæ*, published at Cambridge in 1800. The value of this Lexicon is that all Greek words with the same termination follow each other in alphabetical order according to their final letters—a very convenient arrangement for conveniently tracing etymological analogies.

HOOGHLY, an extensive district in the province of Bengal, formerly called Saatgong, situated principally between the 22d and 23d degrees of north latitude, and extending a considerable distance along the right bank of the River Hooghly. It is bounded on the N. by the district of Burdwan, on the S. by the district of Hidjelee, on the E. by the River Hooghly, and on the W. by Midnapoor. This district consists of low flat land, very fertile; but that part which is nearest to the sea is very thinly inhabited; it is called the Sunderbund, is swampy, covered with wood, and remarkably unhealthy. It is intersected in every direction by rivers and their branches, which afford great facilities for internal navigation. Along the shores of the ocean salt of an excellent quality is manufactured on account of the government. The area, according to official return, is 2089 square miles. The population is given at 1,520,840, an amount which, compared with the area, indicates an extraordinary density of 728 to the square mile, and it is nevertheless considered that the numbers of the people are steadily on the increase. The French settlement of Chandernagore is situate within the limits of the district, as are also Chinsura and Serampore, now British possessions, but formerly belonging the first to the Dutch and the latter to the Danes. The right of the East India Company to the district originated in the treaty concluded with Meer Cossin in 1760.

Hooghly, an ancient, and formerly a large town in the province of Bengal, situated on the western bank of the Hooghly, nearly 26 miles above Calcutta, and supposed to have been founded by the Portuguese about the year 1538. During the Mogul government, it was a town of great consequence, being the port of the western arm of the Ganges, where the duties on merchandise were collected. It very soon drew away all the trade from Saatgong, which had been before the government port of Bengal. During the prevalence of the Portuguese dominion in India, Hooghly was fortified, and continued to flourish till the year 1632, when it was attacked by order of the Emperor Shah Jehan, and, after a siege of three months and a half, was taken by the Mogul troops, 1000 of the Portuguese being killed, and 4400 men, women, and children taken prisoners. From this period Hooghly became the imperial port. All the officers of the government were ordered to remove thither, and it was placed under the jurisdiction of a special governor. In the year 1676 the English, and soon afterwards the Dutch, obtained the permission of the native government to erect factories. After this period, every encouragment was given to commerce; and Hooghly, which was called Bukhshy Bunder, became a great commercial emporium between Europe, Persia, Arabia, and India. In 1686 hostilities commenced between the English and the Nawaub. An action ensued, in which the Nawaub's troops were defeated; and at the same time the town of Hooghly was cannonaded, and five hundred houses burned. In 1700 the East India Company's factory was transferred from Hooghly to Calcutta. The population of Hooghly is now estimated at 12,000. The town is situate on the line of railroad recently constructed from Calcutta to Burdwan. E. Long. 88. 22., N. Lat. 22. 54.

Hooghly *River*, properly the Bhagirutty, a river of Bengal, formed by the junction of the two westernmost branches of the Ganges, the Cossimbazar, and the Jellinghy. This is the port of Calcutta, being the only branch of the Ganges that is navigated by large vessels; yet the entrance to the river is rendered extremely dangerous and difficult, by reason of numerous sandbanks in it, which are frequently shifting. There is indeed a rumour afloat that the river is gradually silting up, and must eventually cease to be navigable. This would prove a fearful blow to the trade of Calcutta, and the proposed remedy is to connect the River Mutwal with the capital by railway or ship canal. During the prevalence of the S.W. monsoon, when a strong current sets in from the Bay of Bengal, the extraordinary phenomenon, termed by Europeans the "Bore," occasionally presents itself. It rises in waves 12 or 15 feet high, and rushes on at the rate of 20 miles an hour. It commences at Hooghly Point, where the river first contracts itself, and is perceptible above Hooghly town; and though the distance is above 70 miles, it traverses this space in about four hours, running along the opposite bank to the Calcutta side, whence it crosses at Chitpoor, about 4 miles above Fort William, and rushes with great violence past Barnagore, Duckingsore, &c., frequently oversetting boats and driving ships from their anchorage. At Calcutta it sometimes occasions an instantaneous rise of 5 feet. The tide does not rise more than 30 miles above Calcutta; and during the rainy season its influence is checked by the large body of water that comes down the river. The Hooghly contains several kinds of good fish, particularly *Ciprinus Anjana*, the mango fish, or *Polynemus paradoxus*, and prawns; and it abounds also in crocodiles and sharks. It is about three-quarters of a mile broad at Calcutta, and 8 or 10 miles wide at the mouth. It is only navigable for ships as high as the tide reaches, and the upper part of it is nearly dry during the hot season; yet there are few rivers that can boast of a more extensive commerce, its banks being studded with numerous towns and villages. It is esteemed by the Hindus to be the most sacred branch of the Ganges, and it is on this account that those who cannot afford to bury their dead throw them into the Hooghly.

HOOK, Theodore Edward, the son of James Hook, a musical composer of some merit, was born in London in 1788. At a too early age, and after a very flimsy education, he began life without a profession or definite views of any kind. While a mere boy he wrote a good many trashy farces and burlesques for the theatres; but the temporary success of a few of them tempted him to devote his life to authorship. He soon became better known, however, from his convivial talents, which floated him into the aristocratic society of London. There he frittered away in clever improvisations and other forms of social debauchery, talents that might have gained for him a respectable position in English literature. His inexhaustible wit, his daring practical jokes, his amazing power of punning, and his musical skill, made him a great favourite with the Prince Regent, who, in 1812, sent him to the Mauritius as treasurer of that island. The whole of Hook's past career had in an eminent degree disqualified him for such an office, and at the end of five years he was brought back to England a prisoner, under a charge of embezzling some L.12,000 of the public money. Subsequent investigation induced the government to drop the criminal charge; and Hook, though he never denied that a large sum (L.9000) of the public money had been lost, through his carelessness and unthrift, never exerted himself to repay it. After his liberation from jail, where he spent some months while his case was under trial, he established the *John Bull* newspaper. This journal had at first a large sale, and again opened to its editor a door into the world of fashion, where, as before, he shone with a fatal brilliancy. In the attempt to turn his social advantages to account, he wrote a number of novels of what has been called "the silver fork school," which was for a time the fashion. But gambling, hard living, and the strain of incessant writing, made the gay and sparkling wit one of the unhappiest men in England during the latter years of his life, and at the time of his death in 1841 he was utterly broken in mind, body, and estate. Some of his best novels, such as his *Sayings and Doings*, in three series, *Gilbert Gurney*, and *Jack Brag*, still find admirers among a certain class of readers, but their interest is entirely limited to the circles whose follies and fashions they describe.

HOOKAH, an oriental pipe used chiefly in Turkey, by which the smoke of the tobacco is made to pass through water in order to cool it and render it more grateful to the mouth.

HOOKE, Nathaniel, the author of a *History of Rome*, was born in Ireland, but in what year is unknown. His Roman History embraces the period extending from the foundation of the city to the time of Augustus. It was published in 4 vols. 4to, at intervals of nearly forty years between the appearance of the first and last volumes. He had died before the publication of vols. 3 and 4. His work possesses the virtues of acuteness and clearness. In opposition to Middleton, he defended the cause of the Plebeians against the Patricians. Hooke was a zealous Catholic. When Pope was dying, a priest was brought to hear his confession and grant him absolution. This priest was brought by Hooke. He had been employed and well paid by the Duchess of Marlborough for assisting her in writing her memoirs, but he was so zealous in attempting to convert the Duchess to Catholicism that a quarrel was the consequence. He was one of the sufferers from the South Sea Bubble. Besides his *Roman History*, he wrote *Observations upon the Roman Senate*, 4to, 1758, in which he advocated and extended the political views propounded in his *History*. He also translated from the French the *Vie de Fénélon*, and Ramsay's *Voyages de Cyrus*. He died in July 1763.

Hooke, *Robert*, one of the most ingenious philosophers, was born July 18, 1635, at Freshwater, in the Isle of Wight. His father was a clergyman, and he himself was originally destined for the church, but his studies were interrupted by weakly health. His leisure hours were spent in devising mechanical contrivances, and his construction of a wooden clock was a premonition of one sphere in which he was to excel. In 1648 his father died. After having been some time with Lely the painter, he went to Westminster School, and was initiated in mathematics and the learned languages, including Hebrew. In 1653 he went to Christ's Church College, Oxford. He appears to have turned his attention somewhat eagerly towards devising a method by which men should be able to elevate themselves in the air like birds, but without success. In 1655 he became assistant to Dr Willis in chemistry, and soon afterwards to the Honourable Robert Boyle. To the latter he was very serviceable in constructing the air-pump. In 1664 Sir John Cutler founded a mechanic school, of which in the beginning of next year Hooke was made Curator of Experiments for life. In 1666 he produced a model for rebuilding London after the great fire, but however much it was approved of, it was not carried into execution. Hooke, however, was employed as one of the surveyors—a post which was very lucrative. In 1677, by the death of Mr Oldenburgh, the office of secretary to the Royal Society became vacant, and Hooke was appointed to it. In 1687, after the death of his niece, who had lived with him, he was overwhelmed with grief. It affected his temper as well as his spirits, and his moodiness was still farther increased by a chancery suit between him and Sir John Cutler. In 1691 a warrant from Archbishop Tillotson conferred on him the degree of doctor of physic. In 1696 the chancery suit was determined in his favour. He died at his lodgings at Gresham College, March 3, 1702, and was buried in St Helen's Church, Bishopsgate Street, his remains being followed to the grave by all the members of the Royal Society. Hooke was remarkably inventive, but being also ambitious and jealous, he laid claim to inventions which had been made independently of him; and, distrustful, he accused others of making known his discoveries to rivals. His personal appearance was mean, he being short of stature, crooked, lean, and pale. His lank brown hair he allowed to grow long, and to hang over his face. He was penurious; and his melancholy and meagre appearance were rendered worse by the late hours which he kept at night. He wrote *Sectiones Culterianæ; Micrographia; A Description of Helioscopes; A Description of some Mechanical Improvements of Lamps and Waterpoises;* and from his papers Richard Waller published posthumous works. For a statement of his near approach to the discovery of gravitation, his improvements in clock-making, and his claim to other discoveries, see Playfair's Dissertation.

HOOKER, John, also called *Vowell*, the uncle of the famous author of the *Ecclesiastical Polity*, was born at Exeter in 1524. He received a college education at Oxford, and afterwards travelled on the Continent. He studied law at Cologne, and divinity at Strasbourg under Peter Martyr. Returning to his native country, he was made chamberlain of Exeter, the first who ever enjoyed that honour. In 1571 he became member of parliament for the same place. Three years previously to this, he had been sent to Ireland, where also he was elected a member of parliament. He died A.D. 1601. His work, *The Order and Usage of Keeping of the Parliaments in England*, was written for the use of the Irish Parliament. Also, in regard to Irish affairs, he made numerous additions to Holingshed's *Chronicles*, of which an edition appeared in

1586. He wrote a description of Exeter, a catalogue of its bishops, and an account of the duties, &c., of every sworn officer in it. He wrote also a work, *The Events of Comets, or Blazing Stars, made upon the sight of the Comet Pagonia*, a comet which appeared in 1577.

Hooker, *Richard*, the author of the *Ecclesiastical Polity*, was born in 1553 or 1554 at Heavy-tree, near Exeter, in the county of Devon. At the school of his native town he gave such assurance of "pregnant parts" that his teacher, taking an interest in his destiny, persuaded his uncle, John Hooker, a wealthy man, and the chamberlain of Exeter, to supply him with the means of completing his education at the university. A small allowance from this relative, a little similar aid from the famous John Jewel, Bishop of Salisbury, and a clerkship in Corpus Christi College, carried the young student comfortably through his academic career at Oxford. In 1573 he was admitted one of the twenty scholars of the Foundation, and four years later a fellow of the college. In 1579 he was appointed Hebrew lecturer to the university; but after discharging the duties of this office for three months, he, along with four other fellows of his college, was expelled by the vice-president. The grounds for this tyrannical act are unknown; but they must have been quite untenable, for in less than a month the ejected members were all restored. After an interval of three years Hooker took orders, and was appointed to preach at St Paul's Cross, London. On reaching the metropolis he repaired to the house of a Mr Churchman. This man's wife succeeded in persuading the young divine that "he was a man of a tender constitution; and that it was best for him to have a wife that might prove a nurse to him—such a one as might both prolong his life, and make it more comfortable; and such a one she could and would provide for him if he thought fit to marry." The guileless and unsuspecting minister agreed to abide by her choice, which fell upon her own daughter, Joan; and in the following year Hooker married her, "though," as Walton says, "she brought him neither beauty nor portion, and though her conditions were too like that wife's which is by Solomon compared to a dripping-house." She turned out a "silly, clownish woman, and withal a mere Xantippe." In 1584, on resigning his fellowship after his marriage, he was appointed to the living of Drayton-Beauchamp, in Buckinghamshire. During his incumbency of that parish two of his old pupils, Edwin Sandys and George Cranmer, took a journey to see their tutor. They found him, as old Izaak says, "with a book in his hand—it was the Odes of Horace—he being then, like humble and innocent Abel, tending his small allotment of sheep in a common field, which he told his pupils he was forced to do then, for that his servant was gone home to dine and assist his wife to do some necessary household business. But when his servant returned and released him, then his two pupils attended him unto his house, where their best entertainment was his quiet company, which was presently denied them; for *Richard was called to rock the cradle;* and the rest of their welcome was so like this, that they staid but till next morning, which was time enough to discover and pity their tutor's condition; and they having in that time rejoiced in the remembrance, and then paraphrased on many of the innocent recreations of their younger days, and other like diversions, and thereby given him as much present comfort as they were able, they were forced to leave him to the company of his wife Joan, and seek themselves a quieter lodging for next night. But at their parting from him, Mr Cranmer said, "Good tutor, I am sorry your lot is fallen in no better ground as to your parsonage; and more sorry that your wife proves not a more comfortable companion, after you have wearied yourself in your restless studies." To whom the good man replied, "My dear George, if saints have usually a double share in the miseries of this life, I that am none, ought not to repine at what my wise Creator hath appointed for me; but labour—as indeed I do daily—to submit mine to his will, and possess my soul in patience and peace." The Edwin Sandys here mentioned was a son of the Archbishop of York, and through the influence of this prelate Hooker was, in 1585, promoted to the mastership of the Temple in London, being then in his thirty-fourth year. On entering upon the duties of his new office he found that the afternoon lectureship was held by Walter Travers, a man of learning, ability, and personal worth, who had been ordained by the Presbytery of Antwerp, and was a vehement upholder of many of the doctrines of Calvin. These he advocated in his evening sermons; and in his zeal for their promotion carried on a warm correspondence with the leading reformers in Scotland and Geneva. Hooker, whose attachment to the English Church was no less ardent and sincere, soon found himself, much against his will, involved in a controversy with his colleague, giving occasion to a wit to observe that "the forenoon sermons spoke Canterbury, and the afternoon Geneva." The controversy at length threatened such evil consequences, that an interdict was laid on Traver's preaching by Archbishop Whitgift. Travers appealed, and petitioned the Privy Council, but without success. He then published his petition, and found many powerful adherents both in the Temple and elsewhere. Hooker made an able reply, which made him many friends among the upholders of the establishment; but "that he might unbeguile and win those of Mr Traver's judgment, he designed to write a sober deliberate treatise of the Church's power to make canons for the use of ceremonies, and by law to impose an obedience to them, as upon her children; and this he proposed to do in *Eight Books of the Laws of Ecclesiastical Polity*. To carry out this great plan in the peace and quiet which he could not find in the city, he begged to be translated to some country parsonage, and in 1591 was appointed to the living of Boscum, or Boscombe, in the diocese of Sarum in Wiltshire. In this rural retreat he completed the first four books of his *Ecclesiastical Polity*, which he published in 1594. In the following year he was transferred from Boscombe to Bishop's Bourne, near Canterbury, in Kent, where he remained till his death, Nov. 2, 1600. A few days before his death his house was broken into and robbed. When informed of the fact he only asked, "Are my books and written papers safe?" Being told that they were, he merely replied, "Then it matters not; for no other loss can trouble me." He lived to see the fifth book of his *Polity* through the press, but the remaining three were not published till 1647—nearly half a century after the author's death. In his personal character Hooker was one of the most amiable men whose names adorn the annals of the national church. Even in his youth he was remarked for the grave calmness and dignified modesty of his demeanour. The genuine mildness of his temper was proved in his controversy with the Nonconformists. His resigned and humble piety was memorable in an age that had many bright examples of that virtue to boast of.

Hooker's *Ecclesiastical Polity* marks an era in the history of English literature, to which he rendered services that have been amply acknowledged by critics of all shades of religious belief. Its literary merits are attested by Hallam, who says, that "Hooker not only opened the mine but explored the depths of our native eloquence. So stately and graceful is the march of his periods, so various the fall of his musical cadences upon the ear, so rich in images, so condensed in sentences, so grave and noble his diction, so little is there of vulgarity in his racy idiom, of pedantry in his learned phrase, that I know not whether any later writer has more admirably displayed the capacities of our language, or produced more passages worthy of comparison with the splendid monuments of antiquity. If we compare the first book of the *Ecclesiastical Polity* with what perhaps bears most resemblance to it of anything extant, the treatise of Cicero, *De Legibus*, it will appear somewhat perhaps inferior, through the imperfection of our language, which with all its force and dignity does not equal the Latin in either of these qualities, and certainly more tedious and diffuse in some of its reasonings, but by no means less high-toned in sentiment or less bright in fancy, and far more comprehensive and profound in the foundations of its philosophy." The substance of Hooker's argument is given under the head Episcopacy.

HOOLE, John, the translator of the *Gierusalemme Liberata* of Tasso, was born at Moorfields in 1727. His father intended him to follow the trade of watchmaking, but his being short-sighted was an insuperable objection. At the age of seventeen he became a clerk in the accountant's department in the East India House. He occupied his leisure time in learning Italian in order to read in the original the *Orlando Furioso* of Ariosto, Harrington's translation of which had greatly pleased him. His next step was to begin the work of translating. He commenced the *Jerusalem Delivered* in 1758. It was published with a dedication to the queen by Dr Johnson, in 1773. It is characterized by elegance and correctness, but exhibits little of the true genius of poetry. The *Orlando Furioso* was published in 5 vols. 8vo, 1773-1783. In the meantime he had become an auditor of accounts in the East India Company, an employment which took up much of his time. In 1792 he published *Rinaldo*, an early work of Tasso's. His translation of Metastasio's dramas and other poems display more spirit and variety. He composed some dramas for the stage, viz., *Cyrus*, 1768; *Timanthes*, 1770; and *Cleonice*, 1775. These were not successful. Hoole died at Dorking in 1813.

HOOPER, John, an English martyr, was born in Somersetshire, towards the close of the fifteenth century. He was educated at Oxford, where he took his degree of bachelor of arts in 1518. After becoming a Cistercian monk, he returned to Oxford, where the works of the continental reformer, in conjunction with the Holy Scriptures, opened his eyes to the errors of Popery. In 1539 he became chaplain to Sir John Arundel, but his leaning towards the principles of the reformers being discovered, he fled to France. Returning to England, he was again discovered, and escaped to Ireland, disguised as a sailor. From Ireland he again went to the Continent, and remained in Switzerland till Edward VI. ascended the throne in 1547. In 1550 he was consecrated Bishop of Gloucester, but his repugnance to using the robes of the bishops, which he considered relics of Popery, kept him back for some time from entering upon his episcopal duties. He was even committed to prison for non-compliance. In 1552 he was created Bishop of Worcester *in commendam*. In 1553, upon the accession of Queen Mary, he was seized and put in the Fleet. Upon examination he refused to recant his opinions, and was condemned to the flames. The sentence was executed in the beginning of 1555, when Hooper was in the 60th year of his age. He was zealous in the discharge of his sacred duties, and was a popular preacher. He wrote extensively on the controverted subjects of the day, and suffered martyrdom with great Christian fortitude.

HOOPING-COUGH, Chin-Cough or Kink-Cough (*Pertussis*), the *Coqueluche* of the French, is a disease to which children are liable, characterized by the presence of a strangulating convulsive cough, interspersed with a peculiar crowing sound or whoop, which cough returns at uncertain intervals in fits or paroxysms that usually pass off by vomiting. The disease appears to be contagious, and usually occurs but once during life; but if the child should within a year or so be affected with a bronchitic attack, the attending cough is very liable to assume a form resembling the convulsive paroxysms of this disease.

Hooping-cough begins exactly like a common cold, being usually attended with slight febrile symptoms and a cough. The true character of the malady may, however, be suspected if it is observed that the fits of coughing are most frequent and of longest duration during the night. It is not, however, till the cough has continued from a fortnight to three weeks that it assumes the true convulsive character, comes on in irresistible fits, and is attended with that peculiar prolonged crowing inspiration which characterizes the disease. The fits usually end in vomiting, or in the expectoration of a small quantity of mucous secretion.

Hooping-cough is a dangerous and fatal malady, and the more so the younger the child is. In its simple form it rarely proves fatal, but it is liable to three dangerous complications, to one or other of which the fatal result is usually attributable. These complications are,—1st, with bronchitis or pneumonia; 2d, with hydrocephalus and convulsions; and 3d, with infantile remittent fever. Pathology has as yet thrown no light on the nature of the disease.

In the simple form of the malady little treatment is necessary. Keeping the child in a warm equable temperature, attending to the state of the bowels, and giving, if requisite, some simple expectorant mixture, more with the view of favouring the termination of the fit by vomiting than with the view of checking the disease, is in general all that is necessary. When the hoop is fairly formed, change of scene and air in general causes the malady rapidly to subside. In many cases where the fits are severe, and the child delicate, much benefit is derived from the addition of quinine to the expectorant mixture. The effects of external application are, to say the least, doubtful. When the cases are complicated, they require the greatest attention to bring them to a successful issue, and all the usual means must be sedulously employed which are used in the treatment of each different complication. (J. S—K.)

HOORN, a fortified seaport town of Holland, province of North Holland, on the Zuider Zee, 20 miles N. by E. of Amsterdam. It carries on a considerable trade, though in this respect it is much inferior to what it once was. The exports are chiefly butter, cheese, cattle, herrings, and other kinds of provisions. The manufactures comprise woollen cloths, carpets, &c. Shipbuilding and the herring fishery are extensively carried on. It has a naval college. Hoorn was the birth-place of Schouten, who in 1616 discovered Cape Horn, and named it after his native town; and of Tasman, the discoverer of Van Diemen's Land and New Zealand. Pop. about 9000.

HOP (*Humulus lupulus*), a plant chiefly used in brewing. See Brewing and Agriculture.

HOPE, Thomas, the well-known author of *Anastasius, or Memoirs of a Modern Greek*, was descended of an ancient Scottish family, and was one of three brothers who had attained to great wealth and eminence as merchants in Amsterdam. In early manhood he travelled extensively in Europe, Asia, and Africa, and on settling down in London, became known as a munificent patron of art in all its branches. His first published work was a volume on *Household Furniture and Decorations*, which gave occasion to Sidney Smith to call its author "the gentleman of Sphinxes—the Œdipus of coal-boxes—he who meditated on muffineers, and planned pokers"—but which, despite the ridicule of the *Edinburgh* and other reviews, effected a great reform in the style of domestic arrangements in English houses. This book appeared in 1805, and four years later it was followed up by a sumptuous work on the *Costume of the Ancients*, and in 1812, by the no less splendid *Designs of Modern Costumes*. His great work, however, was his *Anastasius*. The hero of this work is a sort of Oriental Gil Blas, who is tossed about through all the conditions of life, and from being a beggar in the streets of Constantinople, rises to be an officer of distinction under a

Bey of Egypt. The strange scenes through which he passes in this motley career are described with a force and eloquence which, as Sidney Smith said, would not disgrace the pen of Tacitus, and with a depth of feeling and a vigour of imagination worthy of Lord Byron, to whom, indeed, the novel, on its first appearance, was very generally attributed. Turning from fiction to metaphysics, Hope next wrote an elaborate work on the *Origin and Prospects of Man*, which, however was not published until after his death. Amid much that is paradoxical, obscure, and fanciful, this work contains many ingenious views, some deep thinking, and occasional passages of striking eloquence. A parallel, in many respects true and correct, has been drawn between the author of *Vathek* and the author of *Anastasius*. Hope died February 3, 1831.

Hope, *Thomas Charles*, M.D., the eminent professor of chemistry for more than half a century in the universities of Glasgow and Edinburgh, was the third son of Dr John Hope, the first regius professor of botany in Edinburgh. Thomas Charles Hope was born on 21st July 1766, and died on 13th June 1844.

As might be expected, he early imbibed a predilection for botany, and had made such proficiency in that study that he aspired to obtain that chair on the death of his father in 1786. Having at the same time studied chemistry under the celebrated Dr Black, he applied himself with great industry to that science, which became his favourite pursuit; and when the chemical chair in the University of Glasgow became vacant, on the death of Dr Irvine in 1787, Hope was chosen as his successor. Aware of what might be required from the successor to the several eminent men who had preceded him in that appointment, viz., Cullen, Black, Robison, and Irvine, the young professor was stimulated to increased exertion, and soon became a favourite teacher of chemical science.

When Hope commenced his chemical prelections, the doctrines of the Stahlian school were universally received and taught. But in 1787 Sir James Hall returned from Paris to Scotland, and soon convinced Hope of the vast superiority of the Lavoisierian theory of combustion and oxygenation to the hypothesis of phlogiston. He became a convert to the new doctrines; and next winter zealously taught them in his class.

In 1783 Dr Hope became a member of the Royal Society of Edinburgh, and in the summer of that year paid a visit to Paris, where he was received with marked attention by Lavoisier and Berthollet,—an honour which he ascribed to his having been a pupil of Black, but which probably was no less owing to his having been introduced as the first British chemist who had publicly taught the new French chemical philosophy.

With the view of becoming a practical physician, Dr Hope had for two years, along with his chemical class, assisted his uncle, Professor Stevenson, in teaching the practice of medicine in the University of Glasgow; and, on the death of that uncle, succeeded him in that office, when he resigned the chair of chemistry. Yet he continued his chemical studies in private; and it was during this period that he made his principal discovery, the presence of a new earth in a mineral which had been confounded with barytes. The mineral was found in strontian lead-mines, in Argyllshire, from which circumstance Hope named this earth *strontites*. In this masterly analysis he pointed out the chemical characters that distinguish the two earths, and laid the results before the Royal Society of his native city in 1793, which established his reputation as an expert analytic chemist. This discovery has been attributed to several other persons, but the only one whose pretensions are deserving of notice is Klaproth, who, in the journal *Chemische Annalen* for 1793-94, pointed out the distinction between the minerals *strontianite* and *witherite*. Yet though Hope's experiments precede those of Klaproth, both may be considered as original investigators of this earthy body.

The success and popularity of Hope's teaching at Glasgow suggested in 1795 to Dr Black, then in declining health, the advantage of obtaining his assistance; and, with the consent of the patrons of the university, Black made him the offer of becoming his assistant and successor in the chemical chair. It was accepted by Dr Hope, who resigned his prospects in Glasgow, and came to reside in Edinburgh. For two years he assisted Dr Black in the duties of the chair, but from 1798 the whole task devolved on Dr Hope. He soon became sole professor, and continued to fulfil the important duties of the chair till the end of the session of 1843.

Those who have had the advantage of being Hope's pupils have acknowledged the interest and instruction they derived from his able prelections, and very happily-executed experimental illustrations of the leading principles of chemistry. These qualities made him the most popular teacher of the science of his day in Britain; and his class-room for many years was constantly crowded to excess. The students in his course of 1799 were about 400, in 1813 they amounted to 500, and in 1827 to 575. During his career in Edinburgh his pupils amounted to 16,800.

Some persons have been surprised that Dr Hope, who had so auspiciously commenced his experimental career, should have apparently abandoned the pursuit of original research. But he considered his chief duty as a teacher to demand his utmost efforts to improve his lectures, and to devise the most characteristic and striking experimental illustrations, and in this he succeeded almost beyond any of his contemporaries. He did not, however, wholly give up original research; and some of his communications to the Royal Society are on important scientific questions. In 1804 he produced some ingenious experiments "On the Point of greatest Density of Water," which he fixed at temperature 39° 5' Fahr. (see *Edin. Phil. Trans.* for 1805). In the same paper he demonstrated the fallacy of Rumford's idea that fluids are absolute non-conductors of heat, which were afterwards confirmed by Thomson, Dalton, and Traill. Another curious paper appears in the *Transactions* in 1836—"Observations and Experiments on the Coloured and Colourable matters in Leaves and Flowers of Plants, upon which Acids and Alkalis act in producing red, yellow, or green colours." In the same year he read a paper "On the Chemical nomenclature of Inorganic Compounds." To Dr Hope, also, we owe a decided improvement on the Eudiometer of Scheele. The year before his death he communicated two papers to the Royal Society—1. "Observations on the flowers of *Camellia japonica*, *Magnolia grandiflora*, and *Chrysanthemum leucanthemum*," in each of which he discovered the existence of a distinct proximate principle to which he gave the names of *camelline*, *magnoline*, and *chrysanthemine*. 2. "An attempt to explain the Phenomena of the Freezing Cavern at Orenburg." Such are his chief contributions to science; but he considered *teaching* as the great business of his life, and to this he made it his duty to devote his chief energies. See Dr Traill's *Memoir of Hope* (*Edin. Phil. Trans.* xvi.).

HOPITAL, Guillaume François Antoine, Marquis de l', a celebrated French mathematician, was born at Paris in 1661. Entering the army, he served for some time in a cavalry regiment, but his bad eyesight, and a strong desire to pursue the study of mathematics, induced him to retire into private life. At a very early age he had given proof of a strong bent as well as of a large capacity for the pure sciences. One day at the table of the Duc de Rohan, a problem was mentioned, for which it was said that Pascal after long thinking had found an elegant solution. De l'Hôpital, then a lad of fifteen, astonished the savants who were admiring the neatness of Pascal's method by declaring that he believed he could solve it otherwise, and in a few days he did send in a correct solution on a totally different principle. Towards the close of the seventeenth century the *calculus* was beginning slowly, and amid fierce opposition, to force its way into general acceptance among the mathematicians of Europe. One of its ablest advocates, John Bernouilli, coming to Paris, was engaged by De l'Hôpital to give him instructions in it, and spent some time in the marquis's house, teaching him the higher mathematics. So great was De l'Hôpital's progress, that when his tutor propounded to the mathematicians of Europe his famous problem of the curve of quickest descent he was the only Frenchman who sent in a solution. De l'Hôpital now became one of the warmest supporters of the *calculus*, and indeed wrote the first systematic treatise on it, which appeared at Paris in 1696, under the title of *L'Analyse des Infiniment Petits*. In the preparation of this work De l'Hôpital is said, though apparently on insufficient grounds, to have been unduly aided by his old tutor Bernouilli. This work, which may be fairly regarded as marking an era in the history of mathematical science, was frequently reprinted in the course of the eighteenth century. Not long after De l'Hôpital's death, which took place in 1704, a treatise on the conic sections, which he had left in MS., was published, and long maintained its ground as the standard work on this department of mathematics. See Playfair's Dissertation, prefixed to this work.

Hôpital or **Hospital**, *Michel de l'*, chancellor of France, was born at Aigueperse in Auvergne, in the year 1505. His father, Jean de l'Hôpital, who was at once physician and councillor to the Constable of Bourbon, sent him to study law, first at Toulouse, and afterwards at Padua, the legal school of which then enjoyed great celebrity. In that age jurisprudence was the principal science cultivated, and no one could aspire to any employment without having studied it profoundly. L'Hôpital, although he had already acquired the elements of this science in France, spent six years at Padua in improving himself in it; he also applied himself to the study of the belles lettres, in which he made rapid progress, and at the same time cultivated the Greek and the Latin languages, with which he rendered himself perfectly familiar. Having completed his studies, and finding his prospects clouded by the death of the Cardinal de Grammont, who had induced him to return to France, and upon whose influence he had placed his hopes of preferment, he entered himself of the bar at Paris. In this profession, his merit and virtue were soon appreciated. At the end of three years, Jean Morin, criminal-lieutenant, a person famous in the martyrology of the Protestants, on account of the severity with which he enforced the laws enacted against them, gave L'Hôpital his daughter in marriage, and at the same time conferred upon him the office of counsellor to the parliament of Paris as her dowry.

In this situation, which he held during twelve years, the toleration he displayed formed a remarkable contrast to the unrelenting severity by which his father-in-law had rendered himself but too celebrated. When L'Hôpital entered the parliament, that once illustrious body had much degenerated, owing to the venality introduced or at least overlooked by Francis I. A witness of this corruption, L'Hôpital deplored its consequences, and, in concert with some old magistrates who still remained, endeavoured to set an example of assiduity and application to a crowd of inexperienced young men, who, by venality, had obtained admission into the parliament, and who had no other title to that honour but the money they had paid for it. L'Hôpital was long cited as a model in the magistracy. He made it a rule to listen with patience, to interrupt no one, to express himself as concisely as possible, and to oppose all unnecessary delays; he was also punctual in his attendance in court, where he generally remained until the business of the day had been regularly gone through, and always rose with reluctance, however late, if any portion of it remained unattended to. In short, he was a laborious and conscientious judge, who to great talents united the most steady and persevering industry. The vacations made no material change in his way of life; his pursuits were indeed different, but his application was the same; the perusal of the great writers of antiquity, the study of French history, and the reading of the Holy Scriptures, each in its turn formed the occupation of his leisure time. "There is nothing frivolous in my amusements," says he, in one of his letters; "sometimes Xenophon is the companion of my walks; sometimes the divine Plato regales me with the discourses of Socrates. History and poetry have their turns; but my chief delight is in the sacred writings."

The next appointment which L'Hôpital received was that conferred upon him by Henri II. of envoy or ambassador to the Council of Trent, which was then sitting at Bologna. But having soon grown tired of the inactivity to which he found himself reduced, he was, at his own desire, recalled, and, upon his return, experienced some coldness on the part of the court, which did not altogether relish his evident disinclination to assist in the proceedings of that famous council. The coldness, however, proved only temporary, for ere long he was appointed master of the requests. In 1554 he was made director and superintendent of the royal finances in the chamber of accounts. At this time the finances required a guardian at once vigilant and faithful. Enormous abuses prevailed in the whole fiscal administration. On the one hand there existed profusion without limits, and on the other malversation without shame. Scarcely a third, or even a fourth part of the sums collected, ever reached the royal treasury; the people were exposed to the most grinding exactions, yet the revenue was in a state of gradual decline. To put an end to these disorders, L'Hôpital revived the ancient laws which had fallen into desuetude; he struck terror into defaulters by some examples of wholesome severity; he refused to sanction any expenditure except for the immediate purposes of the state; he defied the enmity of that numerous and vindictive class whose dishonest gains he had destroyed; and he acted with so much personal disinterestedness, that, after having been five years in office, he was unable to give a portion to his daughter, and the deficiency was supplied by the liberality of the sovereign.

After the fatal accident which, in 1559, put an end to the life of the king, the Cardinal de Lorraine, then at the head of affairs, introduced L'Hôpital into the council of state; but as one of the articles of the treaty of Chateau-Cambrésis had provided that the Duchess De Berri, his benefactress, should espouse Emanuel-Philibert, Duke of Savoy, he was appointed to conduct that princess into Piedmont, whither he attended her in the capacity of chancellor. The distracted situation of France, however, soon made it necessary to recall a man of such undaunted firmness and inflexible integrity. In the midst of faction, turbulence, and confusion, when the passions of men appeared, like the evil spirits, to have been for a season unchained, he was advanced to the office of chancellor of France, and in this elevated station conducted himself like a philosopher and a hero. At this period the destruction of the Protestants had been determined on; it was resolved to leave them no alternative but abjuration or death; and it was even meditated to establish the inquisition in France. The new chancellor durst not attack this project directly, without compromising himself with the governing party; but he sought indirectly to defeat the odious design, and by the edict of Remorantin, which declared the crime of heresy to be cognisable only by the ecclesiastical judge, he ultimately accomplished his beneficent design, and thus decided the clergy to abandon all idea of establishing the inquisition, which, they knew, would be powerless when deprived of the aid of the secular arm. Upon all occasions, indeed, he was the advocate of mercy and reconciliation, and a declared enemy to persecution on account of religion; and hence the more bigoted Romanists, offended at his wisdom and moderation, accused him of being a concealed Protestant, unconscious that by such suspicions and accusations they paid the highest compliments to the spirit of that faith which they were so desirous to eradicate. With a man of such character, ability, and firmness, at the head of affairs, it was hopeless to attempt to carry through the violent measures which were already contemplated; yet when the question of giving him a successor came to be seriously agitated, Catherine de Medici found herself involved in very great perplexity. The ancient relations of L'Hôpital with the House of Lorraine; the estimation in which he was universally held; his known love of his country, which, in his mind, absorbed all other affections; and the difficulty of finding any one to fill his place, who would not sink into insignificance and contempt in comparison with this truly great man—were serious obstacles to his removal; but as nothing could induce him to abandon or change the pacific character of his measures, all other considerations were at length disregarded, and the queen excluded him from the council of war, upon which he immediately withdrew to his country-house at Vignay, near Estampes.

His exclusion from the council was accompanied with insult. The Constable of Montmorency told him that a man of his profession, a civilian, ought not to intermeddle in what related to war. "That is a subject," said the constable, "on which you are not qualified to give advice." "True," replied the chancellor, "I do not know how to make war, but *I know when it is necessary*." Several days after his retirement from office, when the seals were demanded of him, he resigned them without regret, observing that the affairs of the world were too corrupt for him to meddle with them. He spent his time in lettered ease, amusing himself with writing Latin poetry, and enjoying the society of some select friends, until his peace was broken by the bloody tragedy of St Bartholomew, which, with his usual sagacity, he had foreseen. Of this barbarous and inexpiable massacre the judgment he pronounced has been ratified by posterity. He himself narrowly escaped being one of its victims. The inhabitants of the country had risen, and were devastating the fields, and dragging the farmers in chains towards the city. But the queen, anxious about his fate, sent a detachment of cavalry for his protection. The sudden apparition of this troop, whose destination was unknown, produced great consternation in his house, which was open on all sides. He was asked by the inmates if they would close the gates. "No, no," said he; "if the small gate will not admit them, throw open the large one." When informed that the persons who prepared the lists of proscription had pardoned him the opposition which he had always given to their projects; "I did not know," replied he coldly, "that I had done any thing to deserve either pardon or death." But what most deeply affected L'Hôpital on this mournful occasion, was the danger to which his daughter, who happened to be in Paris, was in consequence exposed. She was saved by the interference of Anne d'Este, duchess of Guise, whom L'Hôpital thanked for this signal service, in an epistle overflowing with the warmest feelings of paternal gratitude. These cruel events, however, deeply affected his health and spirits, and he died at Vignay, on the 13th of March 1573, at the age of sixty-eight, and less than one year after the massacre.

"L'Hôpital," says Brantôme, "was the greatest, worthiest, and most learned chancellor that was ever known in France. His large white beard, pale countenance, and austere manner, made all who saw him think they beheld a true portrait of St Jerome, and, in fact, he was called St Jerome by the courtiers. All orders of men feared him, particularly the members of the courts of justice; and when he examined them on their lives, their discharge of their duties, their capacities, or their knowledge, and particularly when he examined candidates for offices, and found them deficient, he made them feel it. He was profoundly versed in polite learning, very eloquent, and an excellent poet. His severity was never ill-natured; he made due allowance for the imperfections of human nature; he was always equal and firm. After his death his very enemies acknowledged that he was the greatest magistrate whom France had known, and that they did not expect to see such another." The productions of L'Hôpital are—1. *Latin poems*; 2. *Speeches delivered at the meeting of the States at Orleans*; 3. *Mémoires, contenant plusieurs Traités de Paix*, &c., from 1551 to 1560, Cologne, 1672, in 12mo. A work which he had undertaken on law is lost; and it is said that he had also projected a history of his own time, on the model of the ancient historians; but of this no part appears to have been executed. In 1807, M. Bernardi published his *Essai sur la Vie, les Ecrits, et les Loix de Michel de l'Hôpital*, in one volume 8vo, from which and other documents Mr Charles Butler published his Essay on the Life of L'Hôpital, principally with the view of exhibiting him as a friend of toleration. An admirable life and estimate of De l'Hôpital will also be found in Villemain's *Nouveaux Mélanges Littéraires*. (J. B—E.)

HOPKINS, EZEKIEL, bishop of Londonderry, and one of the standard theologians of England, was born in 1663 at Stanford, in Devonshire, of which his father was curate. His early education was conducted under Presbyterian and Independent influences,—a fact which threatened at first to mar his prospects of church preferment. On leaving Oxford, where he had been one of the choristers, and finally chaplain of Magdalen College, he was presented to the living of St Mary Woolnoth, in London. When the great plague broke out in the capital, Hopkins withdrew to Exeter, where he obtained the living of St Mary's. Here he married Araminta, a daughter of Lord Robartes; and when that nobleman was made lord-lieutenant of Ireland, Hopkins went with him to Dublin, and through his influence obtained the deanery of Raphoe. In 1671 he was made bishop of that diocese, and ten years later was translated to the see of Londonderry. In the famous siege of that town by the Irish adherents of James II. in 1689, Hopkins showed how completely he had rid himself of the influences of his early training by preaching with the most earnest zeal the doctrines of non-resistance. In the words of Macaulay, "he exhorted his flock to go patiently to the slaughter rather than incur the guilt of disobeying the Lord's anointed." In the course of the siege he withdrew from the town, and retired first to Raphoe and afterwards to London, where he was made rector of St Mary Aldermanbury. This charge he held till his death in June 1690. Hopkins' works, which have been frequently republished, comprise *Sermons*, *Expositions of the Decalogue and the Lord's Prayer*, and elaborate discourses on *Regeneration* and *The Vanity of the World*. The purely literary merits of these treatises are very great. In that sententious brevity which compresses whole chapters and volumes of meaning into a single line, Charnock was in that day without a rival, yet many of Hopkins' thoughts are expressed with a proverbial force and conciseness not unworthy of his great contemporary. His works are a mine of jewels. Their solid worth, apart from all ornament, their sound theology, their deep spiritual fervour, their practical good sense, and the acquaintance which they display with the nature and heart of man, commend them to our high esteem. But beside all this, the purity of their style, the clearness and vigour of their thought, and the abounding beauty of their illustrations, place them in some respects far above the average of the pulpit productions of the best known contemporary authors. Regarded by the Puritans, or at least by some of them, as a deserter from their ranks, buried in the obscurity of an Irish bishopric, Hopkins has never had due justice paid to his memory and worth. A candid perusal of his works will suffice to prove his title to rank with the best and ablest divines that England had to boast of in the seventeenth century.

HOR, a mountain of Arabia Petræa, on the confines of Idumæa, and forming part of the mountain of Seir or Edom. It is generally regarded as the modern *Jebel Haroun*, or Mount Aaron, lying midway between the Dead Sea and the Elanitic Gulf. On the summit of this hill is a tomb, venerated by the Mohammedans as the sepulchre of the high priest Aaron.

HORAPOLLO, or HORUS APOLLO. See HIEROGLYPHICS.

HORATII, three brothers of the Horatian gens, who figure in one of the old Roman legends. See ROMAN HIST.

HORATIUS FLACCUS, QUINTUS, the most popular, and, next to Catullus and Virgil, the greatest of the Roman poets, was born vi. Id. Dec. A.U.C. 689 (Dec. 8, B.C. 65), during the consulship of L. Aurelius Cotta and L. Manlius Torquatus, and died Nov. 27, A.U.C. 746 (B.C. 8). Horace is his own biographer. All the material facts of his personal history are to be gathered from the allusions scattered throughout his poems. A memoir, attributed to Suetonius, of somewhat doubtful authenticity, furnishes a few additional details, but none of material moment, either as to his character or career. His father was a freedman (*Sat.* I. vi., 6, 46-47), and it was long considered that he had been a slave of some member of the great family of the Horatii, whose name he had assumed, in accordance with the common usage in such cases. But this theory has latterly given place to the suggestion, based upon inscriptions, that he was a freedman of the town of Venusia (the modern Venosa), the inhabitants of which belonged to the Horatian tribe (G. F. Grotefend, *Encyclopädie von Ersch und Gruber*, 2d sec., vol. x., p. 457, Leipzig, 1833; and C. L. Grotefend, *Ephemerid. Literar.*, Darmstadt, 1834, p. 182; and Mommsen's *Inscriptiones Regni Neapolitani*, Lipsiæ, 1852). The point is, however, of little importance, as the name, distinguished as it was, has derived more lustre from the poet than from any of the patriots and heroes by whom it had previously been borne. The elder Horace had received his manumission before his son was born (*Sat.* I. vi., 8). He had realized a moderate independence in the vocation of *coactor*, a name borne indifferently by the collectors of public revenue, and of money at sales by public auction. To which of these classes he belonged is uncertain, but most probably to the latter (*Sat.* I. vi., 86). With the fruits of his industry he had purchased a small property near Venusia, upon the banks of the Aufidus, the modern Ofanto, in the midst of the Apennines, upon the doubtful boundaries of Lucania and Apulia. Here the poet was born, and in this picturesque region of mountain, forest, and stream, the boy became imbued with the love of nature, which distinguished him through life. The third ode of the fourth book affords a pleasing glimpse of the child, wandering out of bounds along the slopes of Mount Vultur, and being found, after an anxious search, asleep under a covering of laurel and myrtle leaves, which the wild pigeons had spread to shield this special favourite of the gods from the snakes and wild animals. The augury of the future poet, said to have been drawn from the incident at the time, was no doubt an afterthought of the poet's own, but the picture which the lines present of the strayed child asleep with his hands full of spring flowers is welcome, whatever may be thought of the omen. In his father's house, and in those of the Apulian peasantry around him, Horace had opportunities of becoming familiar with the simple virtues of the poor—their independence, integrity, chastity, and homely worth, which he loved to contrast with the luxury and vice of imperial Rome. Of his mother no mention occurs, directly or indirectly, throughout his poems, and it is reasonable to infer from this circumstance, taken in connection with the indications which they present of strong natural affection, that she died during his infancy. He appears also to have been an only child. No doubt he had at an early age given evidence of superior powers, and to this it may have been in some measure owing that his father thought him worthy of a higher education than could be obtained under a provincial schoolmaster (*Sat.* I. vi., 71, *et seq.*), and, although but ill able to afford it, carried him to Rome when about twelve years old, and gave him the best education which the capital could supply. No expense was spared to save the boy from any sense of inferiority among his fellow-scholars of the higher ranks. He was waited on by numerous slaves, as though he were the heir to a considerable fortune. But at the same time he was not allowed to entertain any shame for his own order, or to aspire to a position which he was unequal to maintain. His father taught him to look forward to filling some situation akin to that in which he had himself acquired a competency, and to feel that in any sphere culture and self-respect must command influence, and afford the best guarantee for happiness. Under the stern tutorage of Orbilius Pupillus, a grammarian of high standing, richer in reputation than gold, whom the poet has condemned to a bad immortality for his flogging propensities, he learned grammar, and became familiar with the earlier Latin writers, and with Homer. He also acquired such other branches of instruction as were usually learned by the sons of Romans of the higher ranks. But, what was of still more importance, during this critical period of his first introduction to the seductions of the capital, he enjoyed the advantage of his father's personal superintendence, and of a moral training, which kept him aloof, not merely from the indulgence, but even from the contact of vice. His father went with him to all his classes (*Sat.* I. vi., 81, *et seq.*), and, being himself a man of shrewd observation and natural humour, he gave his son's studies a practical bearing, by directing his attention to the follies and vices of the luxurious and dissolute society around him (*Sat.* I. iv., 105, *et seq.*), and showing their incompatibility with the dictates of reason and common sense. From this admirable father, Horace appears to have inherited that manly independence for which he was remarkable, and which, while assigning to all ranks their due influence and respect, never either overestimates or compromises its own. Under the homely exterior of the Apulian freedman we see the soul of the gentleman. His influence on his son was manifestly great. In the full maturity of his powers Horace penned a tribute to his worth (*Sat.* I. vi., 68, *et seq.*) with a fervour manifestly prompted by the full heart of a man who had often had cause to feel the blessings of that influence throughout the vicissitudes of a chequered life. It had given tone and strength to his character, and in the midst of manifold temptations had kept him true to himself and his genius.

At what age Horace lost his father is uncertain. Most probably this event occurred before he left Rome for Athens to complete his education, as was then the practice, in the Greek literature and philosophy, under native teachers. This he did some time between the age of seventeen and twenty. At Athens he found many young men of the leading Roman families—Bibulus, Acidinus, Messala, and the younger Cicero—engaged in the same pursuits with himself. His works prove him to have been no careless student of the classics of Grecian literature, and with a natural enthusiasm he made his first poetical essays in their flexible and noble language. With his usual good sense, however, he soon abandoned the hopeless task of emulating the Greek writers on their own ground, and directed his efforts to transfusing into his own language some of the grace and melody of these masters of song (*Sat.* i. x., 31–35). In the political lull between the battle of Pharsalia, A.U.C. 706 (B.C. 48), and the death of Julius Cæsar, A.U.C. 710 (B.C. 44), Horace was enabled to devote himself without interruption to the tranquil pursuits of the scholar. But when after the latter event Brutus came to Athens, and the patrician youth of Rome, fired with zeal for the cause of republican liberty, joined his standard, Horace was infected by the general enthusiasm, and accepted a military command in the army which was destined to encounter the legions of Anthony and Octavius. His rank was that of tribune, equivalent to a colonelcy of foot in our own army, and for this he must have been indebted either to the personal friendship of Brutus, or to an extraordinary dearth of officers, seeing that he was not only without experience or birth to recommend him, but possessed no particular aptitude, physical or moral, for a military life. His appointment excited jealousy among his brother officers, who considered that the command of a Roman legion should have been reserved for men of nobler blood. (*Sat.* I. vi., 46, *et seq.*) It was probably here that he first came into direct collision with the aristocratic prejudices which the training of his father had taught him to defy, and which, at a subsequent period, grudged to the freedman's son the friendship of the emperor and of Mæcenas. At the same time he had doubtless a strong party of friends, who had learned to appreciate his genius and attractive qualities. It is certain that he secured the esteem of his commanders, and bore an active part in the perils and difficulties of the campaign, which terminated in the total defeat of the republican party at Philippi, A.U.C. 712 (B.C. 42). A playful allusion by himself to the events of that disastrous field (*Odes*, II. vi., 9, *et seq.*) has been turned by many of his commentators into an admission of his own cowardice. This is absurd. Such a confession is the very last which any man, least of all a Roman, would make. Horace says, addressing his friend Pompeius Varius—

> "With thee I shared Philippi's fiery flight,
> My shield behind me left, which was not well,
> When all that brave array was broke, and fell
> In the vile dust full many a towering wight."

Such an allusion to the loss of his shield could only have been dropped by a man who felt that he had done his duty, and that it was known he had done it. The lines may thus be safely regarded, according to the views of Lessing and others, as a not ungraceful compliment to his friend, who continued the struggle against the triumvirate with the party who threw themselves into the fleet of Sextus Pompeius. This interpretation is confirmed by the language of the next verse, where, in the same spirit, he applies the epithet "paventem" (craven) to himself.

> "But me, poor craven, swift Mercurius bore,
> Wrapp'd in a cloud through all the hostile din,
> While war's tumultuous eddies, closing in,
> Swept thee away into the strife once more."

It was no shame in Horace to have despaired of a cause which its leaders had given up. After the suicide of Brutus and Cassius the continuance of the contest was hopeless; and Horace may in his short military career have seen, in the jealousy and selfish ambition of many of his party, enough to make him suspicious of success, even if that had been attainable. Republicans who sneered at the freedman's son were not likely to found any system of liberty worthy of the name.

When Horace found his way back to Italy it was to find his paternal acres confiscated. His life was spared, but nothing was left him to sustain it but his pen and his good spirits. He had to write for bread—*Paupertas impulit audax ut versus facerem* (*Epis.* II. ii., 51)—and in so doing he appears to have acquired not only considerable repute, but also sufficient means to purchase the place of scribe in the Quæstor's office, a sort of sinecure Clerkship of the Treasury, which he continued to hold for many years, if not to the close of his life (*Sat.* II. vi., 36). It was upon his return to Rome that he made the acquaintance of Virgil and Varius, who were already famous, and to them he was indebted for his introduction to Mæcenas. The particulars of his first interview with his patron he has himself recorded (*Sat.* I. vi., 55, *et seq.*) It is a curious circumstance in the history of a friendship, among the closest and most affectionate on record, that nine months elapsed after their meeting before Mæcenas again summoned the poet to his house, and enrolled him in the list of his intimate friends. This event took place in the third year after the battle of Philippi; and as the only claim of Horace, the man of humble origin and the retainer of a defeated party, to the notice of the minister of Augustus must have been his literary reputation, it is obvious that even at this early period he had established his position among the wits and men of letters in the capital. The acquaintance rapidly ripened into mutual esteem. It secured the position of the poet in society, and the generosity of the statesman placed him above the anxieties of a literary life. Throughout the intimate intercourse of thirty years which ensued there was no trace of condescension on the one hand, nor of servility on the other. Mæcenas gave the poet the place next his heart. He must have respected the man who never used his influence to obtain those favours which were within the disposal of the emperor's minister, who cherished an honest pride in his own station, and who could be grateful without being obsequious. Horace is never weary of acknowledging how much he owes to his friend. When he praises him, it is without flattery. When he soothes his anxieties, or calms his fears, the sincerity of his sympathy is apparent in the warmth of his words. When he resists his patron's wishes, he is firm without rudeness. When he sports with his foibles, he is familiar without the slightest shade of impertinence.

By Mæcenas Horace was introduced to Octavius, most probably soon after the period just referred to. In A.U.C. 717, a year after Horace had been admitted into the circle of his friends, Mæcenas went to Brundusium, charged by Octavius to negotiate a treaty with Marcus Antonius. On this journey he was accompanied by Horace, who has left a graphic record of its incidents (*Sat.* I. v.) It is probable that on this occasion or about this time the poet was brought to the notice of the future emperor. Between the time of his return from this journey and the year 722, Horace, who had in the meantime given to the world many of his poems, including the ten *Satires* of the first book, received from Mæcenas the gift of the Sabine farm, which at once afforded him a competency and all the pleasures of a country life. The gift was a slight one for Mæcenas to bestow, but he no doubt made it as the fittest and most welcome which he could have offered to his friend. It made Horace happy. It gave him leisure and amusement, and opportunities for that calm intercourse with nature which he "needed for his spirit's health." Never was a gift better bestowed or better requited. It at once prompted much of that poetry which has made Mæcenas famous, and has afforded ever new delight to successive generations. The Sabine farm was situated in a romantic valley about 15 miles from Tibur (Tivoli), and among its other charms, possessed the valuable attraction for Horace, that it was within an easy distance of Rome. When his spirits wanted the stimulus of society or the bustle of the capital, which they often did, his ambling mule could speedily convey him thither; and when jaded on the other hand by

> "The noise, and strife, and questions wearisome,
> And the vain splendours of imperial Rome,"

he could by the same easy means of transport, in a few hours bury himself among the hills, and there, under the shadow of his favourite Lucretilis, or by the banks of the Digentia, either stretch himself to dream upon the grass, lulled by the murmurs of the stream, or look after the culture of his fields, and fancy himself a farmer. The site of this farm has been pretty accurately ascertained, and it is at the present day a favourite resort of travellers, especially of Englishmen, who visit it in such numbers, and trace its features with so much enthusiasm, that the resident peasantry, "who cannot conceive of any other source of interest in one so long dead and unsainted, than that of co-patriotism or consanguinity," believe Horace to have been an Englishman (*Letter* by Mr Dennis. Milman's *Horace*, London, 1849, p. 109). The property was of moderate size, and produced corn, olives, and wine, but was not highly cultivated. Here Horace spent a considerable part of every year. Latterly, when his health failed, he passed the winter in the milder air of a villa at Tivoli. The Sabine farm was very retired, being about four miles from Varia (Vico Varo), the nearest town, well covered with timber, and traversed by a small but sparkling stream. It gave employment to five families of free *coloni*, who were under the superintendence of a bailiff; and, besides these, eight slaves were attached to the poet's establishment. With his inexpensive habits this little property was sufficient for all his wants (*Satis beatus unicis Sabinis*). Here he could entertain a stray friend from town,—his patron Mæcenas, upon occasion,—and the delights of this agreeable retreat and the charm of the poet's society, were doubtless more than a compensation for the plain fare or the thin home-grown wine, *Vile Sabinum*, with which its resources alone enabled him to regale them.

The life of Horace from the time of his intimacy with Mæcenas appears to have been one of comparative ease and of great social enjoyment. Augustus soon admitted him to his favour, and sought to attach him to his person in the capacity of secretary. This offer Horace was prudent and firm enough to decline; while at the same time he had the tact not to offend the master of the world by his refusal. To the close of his life his favour at court continued without a cloud. Augustus not only liked the man, but entertained a profound admiration for the poet. Believing in the immortality of his writings, it was natural the emperor should cultivate the good will and seek to secure the "deathless meed" of his favourite's song. That Horace had fought with Brutus against him was no prejudice. To have espoused the cause, and enjoyed the confidence of one whose nobility of purpose his adversaries never scrupled to acknowledge, formed, indeed, in itself a claim upon his successful rival's esteem. Horace was no renegade; he was not ashamed of the past, and Mæcenas and Augustus were just the men to respect him for his independence, and to like him the better for it. They could appreciate his superiority to the herd of parasites and time-servers around them; and like all the greatest actors on the political stage, they were above the petty rancours of party jealousy, or the desire to enforce a renunciation of convictions opposite to their own. It was by never stooping to them unduly that Horace secured their esteem, and maintained himself upon a footing of equality with them, as nearly as the difference of rank would allow. There is no reason to suspect Horace, in the praises which he has recorded of Augustus, either of insincerity or sycophancy. He was able to contrast the comparative security of life and property, the absence of political turmoil, and the development of social ease and happiness, which his country enjoyed under the masterly administration of Augustus, with the disquietude and strife under which it had languished for so many years. The days of a republic had gone by, and an enlightened despotism must have been welcomed by a country shaken by a long period of civil commotion, and sick of seeing itself played for as the stake of reckless and ambitious men. He was near enough to the councils of the world's master to see his motives and to appreciate his policy; and his intimate personal intercourse with both Augustus and Mæcenas no doubt enabled him to do fuller justice both to their intentions and their capacity, than was possible perhaps to any other man of his time. The envy which his intimacy with these two foremost men of all the world for a time excited in Roman society by degrees gave way, as years advanced, and the causes of their esteem came to be better understood. Their favour did not spoil him. He was ever the same kindly, urbane, and simple man of letters he had originally been. He never presumed upon his position, or looked superciliously on others less favoured than himself. At all times generous and genial, years only mellowed his wisdom, and gave a sharper lustre to the beauty of his verse. The unaffected sincerity of his nature, and the rich vein of his genius, made him courted by the rich and noble. (*Odes*, ii. xvii., 9, *et seq.*) He mixed on easy terms with the choicest society of Rome, and what a society must that have been which included Virgil, Varius, Plotius, Tibullus, Pollio, and a host of others, who were not only ripe scholars, but had borne and were bearing a leading part in the great actions and events of that memorable epoch? It is to this period that the composition of his principal odes is to be attributed. To these, of all his writings, Horace himself ascribed the greatest value, and on these he rested his claims to posthumous fame. They were the result of great labour, as he himself indicates: "Operosa parvus Carmina fingo" (*Odes*, IV. ii., 31), and yet they bear pre-eminently the charm of simplicity and ease. He was the first to mould the Latin tongue to the Greek lyric measures; and his success in this difficult task may be estimated from the fact, that as he was the first so was he the greatest of the Roman lyrists. Quinctilian's criticism upon him can scarcely be improved: "Lyricorum Horatius fere solus legi dignus. Nam et insurgit aliquando, et plenus est jucunditatis et gratiæ, et variis figuris, et verbis felicissime audax." In this airy and playful grace, in happy epithets, in variety of imagery, and exquisite felicity of expression, the *Odes* are still unsurpassed among the writings of any period or language. If they want the inspiration of a great motive, or the fervour and resonance of the finest lyrics of Greece, they possess at all events an exquisite grace and terseness of expression, a power of painting an image or expressing a thought in the fewest and fittest words, and a melody of tone, which imbue them with a charm quite peculiar, and have given them a hold upon the minds of educated men, which no change of taste has shaken. That they are inferior to his Greek models is not to be wondered at. Even although Horace had possessed the genius of Pindar or Sappho, it is doubtful whether, writing as he did in an artificial language, which he was compelled to make more artificial by the adoption of Grecian terms of expression, and being therefore without the free and genial medium of expression which they had at command, he could have found an adequate utterance for his inspiration. But his genius was akin to neither of these; and that good sense, which is his great characteristic, withheld him from ever either soaring too high or attempting to sustain his flight too long. He knew the measure of his powers, and in his greatest efforts therefore no undue strain upon them is to be detected. His power of passion is limited, and his strokes of pathos are few and slight. Above all, he did not possess the faculty, which, in a lyrical writer, is the highest, of losing himself in a great theme. Whatever subject he treats, we never lose sight of the poet in the poem. This quality, while it is fatal to lyric poetry of the highest class, helps, however, to heighten the charm of the mass of his odes, especially those which are devoted to his friends, or which breathe the delight with which the contact with the ever fresh beauties of natural scenery inspired him. Into these he throws his whole heart, and in them we feel the fascination which made him beloved by those who came within the circle of his personal influence, and which makes him as it were the well known and intimate friend of all to whom his writings are a familiar study. Horace was not and could not have been a national poet. He wrote only for cultivated men, and under the shadow of a court. The very language in which he wrote must have been unintelligible to the people, and he had none of those popular sympathies which inspire the lyrics of Burns or Béranger. The Roman populace of his time was perhaps as little likely to command his respect as any which the world has ever seen; and there was no *people*, in the sense in which we understand the word, to appeal to. And yet Horace has many points in common with Burns. "A man's a man for a' that," in the whole vein of its sentiment is thoroughly Horatian; but the glow which kindles the heart and fires the brain is subdued to a temperate heat in the gentler and physically less energetic nature of Horace. In his amatory verses the same distinction is visible. None of his erotic poems are vivified by those gushes of emotion which animate the love poetry of the poets we have named and of other modern song writers. Never indeed was love less ideal or intense in a poet of unquestionable power. Horace is not insensible to beauty. No writer hits off with greater neatness the portrait of a beauty, or conjures up more skilfully before his reader an image of seductive grace. But the fire of genuine passion is wanting. Horace's ardour seems never to have risen above the transient flush of desire. His heart is whole though Cupid may have clapped him on the shoulder. The Lalages and Lyces, the Glyceras and Phrynes of his *Odes* are pretty playthings of an hour, who amused his fancy and delighted his senses, but never robbed him of a night's repose or of a day's appetite. The attempt to make them out as real objects of attachment is one of the many follies in which his commentators have wasted much dreary labour. Horace might, no doubt, have sung of himself, like Béranger, in his youth,—

> "J'avais vingt ans une folle maitresse,
> Des francs amis, et l'amour de chansons,"—

and even when he could count eight lustres, despite his own protest (*Ode* ii., 4, 21, *et seq.*), his senses were probably not dead to the attractions of a fine ancle, or a pretty face, or to the fascination of a sweet smile, or a musical voice. But his passions were too well controlled, and his love of ease too strong, to have admitted of so many flirtations as would be implied in the supposition that Tyndaris, Myrtale, and a score of others, were actual favourites of the bard. To sing of beauty has always been the poet's privilege and delight; and to record the lover's pains an easy and popular theme. Horace, the wit and friend of wits, was not likely to be out of the mode, and so he sang of love and beauty according to his fashion. Very airy and playful and pleasant is that fashion, and, for his time, in the main comparatively pure and chaste; but we seek in vain for the tenderness, the negation of self, and the pathos, which are the soul of all true love poetry. "His love ditties," it has been well said, "are, as it were, like flowers, beautiful in form, and rich in hues, but without the scent that breathes to the heart." It is certain that many of them are merely imitations of Greek originals.

His *Satires* and *Epistles* are less read, yet they are perhaps intrinsically more valuable than his lyric poetry. They are of very various merit, written at different periods of his life, and, although the order of their composition may be difficult to define with certainty, much may be inferred, even from the internal evidence of style and subject, as to the development of the poet's genius. This subject has engaged much of the attention of the commentators, and all concur in placing the *Satires* first, and the *Epistles*, including the *Epistle to the Pisos, De Arte Poeticâ*, last in the order of date. As reflecting "the age and body of the time," they possess the highest historical value. Through them the modern scholar is able to form a clearer idea of the state of society in Rome in the Augustan age than of any other phase of social development in the history of nations. Mingling, as he did, freely with men of all ranks and passions, and himself untouched by the ambition of wealth or influence which absorbed them in the struggle of society, he enjoyed the best of opportunities for observation, and he used them diligently. Horace's observation of character is subtle and exact, his knowledge of the heart is profound, his power of graphic delineation great. A genial humour plays over his verses, and a kindly wisdom dignifies them. Never were the maxims of social prudence and practical good sense inculcated in so pleasing a form as in the *Epistles*. The vein of his satire is delicate yet racy, and he stimulates and amuses, but rarely offends by indelicacy, or outrages by coarseness. He does not spare himself upon occasion. His sarcasms, moreover, have no spice of malignity, neither are they tinged by the satirist's vice of vaunting his superiority to his neighbours. For fierceness of invective, or loftiness of moral tone, he is inferior to Juvenal; but the vices of his time were less calculated to provoke the "sæva indignatio," or to call for the stern moral censure of the satirist of a more recent date. He deals rather with the weakness and follies, than with the vices or crimes of mankind, and his appeals are directed to their judgment and practical sense rather than to their conscience. The idea of duty or absolute right is not a prominent one with Horace. He inculcates what is fitting and decorous, and tends most to tranquillity of mind and body, rather than the severe virtues of a high standard of moral purity. To live at peace with the world, to shun the extremes of avarice, luxury, and ambition, to outrage none of the laws of nature, to enjoy life wisely, and not to load it with cares which the lapse of a few brief years will demonstrate to be foolishness, is very nearly the sum of his philosophy. Of religion, as we understand it, he had little. He was, however, too observant of the world around him, and too habitually accustomed to look into his own soul, not to have been profoundly impressed with the evidences of Supreme Wisdom governing the machine of the universe, and to have felt aspirations for a future in which the mysteries of the present world should find a solution. Although himself little of a practical worshipper—*parcus deorum cultor et infrequens*—he respected the sincerity of others in their belief in the old gods. But in common with the more vigorous intellects of the time, he had outgrown the effete creed of his countrymen. He could not accept the mythology, about which the forms of the contemporary worship still clustered. The relation of the universe to its Maker was a mystery to him, and the agency of an active Providence, if it occasionally startled him out of the easy indifference of a vain philosophy, seems to have been by no means a permanent conviction of his mind, influencing his actions, or giving a lofty sweep to his speculations. The morality of enlightened and far-seeing wisdom was attainable by such a mind, and it was attained; but to the divine spirit, which raised some of the ancient writers almost to a level with the inspired authors of the books of our faith, Horace has no claim. As a living and brilliant commentary on life, as a storehouse of maxims of practical wisdom, couched in language the most apt and concise, as sketches of men and manners, which will be always fresh and always true, because they were true once, and because human nature will always reproduce itself under analogous circumstances, his *Satires*, and still more his *Epistles*, will have a permanent value for mankind. In these, too, as in his *Odes*, Horace helped materially in giving to the Latin language the highest amount of polish of which it is susceptible.

At no time very robust, Horace's health appears to have declined for some years before his death. He was doomed to see some of his most valued friends drop into the grave before him. This to him, who gave to friendship the ardour which other men give to love, was the severest wound that time could bring. Youth, and spirits, and health, the inevitable decay of nature, saddened the thoughtful poet in his solitude, and tinged the gayest society with melancholy. But the loss of friends, the brothers of his soul, of Virgil, Quinctilius, Tibullus, and others, and ultimately of Mæcenas, without that hope of reunion which springs from the cheering faith which was soon afterwards to be revealed to the world, must have by degrees stripped life of most of its charms. *Singula de nobis anni prædantur euntes* (*Epis.* II. ii., 55) is a cheerless reflection to the man who has no assured hope beyond the present time. Mæcenas's health was a source of deep anxiety to him, and one of the most exquisite odes (the 17th of the 2d book), addressed to him, in answer to some outburst of despondency, while it expresses the depth of the poet's regard, bears in it the tone of a man somewhat weary of the world:—

> "Ah! if untimely fate should snatch thee hence,
>   Thee, of my soul a part,
> Why should I linger on, with deaden'd sense,
>   And ever-aching heart,
> A worthless fragment of a fallen shrine?
> No, no! One day beholds thy death and mine!
>
> "Think not that I have sworn a bootless oath!
>   Yes, we shall go, shall go,
> Hand link'd in hand, whene'er thou leadest, both
>   The last sad road below!"

The prophecy seems to have been realized almost to the letter. The same year (A.U.C. 746, B.C. 8) witnessed the death of both Horace and Mæcenas. The latter died in the middle of the year, bequeathing his friend, in almost his last words, to the care of Augustus: *Horatii Flacci, ut mei, esto memor.* On the 27th of November, when he was on the eve of completing his fifty-seventh year, Horace himself died, of an illness so sharp and sudden, that he was unable to make his will in writing. He declared it verbally before witnesses, leaving the little all which he possessed to Augustus. He was buried on the Esquiline Hill, near his patron and friend Mæcenas. No trace of the tombs of either remains; but the name and fame of both are inextricably entwined, and can only perish with the decay of literature itself. The fame of Horace was at once established. In the days of Juvenal he shared with Virgil the doubtful honour of being a schoolbook (Juvenal, *Sat.* vii. 226). That honour he still enjoys; but it is only by minds matured by experience and reflection that Horace can be thoroughly appreciated. To them the depth of his observation, and the reach of his good sense are made daily more apparent; and the verses which charmed their fancy or delighted their ear in youth, became the counsellors of their manhood, or the mirror which focalizes for their old age the gathered wisdom of a lifetime. No writer is so often quoted, and simply because the thoughts of none are more pertinent to men's "business and bosoms" in the concerns of every-day life, amid the jostle of a crowded and artificial state of society; and because the glimpses of nature, in which his writings abound, come with the freshness of truth, alike to the jaded dweller in cities, and to those who can test them day by day in the presence of nature herself. To Petrarch and Wordsworth he was a favourite study. Richard Hooker made him a manual. Louis XVIII. had him by heart; and there is scarcely a statesman of eminence in whose mouth his sayings are not household words.

There are no authentic busts or medallions of Horace, and his descriptions of himself are vague. He was short in stature; his eyes and hair were dark, but the latter was early silvered with gray. He suffered at one time from an affection of the eyes, and seems to have been by no means robust in constitution. His habits were temperate and frugal, as a rule, although he was far from insensible to the charms of a good table and good wine, heightening and heightened by the zest of good company. But he seems to have had neither the stomach nor the taste for habitual indulgence in the pleasures of the table. In youth he was hasty and choleric, but easily placable; and to the last he probably shared in some degree the irritability which he ascribes to his class. At the same time, if his writings be any index to his mind, his temper was habitually sweet and well under control. Like all playful men, a tinge of melancholy coloured his life, if that is to be called melancholy which is more properly only that sense of the incompleteness and insufficiency of life for the desires of the soul, which must be deeply seated in all earnest natures. Latterly he became corpulent, and sensitive to the severity of the seasons, and sought at Baiæ and Tivoli the refreshment or shelter which his mountain retreat had ceased to yield to his delicate frame.

The chronology of the poems of Horace has been the source of much critical controversy. The earlier labours of Bentley, Masson, Dacier, and Sanadon have been followed up in modern times by those of Passow, Walckenaer, Weber, Grotefend, and Stallbaum abroad, and of Tate and Milman at home. As the subject is not one which admits of certainty, the speculation is endless, and must always be in a great measure unsatisfactory. The general result may be stated as follows. The *Satires* and *Epodes* were first in the order of composition, having been written between the years 713 and 725, after the return of Horace to Rome, and before the close of the civil wars consequent upon the defeat of Antony and his party. The two first books of *Odes* appeared between this period and the year 730. Then followed the first book of *Epistles.* The third book of *Odes* appears to have been composed about the year 735, the *Carmen Seculare* in 737, and the fourth book of *Odes* between 737 and 741. The second book of *Epistles* may be assigned to the period between 741 and 746; and to the same period may be ascribed the composition of the *Epistle to the Pisos.* The results of the speculations of Bentley and several of the leading critics are presented in a tabular form in the admirable edition of *Horace* published by Firmin Didot, Paris, 1855, with the commentary of Dübner, which is a model at once of typographical beauty and editorial skill.

For a list of the best editions of *Horace*, and of the numerous works on the topography and chronology of his poems, reference may be made to Smith's *Dictionary of Greek and Roman Biography and Mythology*, London, 1850, *sub voce* Horatius.

The translations of *Horace* into all the European languages are numerous. The English versions are more numerous than successful. Pope and Swift, in their imitations, have caught more of his manner than any of the translators: and probably the rendering which will convey the best idea of his peculiar charm will be that which hits a happy medium between the literal and the paraphrastic. The translation of Francis, which long held a place as the English representative of this classic, is a poor performance, and is rapidly falling into merited oblivion. That of Wrangham is weak, colourless, and trivial. Of late years many versions have issued from the press, among which those of F. W. Newman, London, 1853; Melville, London, 1850; and Robinson, London, 1846-55, are chiefly remarkable. But a good English *Horace* is still a desideratum, and, if ever supplied, it will probably be the result of the combined labours of many hands. (T. M—N.)

HORIZON (ὁριζω, *I bound*), the plane of a great circle which divides the upper or visible from the lower or invisible hemisphere. See ASTRONOMY; and GEOGRAPHY.

HORN. The projecting weapons on the head of the ox, the sheep, the antelope, and the rhinoceros, consist of a sheath of horn on a core of bone. Horn is composed chiefly of coagulated albumen, gelatine, and a small portion of phosphate of lime. It is essentially distinct from bone and ivory; the antlers of the stag, although sometimes called horns, consist entirely of bone. Modifications of horn may be noticed in the scales of the armadillo, the plate armour of the tortoise, the spines of the porcupine and hedgehog, the quills of birds, and the hoofs, claws, and nails, of animals. For manufacturing purposes, the horns and hoofs of the bull and cow are in request, and there is a large import of these from South America, Southern Africa, and from Russia. The horns of the bison and buffalo, the chamois and the antelope, are used for the better kinds of work.

The manufacturer first detaches the horn from the bony core, by macerating the horn in water for a month or six weeks, when the membrane by which the horn is attached to the core putrifies and allows the two to be separated. The ash of the cores makes excellent cupels for the assay of gold and silver. The solid tips of the horn are sawn off, and are used for handles for knives, for buttons, &c.; the other portion of the horn is cut into short lengths, or soaked whole in boiling water, or heated at a fire, the effect of which is to soften it, and allow it to be spread out nearly flat. The *flats* are next pressed between warm and greased iron plates, the pressure varying according to circumstances. If intended for lanterns, the pressure is continued until the horn separates into distinct plates; these are placed on a board covered with hide, and scraped with a knife having a wire edge. Some of the shavings which come off are sometimes dyed and cut into various forms, and are so sensitive as to curl up by the warmth of the hand. They are sold at toy-shops under the name of "sensitive leaves." After the scraping, the sheets of horn are polished with a woollen cloth dipped in charcoal dust and water, next with rotten-stone, and lastly with horn shavings.

The effect of heat and pressure on light-coloured horn is to render it transparent; but most of the articles made of horn are coloured artificially by boiling the horn in infusions of colouring matter. If the horn be intended for combs, the pressure must be moderated, or the teeth will be brittle; if intended for drinking cups, the horn is cut into lengths, scalded, roasted, and moulded in a cone of wood, and a wooden plug is driven into it for pressing the horn into the required shape. After this, the cup is turned and polished at the lathe, and a groove is cut to receive the bottom; this is cut out of a flat piece of horn by means of a crown saw, and the bottom of the cup having been softened at the fire, the disk is forced into the groove, and the horn contracting in cooling makes a water-tight joint. For knife-handles and similar works, the horn is cut nearly to the required form, and is moulded in dies with the assistance of heat and a powerful screw-press. The work is finished by scraping and buffing with Trent sand and oil, or rotten-stone and oil. Horn is sometimes used as a vehicle for applying polishing powders to the flat works of the watchmaker. In the Great Exhibition of 1851, there were sundry small articles of chamois horn, consisting of brooches, shirt-buttons, rings, and watch-keys, by a Swiss exhibitor; there were also some transparent horn paintings from Hamburg, and a pair of polished ox-horns from Port Natal, with the head complete, measuring from tip to tip 8 ft. 4 in., and 21 in. in circumference. The best collection of articles in horn-work was, however, from Turkey. See TORTOISE-SHELL. (C. T.)

HORN, a musical instrument, varying in form and in quality of sound. Each horn has a cup-shaped mouth-piece, by blowing into which, with a particular management of the lips, the sounds are produced. The ancient coronets, of different sizes, straight-shaped, formed of wood, &c., need not be described here, as they are disused. The common hunting-horn is of copper or brass, and bent into a semicircle. The French horn is made of brass, and consists of a tube bent into circular convolutions, and terminating in an expansion of the tube, called the bell or pavilion. There are generally two French horns used in orchestras, or in military bands,—a first and a second horn,—and these are furnished with crooks which alter the length of the tube, so as to adapt the horns to the different keys of the music to be played. The natural or open sounds follow the harmonic progression 1, 2, 3, 4, 5, 6, 7, &c.; but by placing the hand, or a cone of pasteboard, within the bell, the intermediate tones and semitones may be produced, and a scale formed, more or less pure and accurate. (See MUSIC, § *Horn.*) Finger-keys were at one time applied to some horns, but have been superseded by pistons. The old bugle-horn is now the pistoned cornet or cornopean. Of late years, C. J. Sax of Brussels has greatly improved all instruments of the horn kind, as well as flutes, clarinets, &c. The German bass-horns are made of wood, and have finger-holes and finger-keys. The basset-horn and the English horn are not really horns, the former being only a large clarinet, and the latter a large oboe, with some peculiarities of form. See Appendix to G. F. Graham's *Essay on Musical Composition*, Edin. 1838.

HORN, or *Hoorn, Cape*, commonly considered the southern extremity of America, is not a part of that continent, but the most southerly point of a small island of the Tierra del Fuego group; S. Lat. 56. 58. 40., W. Long. 67. 16. It consists of a lofty, precipitous, bare black rock, running far out into the sea; and was formerly considered dangerous to pass on account of the strong westerly gales that prevail in its neighbourhood during summer, but as these are restricted to the vicinity of the cape, vessels avoid the difficulty by sailing in a higher latitude. It was discovered in 1616 by the Dutch navigator Schouten, who named it after his native town, Hoorn.

HORNCASTLE, a market-town of England, county of Lincoln, on the Bain, a tributary of Witham, and navigable to this point, 18 miles E.S.E. of Lincoln. It was anciently a Roman station, and traces of its old walls still exist. Roman coins and other antiquities have also been discovered in the vicinity. A considerable trade is carried on by means of the river. Horncastle has a grammar school, mechanics' institute, library, literary society, and a savings bank. The market-day is Saturday; and one of the largest horse fairs in the kingdom is held here in August. Pop. (1851) 4921.

HORNE, GEORGE, author of the *Commentary on the Psalms*, was born in 1730 at Otham, in Kent. He was educated in the school of Maidstone, whence he passed to University College, Oxford. He afterwards became a fellow, and finally principal of Magdalen College. In 1771 he was chosen chaplain-in-ordinary to the king, and held that office for ten years. In 1776 he became vice-chancellor of the University; five years later, he was made dean of Canterbury; and in 1790 was promoted to the see of Norwich, which he retained till his death, Jan. 17, 1792.

Bishop Horne's only important work, his *Commentary on the Psalms*, exhibits a deep acquaintance with Hebrew and biblical lore, and is marked by a spirit of earnest piety. It has been frequently reprinted, and still retains its ground. His other works, for the most part fugitive pieces of a controversial character, are now forgotten. The best of them were written to defend the views of Hutchinson as against those of Sir Isaac Newton; which latter, until he understood them thoroughly, he at first believed were designed to subvert the theology of Scripture.

HORNER, FRANCIS, was born at Edinburgh Aug. 12, 1778. His father was a merchant in that city, of sufficient wealth to give him the best education that money could at that time procure in Scotland. After passing through the ordinary courses at the High School and University of Edinburgh, he qualified himself for the bar, and began to practise with very reasonable prospects of success. His native city, however, he found too small a field for his high aspirations and wide views, and accordingly he removed in 1802 to London, where he entered himself of Lincoln's Inn, hoping to find his true sphere in Westminster Hall. The interval that elapsed between this date and his admission to the English bar in 1807, he spent in a most comprehensive course of legal and general study; and his papers in the *Edinburgh Review* (chiefly on subjects connected with political economy) attest the extent and variety of his reading, and the largeness and soundness of his views. Entering parliament in 1806 for St Ives in Cornwall, and in 1813 for St Mawes, he allied himself with the Whigs, and fixed the attention of England by the ability with which he discussed all the questions of political economy and finance that came before the house. On the question of freedom of trade, especially in corn, he displayed the wisdom of a philosopher, and the knowledge and foresight of a practical statesman, and anticipated by nearly half a century the principles that now regulate the commerce of Great Britain. Perhaps his crowning achievement in parliament was the part he took in the great Bullion question. He was a member of the Bullion committee, and drew up the first part of the report; and it was mainly through his exertions that the unlimited issue of paper-money by the Bank of England and the private banks of the country was stopped, and gold and silver re-established as the only legal circulating media. His parliamentary and literary labours, prosecuted with noble and disinterested zeal for many years, at length wore out a frame naturally far from robust; and in 1816, having gone to Italy in the hope of recruiting his shattered health, he died at Pisa, Feb. 8, 1817.

The most striking characteristic of Horner's mind was its comprehensiveness, a quality which shows itself as remarkably in the plan of private study which he drew up for his own guidance, while only on the threshold of manhood, as in his matured parliamentary efforts. His independence of character was shown in his adoption and manful support of a political creed, which in his early youth it was almost dangerous to profess in Scotland. In choosing this creed he was influenced neither by prejudice nor by passion, but by a simple love of what seemed to him to be the truth, and throughout life he always sought after truth for its own sake, wherever it was to be found. Few Britons of this century have gone to the grave so sincerely and so generally lamented as Horner, if we except Sir Robert Peel. His countrymen found in him a safe and powerful man, who was labouring not for himself or his party but for them. "They were convinced of his talents, they confided in his moderation, and they were sure of his motives; he had improved so quickly and so much that his early death was looked on as the destruction of a great statesman who had done but a small part of the good which might be expected from him, who would infallibly have risen to the highest offices, and as infallibly have filled them to the public good." On his private character it is hardly necessary to dilate. Integrity, gentleness, and nobility of nature are accorded to him by all that ever knew him, without one dissenting voice. Sidney Smith said of him, "the commandments were written on his face, and I have often told him there was not a crime he might not commit with impunity, as no judge or jury who saw him would ever give the smallest degree of credit to any evidence against him; there was in his look a calm settled love of all that was good and honourable—an air of wisdom and of sweetness; you saw at once that he was a great man, whom nature had intended for a leader of human beings; you ranged yourself willingly under his banners, and cheerfully submitted to his sway" (*Memoirs of Francis Horner, with Selections from his Correspondence*, Lond. 1843).

HORROCKS, or HORROX, JEREMIAH, born 1619, at Liverpool, died 1641. See Fourth Preliminary DISSERTATION.

HORSE.

THE Horse is a distinct genus belonging to the order of *Pachydermata*, Cuv., and in himself the most serviceable of all quadruped animals, and ranks with the greyhound as the swiftest of those brought under the dominion of man. Notwithstanding these high qualifications, ancient history informs us that in the primitive ages of the world the ass was used in preference to him, not only as a mere beast of burthen, but for the purpose of conveying from place to place persons of the highest distinction. This, however, may be satisfactorily accounted for. Previously to the art of horsemanship being known, the ass, a superior race of animal perhaps to that generally found in Europe, was more easily managed than the horse, and better suited to the kind of food usually met with for his support. He was, in fact, found to answer every purpose of horses, until mankind increased in numbers and in wealth, when the complicated interests that were the result brought their services into use, and they were trained to the art of war. But another reason may be given for the late introduction of horses. Their use was interdicted by the Almighty in the early ages of the world; first, lest his favourite people, the Israelites, should be led to idolatry by carrying on commerce with Egypt; secondly, by their dependence on a well-appointed cavalry, they might cease to trust in the promised aid of Jehovah; and, thirdly, that they might not be tempted to extend their dominion by such means, and then, by mixing with idolatrous nations, cease in time to be that distinct and separate people which it was His intention they should be, and without which the prophecies relative to the Messiah could not be fully accomplished. Thus, in the Book of Psalms, the horse commonly appears only on the side of the enemies of God's people; and so entirely unaccustomed to the management of him were the Israelites at the period of their signal defeat of the Philistines and other idolatrous nations, that David, their commander and king, caused the greater part of the horses of the cavalry prisoners to be cut down. In the reign of Solomon, however, a cavalry force was established, but to no great extent.

In the infant state of all nations, indeed, we can readily account for the restrictive use of horses. A great deal of land that might be applied to the production of human food is requisite for their maintenance in all countries; and, in hot and sterile ones, the camel answered better, and was found ready at hand. It is true they were used in the armies of the ancient Greeks and Romans, which were not considered as complete without them. In Greece they were not so numerous; but in a war with the Italic Gauls the Romans are said to have had no less than 70,000 horse and 700,000 foot to attack their formidable enemies. The army of Xerxes, when reviewed by him at Dorsica, in Thrace, after it had passed the Hellespont, is reported by Herodotus, contemporary with him, to have contained 80,000 horse; but the judicious reader will be inclined to make considerable abatements from the boasted amount of that celebrated but ill-fated expedition, resting, as it does, entirely on the authority of Grecian writers, who represented facts in the light the most unfavourable to their enemies, and the most glorious to their own gallant countrymen.

As in the scale of excellence the horse ranks first of all animals coming under the denomination of cattle, and, as

Buffon justly says of him, "possesses, along with grandeur of stature, the greatest elegance and proportion of parts of all quadrupeds," it is not a matter of surprise that, as an image of motive vigour, he should have been the subject of the chisel and the pencil of the first artists in the world, or that the description of him by the pen should have been not considered as unworthy the greatest writers of antiquity. But it is only in his native simplicity, in those wild and extensive plains where he was originally produced, that we can form an adequate idea of this noble animal. It is here that he disdains the assistance of man, which only tends to servitude; and it is to a description of his release from this servitude, his regaining his natural liberty, that we are indebted for two of the finest similes of the immortal Greek and Roman epic bards. The return of Paris, with Hector, to the battle of Troy, is thus given in the sixth book of the *Iliad*:—

> "Ως, δ᾽ ὅτε τις στατὸς ἵππος, ἀκοστήσας ἐπὶ φάτνη,
> Δεσμὸν ἀποῤῥήξας θείῃ πεδίοιο κροαίνων,
> Εἰωθὼς λούεσθαι ἐϋῤῥεῖος ποταμοῖο,
> Κυδιόων· ὑψοῦ δὲ κάρη ἔχει, ἀμφὶ δὲ χαῖται
> Ὤμοις ἀΐσσονται· ὁ δ᾽ ἀγλαΐηφι πεποιθώς,
> Ῥίμφα ἑ γοῦνα φέρει μετά τ᾽ ἤθεα καὶ νομὸν ἵππων."

And Virgil is considered to have even exceeded Homer in that splendid passage in the eleventh book of the *Æneid*, where Turnus, turning out fully accoutred for the fight, is compared to a horse that has just broken loose from his stall:—

> "Qualis, ubi abruptis fugit præsepia vinclis,
> Tandem liber equus, campoque potitus aperto,
> Aut ille in pastus armentaque tendit equarum,
> Aut, assuetus aquæ perfundi flumine noto,
> Emicat, arrectisque fremit cervicibus alte
> Luxurians; luduntque jubæ per colla, per armos."

It is impossible, at this distance of time, to fix upon the native country of the horse, as he has been found in various forms and of various sizes in every region of the Old World. The difference in size is easily accounted for. The origin of all animals of the same species was doubtless the same in the beginning of time, and it is chiefly *climate* that has produced the change we perceive in them. Warmth being congenial to his constitution, and cold naturally injurious to him, he is produced in the most perfect form, and in the greatest vigour, when subject to the influence of the one, and not only diminutive, but misshapen and comparatively worthless, when exposed to the evils of the other. Buffon, however, is wrong in making the horse indigenous to Arabia, as is clearly proved by a reference to the Sacred Writings. In the reign of Saul horse-breeding had not yet been introduced into Arabia; for, in a war with some of the Arabian nations, the Israelites got plunder in camels, sheep, and asses, but still no horses. Even at the time when Jerusalem was conquered and first destroyed by Nebuchadnezzar, Arabia appears to have been without horses, as the Tyrians brought theirs from Armenia. That the earliest available uses of the active powers of horses was adopted by the Egyptians, the same authority satisfies us; for we read in the third chapter of Genesis that when Joseph carried his father's remains from Egypt to Canaan "there went up with him both chariots and horsemen." About 150 years afterwards, the horse constituted the principal strength of the Egyptian army; Pharaoh having pursued the Israelites with "six hundred chosen chariots, and with all the chariots of Egypt." The earliest period now alluded to was 1650 years before the birth of Christ; and 1450 years before that event, the horse was so far naturalized in Greece that the Olympic Games were instituted, including chariot and horse races.

The origin of the native horse of our own country is now merely a question of historical interest, the discussion of which would not lead to much practical benefit. That experiments, founded on the study of his nature and properties, which have from time to time been made to improve the breed, and bring the different varieties to the perfection in which we now find them, have succeeded, is best confirmed by the fact of the high estimation in which the horses of Great Britain are held in all parts of the civilized world; and it is not too much to assert that, although the cold, humid, and variable nature of our climate, is by no means favourable to the production of these animals *in their very best form*, we have, by great care, and by our attention to breeding, high feeding, and good grooming, with consequent development of the muscles, brought them to the highest state of perfection of which their nature is susceptible. They may be classed under the following heads, and treated of individually, viz., the race-horse; the hunter; the hackney, for various purposes; the charger; the troop horse; the coach, chariot, and gig horse; and the draught or cart horse.

THE RACE-HORSE.

Although we may safely pronounce that the native breed of English horses, however esteemed for other purposes, could not *race*, in the present acceptation of that word, yet it is equally obvious that they formed the parent stock of the renowned English racer. The first step to improve it by a cross with Eastern blood appears to have been taken by James I., who gave the enormous sum (in those days) of L.500 for an Arab stallion, which, however, the Duke of Newcastle, in his work on horsemanship (great authority at that time), wrote down on account, chiefly, of his comparatively diminutive size. At the Restoration, however, there appears to have been a tolerably good breed of horses in England, which Charles II. improved by an importation of Barbs and Turks, whose blood was engrafted on the original stock, already very considerably ameliorated by the services of a stallion called Place's White Turk (imported by Oliver Cromwell's Master of the Horse, who bore that name), and afterwards by those of the Helmsley Turk, followed by Fairfax's Morocco Barb. The change was at this time so visible, that the Lord Harleigh of that day expressed his fears lest it might be carried to such an extreme as to extirpate the strong and useful horse, which, perhaps, the majority of his countrymen were well satisfied with before. In the latter end of Queen Anne's reign, however, the first great trump turned up to secure future success. This was a stallion called Darley's Arabian, purchased in the Levant by a Yorkshire merchant of that name, although without any real attestation of his pedigree or country. The prejudice against Arabians and other eastern horses, the effect of the Duke of Newcastle's anathema against them, having now for the most part subsided, a good deal of their blood had been infused into the mares of that day, when another stallion, whose services were still more signal, accidentally made his appearance. We allude to the Godolphin Arabian, as he was called, purchased out of a cart in Paris, and consequently of uncertain caste, but evidently the horse of the desert; who, as will be hereafter shown, may be said to have won the game. Although at first thought so meanly of as only to be used as a teazer, yet, fortunately for the turf, he lived twenty years after his services became notorious by the accident of his being the sire of a capital racer out of a mare which the stallion to which he was teazer refused to cover; and, strange to say, no very superior race-horse has appeared in England for many years that cannot be traced to his blood. The success of this horse was much facilitated by the lucky coincidence of his arrival in England at a critical time; that is to say, when the stock from Darley's horse, and the several Arabs, Barbs, and Turks, together with the royal mares imported by Charles II. had been "crossed" (as the term is) on each other, and had produced mares worthy to be the channel of imparting his own transcendant qualities to posterity. Taking it for granted, then, that the English race-horse is descended from Arabian, Turkish, and African (Barb) blood; and also taking into consideration the various peculiarities in the form and power of each of those kinds, requiring modification of shape, qualities, and action suited to the purposes for which they were intended, it cannot be denied that a task of no ordinary difficulty was imposed on the English horse-breeders, and that they have executed that task with a masterly hand. If other countries furnished the blood, England has made the race-horse.

With the exception of one Eastern horse, called the Wellesley Arabian, the grandsire of a winner of the Oaks in 1826, also of Dandizette, who ran second for that stake in 1823, and one or two more good runners, the English turf has benefited nothing during the last three-quarters of a century from the importation of foreign blood. The fact is, that having once gotten possession of the essential constitutional parts necessary to form the race-horse (and which will be described hereafter), we ourselves have (by a superior knowledge of the animal and the means of availing ourselves of his capabilities, not only by rearing and training, but by riding him also) brought him to a pitch of excellence which will not admit of further improvement. Superior as is the air of the desert (which is said to be so free from vapours that the brightest steel is not affected with rust if exposed to it for a night) to that of our humid and ever-varying climate, which, especially in Ireland, is said to produce blindness in horses; and propitious as it must be to animals found, *as the horse was found*, in the greatest perfection when reared in it; yet were the finest Eastern horse that could be procured brought to the starting-post at Newmarket, with the advantage of English training to boot, he would have no chance, at any weight or for any distance, with even a second-rate English race-horse. They will not bear what jockeys term "squeezing" in the last fifty yards of a race, and lose all heart in an instant. The late Mr Atwood was the last racing man who ran half-bred Arabs in England, and he scarcely ever won a race with them from this cause.

Although we have spoken in disparagement of horses of the East as racers, upon the same terms with those of our own breeding, we are willing to allow them the merit of being the parent stock of all our racing blood; as it is quite evident the indigenæ of our own country, or of those European ones which approximate to it, would never have produced the sort of race-horse now seen on the British turf. The nature and character, indeed, of the horse of the desert, are peculiarly adapted to an animal which, like the race-horse, is called upon to put its physical powers to the severest test to which nature, aided by art, can submit. In the first place, the Arabian horse possesses a firmness of leg and sinew unequalled by any other in the world. This excellence, which he owes to climate, arises from his having larger muscles and *smaller bone* than other horses have; muscles and sinews being the sole powers of acting, and on them depend the lasting qualities of an animal going at the top of his speed. Bones being the weight to be lifted, serve only to extend the parts; and it is evident that such as are small but highly condensed, like those of the deer and the horse of the desert, are, by occupying less space and containing less weight, more easily acted upon by muscular force than such as are large and porous, and for a greater duration of time, without fatiguing the acting powers. But the excellence of the Arabian horse, or horse of the desert, does not end with his highly condensed bone, and flat and wiry leg, so much esteemed by the sportsman. All the muscles and fibres of his frame are driven into closer contact than those of any other breed; and, by the membranes and ligaments being composed of a finer and thinner substance, he possesses the rare quality of union of strength with lightness, so essential to the endurance of fatigue in all quick motions. He thus moves quicker and with more force, by reason of the lightness and solidity of the materials of which his frame is composed; and when to these qualifications are added the peculiar and deer-like elegance of his form, and extraordinary share of muscular power for his inches, he appears to furnish all the requisites of the race-horse on a small scale.

It is worth inquiring into the reason of the improvement of the horse of the desert, and indeed of all the countries of the East, not advancing towards perfection, as that of our own breed has done. No doubt it was intended that we should improve upon animal nature as we improve our own, and nowhere has the attempt been so successful as upon our varieties of domestic cattle; but the horse of the desert now, if he has not retrograded in his good qualities, is the same animal that he was nearly two centuries back. With the exception of the Wellesley Arabian, said to have been bred in Persia (but the assertion is unaccompanied by proof), which measured 15 hands 2 inches high, all the rest that have been imported have been little better than Galloways, which must be attributed to two causes—first, the want of being forced, as our own horses are, in their colthood, by high keep; and, secondly, by adhering too closely to the indigenous breed, or that whose blood is unmixed, by which means it has dwindled. Accurate observers must have noticed that the greater part of the horses brought to this country as Barbs and Arabians have exhibited a palpable deficiency in the points contributing to strength, and the want of general substance is apparent at first sight. It is true that, of late years, their estimation has so diminished in this country that no great pains have been taken to procure stallions of the highest caste, and scarcely any mares have been imported, and several of those sent over have been accompanied by very unsatisfactory pedigrees. We are, however, inclined to think that, as the immediate descendants of such horses are found quite inefficient as race-horses, and but few of the second or third generation have turned up trumps, unless as a rational experiment, the breeding of *race-horses* from Arabians is at an end.

We have reason to believe, that the best use to be made of Eastern horses, would be for the production of the English hunter, by the best-shaped hunting mares, nearly thorough-bred. By the help of the dam, and our present improved system of keeping young horse-stock, there would be little fear of the produce not coming to a good size, even in the first generation, as it is, for the most part, the property of these horses to beget stock larger than themselves; but by crossing the female produce in the second with our large thorough-bred horses, hunters for heavy weights might be looked for, with every prospect of success. We know that the virtue of the blood, or constituent parts, of the horse that was no racer (Marske, the sire of Eclipse, for example), has produced a racing son, by acquiring proper formation of parts from the dam; and if to the fine form of the English hunter, could be added the firmness of leg and sinew for which the Eastern horse is so conspicuous, but in which the English hunter is too often deficient, in conjunction with the larger muscles, more highly condensed bone, and well-known powers of endurance of the Eastern horse, not omitting his action, which is generally first-rate, but of which a proper judgment could be formed previously to the choice of the stallion, a great improvement upon our present race of hunters would be effected; and all such as were known to be thus bred, would meet a ready sale. It is a well known fact, that some of the most brilliant hunters England ever produced, were got by Arabian stallions; and one, by Lord Clive's Arabian, was decidedly the best horse in Leicestershire, in Mr Meynell's day, over every description of country. He was the property of the late Mr Childe, of Kinlet Hall, Shropshire, who is said to have been the first to introduce the present very spirited style of riding after hounds. Of late years, there have been some very good hunters of this breed in the royal hunt. A powerful Toorkoman stallion would not, we think, fail in getting hunters out of good English mares. That breed is the largest of any of the Eastern horses, owing to being reared on better land.

One word more on the subject of the Eastern horse, as connected with the English turf. Owing to the doubts and uncertainties that hang over the pedigrees and countries of the most celebrated stallions and mares which laid the foundation of our present breed of racers, it is impossible to determine to which individual breed, whether to the Turkish, the Barb, the Arabian, or the Persian, are the greater advantages derived from them to be attributed. They appear to us to be pretty equally divided. To the Byerly Turk we are indebted for the Herod blood (sire of Highflyer); to the Godolphin Arabian, said to be a Barb, for the Matchem blood, the stoutest of any; to the Darley Arabian (the sire of Flying Childers), for the Eclipse blood; and to the Wellesley Arabian, believed to be a Persian horse, to the only real advantage gained to English race-horses, by a foreign cross, in later years. It must, however, be observed, that the most famous horses of the last century, such as Childers, Old Crab, Eclipse, and King Herod, did not appear on the turf before they were five years old; which leads us to suppose that the failure of horses subsequently bred, as they themselves were bred, from Oriental blood, and trained at an early age, may, in great part, be attributed to the fact of the immediate produce of such horses requiring more time to come to maturity, or even to a certain degree of maturity, than those, like our present breed of race-horses, further removed from such blood; and the cause may be attributed to climate. It is reasonable to suppose that the produce of stallions and mares bred in the torrid zone, would come slower to perfection in a damper and colder country than it would have done in its own; and we may infer from this, that in proportion as horses were brought earlier to the post, and races shortened in distance, Eastern blood got into disrepute.

In Great Britain, from the highly cultivated knowledge of the mechanical structure of living bodies, with the junction of best shapes, although but for racing, this knowledge would have been comparatively in its infancy, the horse has arrived at the highest state of perfection of which his nature is capable; and in whatever country and in whatever climate his racing powers are put to the test, he has scarcely found a rival, excepting under very disadvantageous circumstances. It is true his *lasting* qualities were doubted, and he was challenged to rebut the charge; and the following was the result. On the 4th of August 1825, two second-rate English racers, Sharper and Mina, contended against the most celebrated Cossack horses from the Don, the Black Sea, and the Ural, in a race of the cruel length of 47 miles. At starting, Sharper and Mina ran away with their riders more than a mile, and up a steep hill, when the latter horse broke down, and pulled up. Half the distance was run in an hour and forty minutes. In the last half, only one of the Cossack horses was able to contend with Sharper, who, notwithstanding every foul advantage was taken by changing the weight, and dragging along his opponent by a rope, won his race in gallant style, performing the distance in two hours and forty-eight minutes. At starting, the English horses carried three stone more weight than the Cossacks; and, during the latter half of the race, the one Cossack who remained in it was ridden by a mere child. Every trial over the desert, no matter what the distance, during 1826-55, between English and Eastern horses, has been attended with precisely the same results.

From the great export trade to the Continent of English horses, and particularly those of full blood, occupiers of land cannot turn their attention to a much surer source of profit than that of breeding horses, provided they go judiciously to work. But, unfortunately for the speculators in this branch of rural economics, too much is left to chance and experiment, and thus horse-breeding becomes absolutely a matter of speculation, instead of a matter of judgment. It is true, those noblemen and gentlemen whose studs have become eminent on the turf cannot be included in this charge, unless they are extremely prejudiced in favour of a particular sire; but even with the benefit of great experience, and various other advantages, the utmost exercise of their judgment is required to ensure even a prospect of success against such a field as they have to contend with. Having said this, we will lay down a few practical rules for breeding and rearing the various kinds of horses now used in Great Britain, commencing, as before stated, with that of the race-horse.

In the first place, it may be observed there has been a great deal of discussion in various publications on sporting, but to very little purpose, on the much agitated question, "What constitutes full blood, or what is termed a thorough-bred horse?" We consider this question as very easily decided; the term "thorough-bred horse" merely implying one that can be traced through the stud-book, by sire and dam, to any Eastern stallion, or to what were called the royal mares, imported by Charles II., as they, together with two or three of the first imported stallions, form the *ne plus ultra* of all racing pedigrees. As to the assertion, that for a horse to claim the title of thorough-bred it is necessary he should be of pure Oriental descent, it cannot for a moment be supported; as, independently of the fact, that only two mares are stated in the *Stud-Book*, or elsewhere, on authority, to have been imported into England in the early days of racing, it is well known that the first British race-horses were those of British breed, changed, ameliorated, and at last perfected by the admixture of Eastern blood, and judicious crossing afterwards.

The effect of what is called crossing blood is as follows: The first cross gives one-half, or 50 per cent.; the second 75 per cent.; the third $87\frac{1}{2}$ per cent.; and the fourth $93\frac{3}{4}$ per cent. In sheep, after this, if the ewes have been properly selected, the difference in the wool between the original stock and the mixed breed is scarcely perceptible; but with the horse, the breeder must not stop here, if he means to produce a race-horse; and a curious fact is stated respecting sheep, on the authority of the Count Veltheim, of Brunswick, an extensive breeder of that species of stock. "It has frequently occurred to me," says he, "that rams, which, after an improvement of four or five descents, have rivalled all the *visible* qualities of the purest Merinos, when employed in propagation, have got very ordinary lambs, and consequently they are not fit to be used for breeding. On the other hand, a fact may be stated, wherein after a very opposite cross, pure blood, with evident improvement upon the original stock, was procured on the eighth descent. The late Lord Oxford, very celebrated for his greyhounds, finding them degenerating in courage, crossed his best bitches, with a bull-dog. The result was, after several re-crossings with pure blood, that breed of greyhounds for which he was so eminently distinguished. The immediate descendants, however, of the Eastern horses, have, almost without an exception, proved so deficient of late years, that our breeders will no more have recourse to them than the farmer would to the natural oat, which is little better than a weed, to produce a sample that should rival that of his neighbours in the market."

Much speculation has also been indulged in as to the effect of close affinity in breeding the race-horse, or what is called breeding in-and-in; a system which has eminently succeeded in breeding cattle, and also with the late Lord Egremont's racing stud. Beginning with Flying Childers, several of our very best racers have been very closely bred;

and it certainly appears reasonable that, as like is said to produce like, if we have high form and superior organization in an own brother and sister, that high form and superior organization would be very likely to be continued to their incestuous produce. In a work called *Observations on Breeding for the Turf*, published several years back by Nicholas Hankey Smith, who resided a long time among the Arabs, the author gives his opinion that colts bred in-and-in show more blood in their heads, are of better form, and fit to start with fewer sweats than others; but when the breed is continued incestuous for three or four crosses, the animal, he thinks, degenerates. By breeding in-and-in, however, he does not insist upon the necessity of breeding from brother and sister, or putting a mare to her own sire, or the sire to her own dam; but after the first cross, to return to original blood. A proof of the good effect of a close affinity in race-horses may be found in the produce of the dam of George IV.'s favourite mare Maria. By those celebrated stallions, Rubens and Soothsayer, they were worthless; but by Waterloo and Rainbow, grandsons of Sir Peter, and thus combining much of her own blood, they could run to win.

The first and most important point in the choice of a blood-mare for a racing stud, is the soundness of her constitution and limbs; although, of course, it is desirable she should be of good size and shape, with substance. How highly soever she may be bred, and however well she may have run, if she have not a sound frame, she cannot be depended upon to breed racers. If she have never been trained, of course the risk is increased; but, in either case, her form and action must not be overlooked, as it too often is, rendering the breeding of thorough-bred stock a mere matter of chance. Should she have appeared in public, her racing capabilities are to be consulted. For example, if pace (speed) was her best, as the jockies say, a stallion should be selected, who, by the known stoutness of his running is likely to tie her produce to pace, or, in other words, to give them both speed and endurance in a race. Her frame should be roomy, or her produce will be apt to be small, although, it must be admitted, there are exceptions to this rule. She should be of what is termed fashionable blood, for, if she be not, and her produce should come to the hammer, *previous to trial*, they would prove utterly worthless in the market.

It cannot admit of a doubt, that it is trespassing on the powers of nature to expect a mare, or any other female animal, to nourish her fœtus, in embryo, so perfectly during the time she is giving suck, as if she were dry or without milk. Nevertheless, it is customary to put all blood-mares to the horse the ninth day after foaling, and it is almost too much to expect that the owners will let them lie fallow, although they may in some measure resemble the man who cut up his goose to get at the golden egg. During the period of gestation, however, the thorough-bred mare should be highly kept. All animals well fed, produce their species of a superior description to those which are not well fed; and nothing more forcibly shows the beneficial effect of warmth in rearing superior varieties of the horse, than that the half-starved horse of the desert should be as good as he is even now found to be.

In a racing-stud, the period of putting mares to the horse is much earlier in the year than that of any other sort, by reason of their produce being almost always called upon to go into work before they are two years old. In fact, they can scarcely be dropped too soon in the commencement of a new year, where proper accommodations are provided for them. A peep into the seven volumes of the *Stud-Book* will satisfy inquirers into these matters, that some mares have produced more than twenty colts and fillies, and, in a few instances, a third of them have proved good runners; but, we should be inclined to think that the average would not exceed six, as the produce of each mare. It sometimes occurs that mares are put into a breeding-stud, when affected by severe lameness in the feet. When this is the case, the operations of neurotomy or unnerving is recommended; as pain, by producing fevers, not only is injurious to the formation of the fœtus, but often causes abortion. Bad, putrid smells, or being struck on the nose, also produce abortion in brood mares.

Virgil, in his excellent remarks on breeding horses, tells those of his readers who wished to gain a prize, to look to the dam; and, until of very late years, it was the prevailing opinion of Englishmen, that, in breeding a racer, the mare is more essential than the horse to the production of him, in his highest form, and we know it to have been the notion entertained by the late Earl of Grosvenor, the most extensive, though not perhaps the most successful, breeder of thorough-bred stock England ever saw. The truth of this supposition, however, has not been confirmed by the experience of the last half century, and much more dependence is now placed on the stallion than on the mare. The racing calendar, indeed, clearly proves the fact. Notwithstanding the prodigious number of very highly bred and equally good mares that are every year put to the horse, it is from such as are put to our best stallions that the great winners are generally produced. This can in no other way be accounted for, than by such horses having the faculty of imparting to their progeny the peculiar external and internal formation absolutely essential to the first-rate race-horse; or, if the term "blood" be insisted upon, that certain innate but not preternatural virtue, peculiarly belonging to some horses but not to others, which, when it meets with no opposition from the mare, or, in the language of the stable, when "the cross nicks" by the mare admitting of a junction of good shapes, seldom fails in producing a race-horse, in his very best form. The blood of some mares will only cross successfully with one particular horse, and Phryne has, for instance, not been very successful since Pantaloon died. Emma, Arcot Lass, and Barbelle have each produced a brace of Epsom or St Leger winners to a different horse. Mandane has also a strong claim to rank with the world-famed Prunella, and she foaled Altisidora by Dick Andrews, Lottery by Tramp, and Brutandorf by Blacklock. It is obvious, then, that owners of racing studs should not hesitate at paying the difference between the price of a first-rate stallion and an inferior one; and there is always one of the former to be found, to suit every description of mare. Breeders of all kinds of horses, but of the race-horse above all others, scarcely require to be cautioned against breeding from mares, or putting them to stallions, constitutionally infirm. By "constitutionally infirm," is chiefly implied having a tendency to fail in their legs and feet, during their training, which too many of our present racing-breed are given to. Still there are as many good judges who side with the earl, and affirm that the exterior conformation of the foal is principally derived from the sire, and its interior from the dam; thus throwing the responsibility of its sound or unsound lungs, which are, after all, the great test of a good racer, on the latter.

In consideration of the preference given to the stallion over the mare in the propagation of racing-stock, may be quoted the following passage, from part 3d of Percival's *Lectures on the Veterinary Art*, London, 1826:—"It might be supposed that the part the male takes in fecundation is comparatively a very unimportant one; it must be remembered, however, that the copulative act is the essential first cause, that therein the action of the organs is natural and sympathetic, and that the result is the generation of a new animal, bearing a likeness to one or both of the parents; from which it would appear, although the physical part of the male is simply to project the sperm into the female, who alone has the power of rendering it efficacious,

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that the influence of the sperm is much greater in the generative process than we seem to have any notion of, or at least than we have been able to reveal the nature of in physiology."

Rearing of Young Racing Stock.

Under all circumstances, there is too much resemblance between the speculations of the turf and a lottery; but, as the prizes it exhibits are valuable, the most effectual means of obtaining them should be adopted. It signifies little what care and circumspection have been exercised in the selection of stallions and mares, with a view of breeding racers; the prospect of success is very limited indeed at the present day, unless the produce be reared according to the improved system acted upon in our first-rate racing establishments. Such was the pertinacity of opinion combined with long-established prejudices, and in direct opposition to the daily acknowledged fact, of dry and warm countries having been the first to produce the horse in perfection, that it is only within a very few years that young thorough-bred stock has been reared in the manner in which it should be reared. A thorough-bred colt may now be said to be in training from the day on which he is dropped, so great is the care taken to force him into shape and substance. Not only is he drawing from the teats of his dam the milk of a highly fed animal, and consequently, in itself highly nutritious, but, before he is twelve months old, he eats nearly two bushels of oats per week. The time for expansion of frame is youth, and, when we see a two-year-old at the post, with eight stone seven pounds on his back, looking like a horse able to carry a light man after hounds, we most cordially assent to the answer given by the most experienced Newmarket trainer of the present age to the question, What is the best method of rearing a racing colt? "First observe," said he, "that the blood, or cross, is good; secondly, breed him as you would a sheep, from a roomy dam; and thirdly, give him as little green meat as possible, and as much corn as he will eat." The trainer we allude to has now retired, but he had all the young stock of the Duke of Grafton, and many of the first and most successful sportsmen in England, through his hands, and the annual disbursements of his establishment exceeded ten thousand pounds. That dry and hard food, as it is called, is the natural food of the parent stock from which our race-horses are descended, is beyond all doubt; and that the firmness of their acting parts is attributable to that, and to the warmth and dryness of the climate, is also admitted. Is it, then, to be wondered at, that breeders of horses, and not only of race-horses, have at length found out that dry food and warmth have the same effect in the Temperate as they have had, and now have, in the Torrid Zone? that they have discovered that, when colts are bred on rich succulent food, and subject to a humid atmosphere, the bulk of the body increases out of proportion to the strength of the bones; and to these predisposing causes are to be attributed most of the false points which we find in horses, such as fleshy shoulders, deficiency of muscle, weak pasterns, and flat feet? Virgil discovered this nearly two thousand years ago, and, when speaking in praise of Epirus, as suitable to the breeding of horses, emphatically observes:

> "Continuo has leges, æternaque fœdera *certis*
> *Imposuit natura locis.*" *Georg.* i. 60.

So careful, however, now are some of our principal and most successful breeders of race-horses to avoid these evils, that not only is a thorough-bred colt eating grass *ad libitum* become a rare sight, but he is not suffered to be exposed to rain, even in the midst of summer, no, not even to a temporary shower. The effect of rain upon horses' backs, is found to produce the worst of diseases—glanders, for instance—as is well known to all cavalry officers who have been on service with their regiments; and it cannot be innocuous to the highly-bred foal or colt. That he should be sheltered from the cold of winter, need scarcely be insisted upon here, although we are rather inclined to think that, in the generality of breeding establishments, he is more exposed to weather in the winter than he ought to be. There is no objection to a *moderate* allowance of carrots, and a little green food; but according to the old Greek proverb, Ἄλλος βίος, ἄλλα δίαιτα, *another life, anther diet*, we must hear no more of the "natural food" of an animal insisted upon by many, who is so far called upon to outstrip the laws of nature as to begin to work at fourteen months old, and to appear at the starting-post at two years old, displaying the form, character, and strength of one nearly arrived at maturity. Neither is the land on which a racing-stud is situated oftentimes sufficiently considered; but a want of such consideration has been the source of great loss. It is in vain to expect success unless upon that which is dry, and consequently of sound subsoil; and what is termed "upland ground" is most favourable. Walls, independently of security, are preferable to hedges for inclosures to breeding paddocks, as the latter harbour flies, which are very injurious to young stock, and also to their dams, in hot weather; but the present small dimensions of breeding paddocks, not exceeding a quarter of an acre, and many still less, preclude the use of hedges.

Racing colts are physicked when foals, and periodically afterwards; their hoofs, also, are pared with a drawing-knife, that, by shortening the toe, the heel may have liberty to expand. Physic, in this case, may be termed the safety-valve, and such it is in reality, for this system of forcing nature cannot be free from danger. It is found, however, materially to promote growth, as indeed does the work that our racing-colts perform at such a very early age. Muscular action produces muscular strength, and growth will be the result; and we have seen colts sixteen months old measuring 15 hands 2 inches.

Racing colts can scarcely be handled too soon:—

> "Dum faciles animi juvenum, dum mobilis ætas,"

as Virgil says of the bulls; and Horace illustrates the necessity of early erudition of the human species by the excellence of horses which have been well broken in when young. The first breaking in of colts is also alluded to by Ovid, who, like Horace, is in favour of very *careful* treatment of them, and reminds us of the necessity of it in the following beautiful line:—

> "Frænaque vix patitur de grege captus equus."

The system of breaking colts, however, is not only thoroughly well understood in our racing establishments, but is accomplished with much less severity than it formerly was, and consequently with less danger to the animal.

The time of foaling is one of great interest to owners of valuable brood mares, and particularly so when the produce is engaged, perhaps heavily, or when they are of what is termed a running family. The attention of the stud-groom is directed by sundry forewarnings, the most palpable of which is what is called "waxing of the udder," and appearance of milk, which generally precede parturition two or three days, but in some instances more. As the mare brings forth on her legs, there is little fear of the foal being overlaid by the mother; but the less she is disturbed the better, lest she should trample on its legs. Her treatment afterwards is now so well understood, that nothing requires to be said about it; but a bran mash, with from four to six ounces of nitre dissolved in it, given as soon as she has brought forth, keeps off fever. The great preventative of accidents to foals, is the simple contrivance of rollers on the sides of the door-frames, which secure them from being injured as they rush out of the hovel or shed by the side of their dams, especially in cases of alarm.

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Some persons prefer purchasing to breeding young racing stock, and it is difficult to determine between the advantages and disadvantages of the systems. It is true that, in the first case, the purchaser has a certainty of some return for his money, inasmuch as he gets his colt or filly, which the breeder may never get, after incurring a great expense on the mare. The price of a promising yearling, from a hundred to a thousand guineas, is a large sum to begin with; and we cannot, in this instance, say with Varro, that "a good horse is known from the first." If purchased after he has won in public, at two years old, he is often not to be purchased, if he has good engagements, under one to three thousand guineas, a large sum to realize, when added to concomitant expenses. Nothing but the immense amount of stakes for young racing-stock can justify such a speculation. For example, in 1824, a filly of the Duke of Grafton's won four thousand four hundred and fifty guineas, public money, by only starting twice; and Crucifix cleared L.4805 during her two-year-old season in 1839.

One of the principal drawbacks from the prospects of success in a racing establishment, is a complaint called the *distemper*, a sort of catarrhal fever, the cause of which is generally attributed to atmospheric influence, and also to any other which may produce what is termed a cold. Unlike common catarrhs, however, the distemper will run through a whole stud of horses; and if it do not, as it frequently does, end in an affection of the lungs, it leaves a lassitude behind it, which requires some time to remove. As a hot sun, with cold winds in spring, and the humid air of the autumn, are the chief predisposing causes of this complaint, an even temperature in the stable, and warm clothing when out of it, together with avoiding exposure to extremes of heat and cold, are the best safeguards against its attacks. It may be compared to a frost over the blossoms, which in one night blasts all former hopes of a crop.

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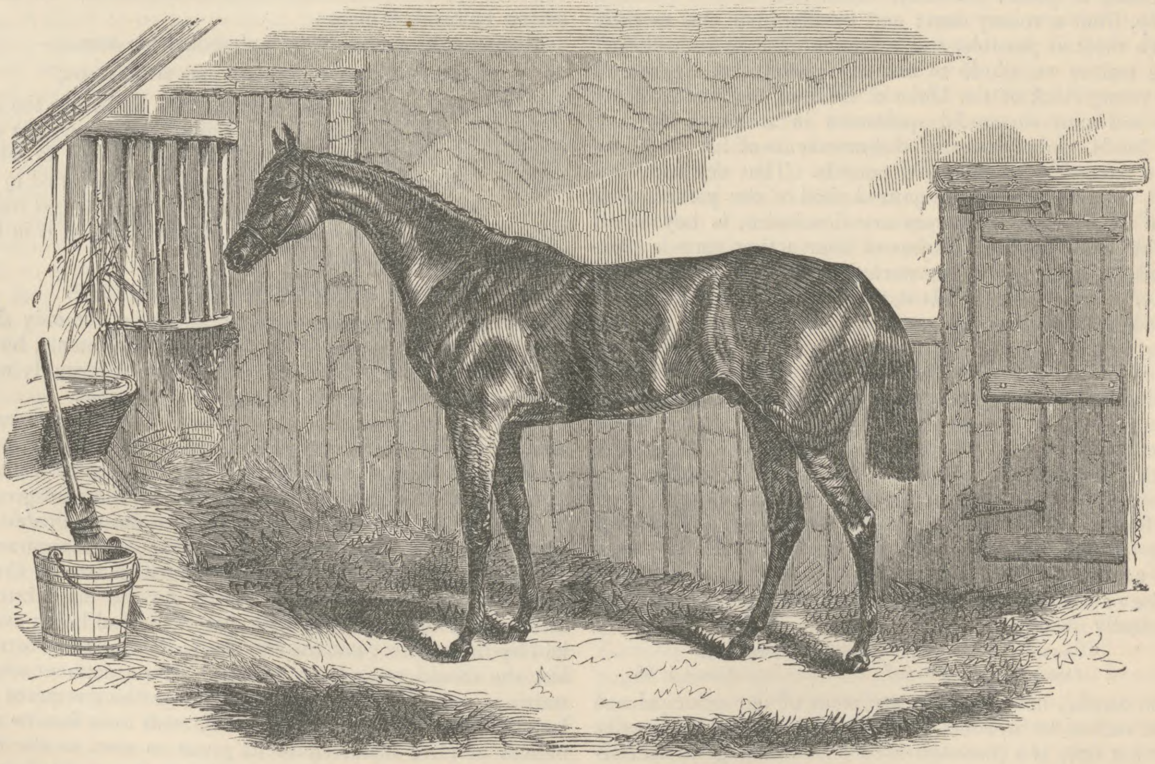
A most interesting event to a breeder of thorough-bred stock is the trial of their racing powers, which at once decides the question of their being worth the expense of training to run or not. There is a great deal of judgment necessary in the act of trying even old horses, but still more is required to form a just estimate of young ones, from the difficulty of knowing when they are quite up to the mark, as well as of keeping them there. They are generally tried early in their two-year-old season, or very late in their yearling one. It is also not one jockey in thirty who can "try" well; and, as a general rule, he ought to ride the trial horse, not the one whose powers are to be tested. William Scott was a first-rate "taster," as it is termed, and so was Frank Butler.

But we have not yet spoken of the form of the race-horse, which we will now describe; and as nothing can be considered characteristic of a species, but what is perfect of its sort, we will so far endeavour to make the pen perform the task of the pencil, as to portray his cardinal points, as nearly perfect as such means will admit of. Nature herself, perhaps, rarely exhibits perfect models in the animal world, leaving the completion of her skill to human sagacity; neither is undeviating symmetry absolutely necessary in a race-horse. In every composite, however, beauty consists in the apt connexion of its parts with each other; and just proportions in the limbs and moving levers, coupled with that elegance of form *in which there is no unnecessary weight to oppress the muscles*, so peculiar to the highly bred race-horse, is all that need be insisted upon in a racer. It is nevertheless hard to say what horse will make a racer; and also what will not, until put to the test; for, how many horses have appeared, which the eye of the sportsman would not wish to study, and yet have proved themselves very capital runners? This excellence, however, in those "cross-made horses," as they are termed, not misshapen ones, arises, as has been before observed, from their possessing parts conducive to speed and action, not, perhaps, very strikingly displayed, but, by means of greater length and depth, and a peculiar manner of setting on of the acting parts, enabling them to excel others, much handsomer to the eye, but wanting in either proper declivity, length, or, what is still more probable, in circular extent of those parts. Thus, as the wise man, according to the Stoics, alone is beautiful, so is a race-horse to be admired solely for those points which make him a good race-horse.



Race-Horse.

Although symmetry and proportion form a perfect figure, and they become deformities when any of the component parts exceed or fall short of their due proportions, yet it is not always necessary to measure by the standard of perfection. Suffice it, then, to state the generally approved points of the English race-horse.

We commence with the head, not merely because it has always been considered as the most honourable member in the human frame, but as it is one of the leading characteristics of the thorough-bred horse. His broad, angular forehead, gives him that beautiful expression of countenance which no other breed possesses; and the tapering of the face from the forehead to the muzzle, forms a striking contrast with the large face of the cart-horse, and the forehead scarcely wider than the face. The race-horse should have a black, lively, and rather prominent eye, which denotes a sound constitution; and as horses do not breathe through the mouth, but only through the nose, the nostrils should be rather expanded and flexible, that they may accommodate themselves to quickened respiration, as the speed of the animal increases. But they should not be over large. "Naribus *non angustis*," says Varro, and he is right. Beauty in the head of the race-horse, however, is only a secondary consideration to the manner in which it should form a junction with the neck, as on that, in a great measure, depends the goodness of his wind in a race. His jaws should not only be thin, and not approach too near together at the throat, but they should not extend too high towards the onset, or they will impede his freedom of breathing. The neck of all horses should be muscular; but what is called a loose neck in a race-horse, is not so objectionable as in a hunter, and is considered as indicative of speed. But as the head of a horse may be called the helm which guides his course, changes, and directs his motions, it is not only desirable that, as he cannot move his head but with the muscles of his neck, those muscles should be pliant, but that he should also have what is termed a good mouth. It is asserted that the weight of the head and neck, the effect increasing with their distance from the trunk, adds to the speed of the horse, by throwing his weight forward; but this is no argument for *additional* weight or length in those parts, which ought to be duly proportioned to the trunk. The neck of the race-horse should be in no extreme, but rather long than otherwise, and not too much arched.

As horses are said to go with their shoulders, these may be considered as highly important points. They vary in form more than any other part of the horse's frame. Those of Flying Childers rose very high and fine towards the withers; whereas, a firkin of butter rested, unsupported, on the withers of Eclipse, when in covering condition. Upright shoulders, however, being (though not in Teddington's case) an impediment to speed, obliquity of the scapula is absolutely necessary, but we do not insist upon their running fine at the withers. We consider the shoulders of Eclipse to have resembled those of the greyhound, wide at the upper part, and nearly on a line with the back. Large, or even what are called coarse shoulders, contribute greatly to strength, and are no impediment to speed, if there is proper declivity of the scapula, or shoulder-bone. The withers, when high, or thin, should enlarge gradually downwards, and there should be four or five inches between the fore-thighs, but less between the feet.

The true position of the limbs is a most material point in the race-horse, as it causes him to stand over more ground than one which is otherwise formed, although possessing a more extended frame. One of these essential points is, the setting on of, and length in, the fore-arm, or part from shoulder to knee in the fore leg; and another is, the declension of the haunch to the hock in the hind leg, which is termed "well let down in the thigh." It is from having those points in excess, that enables *the hare* to describe a far greater circle, and cover more ground at one stroke, than any other animal nearly double her size. In fact, the arm should be set on at the extreme point of the shoulder, which insures this act of extension, and also adds to the declivity of the shoulder. The knee should be broad and flat, and if appearing somewhat prominent, the better. All the Herod legs had prominent knees (and no legs stood work better than they did), concussion in galloping being diminished in legs so formed. The cannon, or shank, from knee to fetlock, should be of moderate length in the race-horse (longer than in the hunter), and, above all, the leg should appear flat, not round, with sinews and bones distinct; and the former appearing to be very firmly braced. The pastern of the race-horse should be long, lax, and rather small than otherwise; length and laxness serving as springs, and smallness contributing to agility, and consequently to perseverance or bottom. Some comparison will hold good between this point in a horse, and the "small of the leg," as it is called, of a man, in contradistinction to the calf. Under the pressure of fatigue, no man complains of the "*small* of his leg" giving him uneasiness, but his calves often give him notice that he has done too much. The hoof of the race-horse should be of moderate size in proportion with the leg above, but, of course, those whose hoofs are unduly small cannot get well through dirt.

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We have already alluded to the bone of the thorough-bred horse, which much exceeds that of any other variety of this animal, in its compactness and solidity; which qualities, as the span in the gallop must give a shock in proportion to its length, are admirably adapted to the race-horse. We cannot say of him, what Job said of the behemoth, that "his bones are like bars of iron;" yet, as in proportion to the muscular power of the animal is the dense quality of the bone, that of the race-horse need not, nor should not, be large. Experience teaches us, that bones very rarely break; fractures, when they do occur in racing, being almost invariably in the joints; and rather small bone in the leg of a race-horse, supported by broad and well-braced sinews and tendons, placed distinct from the bone, and forming what is called a flat and wiry leg, is most desirable, and found to be indicative not only of speed and endurance, but likewise of soundness in severe work. It is only those who are ignorant of the anatomical structure of animals, that fix the basis of strength in the bony substances alone, not considering the muscular appendages, which constitute the main-spring of strength and action.

As the strongest bodies owe their vigour to the milk they receive in their infancy, our recommendation to keep brood mares well will not be considered as unsuitable; but the connexion between milk and bone is also deserving of a remark. When animal bones are divested of their oil and jelly, the earth which remains is chiefly lime, united with phosphoric acid. It is worthy of notice, that phosphate of lime is found in abundance in milk. This seems to indicate, that Nature thought fit to place, in the first nourishment of animals, a quantity of osseous matter, with a view to the necessary celerity of the formation and growth of the bones in the earliest stage of their lives. This is one of the numerous instances of the beneficence of the Creator, exemplified by the science of chemistry, and shows the advantages to be expected from a good flow of milk in a mare that is well fed; and it is a remarkable fact, that the nearer the female approaches to the period of parturition, the more is the milk charged with this calcareous phosphate. Nor is it until the digestive organs of the food are sufficiently strengthened to answer the purposes and work of animalization, that this earthy salt disappears.

But to proceed with the form of a race-horse. The race-horse should have length, but the length should be in his shoulders and in the *quarters;* that is, the part posterior to the hips, and not in his back. To give him that elegance of form for which he is so conspicuous, there should be no acute angle or any straight line. His shoulders should go into his neck at the points, *unperceived*, and his back should sink *a little* behind the withers, which gives his rider a good seat, and does not in the least diminish his strength. On the contrary, horses with very straight backs are generally deficient in their fore-quarters, as well as in their action; and we have known some very good racers, Glencoe and Haphazard for instance, considerably hollow-backed. There should be a little rise in the loins, just behind the saddle; but the race-horse cannot be too closely ribbed up, if you wish him to stay a distance, and carry weight. The ribs should stand out from the spine, producing what is called a round barrel, together with depth of carcass, a formation which not only gives strength of body and constitution, but, by admitting the intestines to be comfortably lodged within the ribs, imparts freedom of breathing, activity and beauty to the whole frame of the horse, other parts being proportional. These useful points must not be carried to an extreme, or the horse may be "too heavy for his legs;" and we know that light-bodied horses save their legs much in their gallops, which accounts for mares and geldings standing the severity of training to a later period of life than stallions, by reason of the former requiring less work, from not generally carrying so much flesh as the latter.

There is no part, excepting the head, so truly characteristic of high breeding in the horse, as his haunch. If a little of the elegance of the parts, however, is diminished by the width of the hips, it will be recompensed by increased strength in the animal, as is the case with broad-shouldered men; and when accompanied with good loins, these protuberances of the ilium can scarcely be too great for the purposes of power and action. We next come to the thigh, the form and substance of which is most material to the race-horse; for although horses are said to go with their shoulders, the power to give the impetus in progressive motion comes from behind. With all animals endowed with, and requiring extreme rapidity of motion, the thigh is furnished with extraordinary powers and length—the hare, for example, whose thighs are let down to a great extent for their size, and the lower part of the hinder leg placed under them, as that of the racer should be, from a proper curve of the hock. The speed of the ostrich arises from the power of the muscles from the pelvis to the foot; and the thigh of the fighting cock is a point much considered by breeders. It is not necessary that a race-horse's thigh should be very large, but it should exhibit well developed muscle. Descending lower in the limb, we arrive at the hock, a very complicated joint, but the form of which is most important in the race-horse. It should be large and lean, and the point of it projecting behind the body, which greatly increases the power of the lever in action, as will presently be most satisfactorily shown.

Size.

The point of perfection in most things lies at a middle distance between two extremes, and such is the case here. The medium height, about 15 hands 2 inches, to 15 hands 3 inches—4 inches to a hand—is the best for a race-horse. As the long beam breaks by its own weight, so large animals have rarely strength in proportion to their size. On the English turf, however, the very large horses that have appeared have, with a very few exceptions, not been found so good under high weights, as those of a medium height; and several instances are on record (Meteora, Whalebone, and others, for example), of the best horse of his year being very nearly the lowest. Ancaster Starling, Gimcrack, Highlander, Milksop, and several of the best 14 hand 2 inch horses of the last century, could also defeat 16 hand horses cleverly at 4 miles, under 12 stone; and those modern dwarfs Mickey Free and Midas have carried 8 st. 7 lbs. with good success.

The following are amongst the principal and essential points of a race-horse, pointed out by Mr Darvill in his *Treatise on the English Race-horse*, London, 1834:—

"His head should be small and lean; his ears small and picked; his eyes brilliantly large; his forehead broad and flat. . . . . . His throat should be clean, and fine from the butt of the ear down to its centre, with a good wide space between the jaw-bones, which latter should be thin. . . . . The neck should be moderate in length. I prefer its being wide; I mean its width should be formed by the substance of muscles which pass along each side of the top part of it; from the withers to the head it may gradually rise a little in its centre, but by no means to any extreme, as I have a great aversion to a high-crested race-horse. Indeed, I would prefer that his neck should be rather of the ewe or deer-like shape, than that it should be loaded on the top. As to the lower part of the neck, I have no very particular remarks to make, further than the trachea or windpipe should be spacious and loosely attached to the neck on its way to the lungs.

"The withers may be moderately high, and, if the reader like, they may also be moderately thin; but, with respect to this latter point, I am not so very particular, provided the shoulders lay well back. From the withers the back commences. I confess that appearance may be in favour of a horse that has his back a little low or hollow. As a saddle-horse this may be all very well, but for a race-horse to have strength and liberty of stride his back should be straight and moderately long, with the shoulders and loins running well in at each end. The loins should have great breadth and muscular substance, so much so as for them to have the appearance of being raised as it were on their surface; and those muscles posterior to the loins should fill up level the top part of the quarters to the setting on of the tail, which latter should be set on pretty high up."

After describing the fundament, which, if small, close, and tight, and rather projecting than otherwise, Mr Darvill considers as a good constitutional point, he thus proceeds:—"I now come to speak of the body, or what is by some people commonly called the 'middle piece' of the horse, and which is divided, internally, into two cavities by a muscular substance called the 'diaphragm.' The anterior cavity, the chest, contains the lungs, the heart, &c. The posterior one, the abdomen, contains the stomach, intestines, liver, kidneys, &c. Now, with respect to the external form of the body, which contains and protects all those numerous organs so important to life, I shall first make my observations on the chest. To use a common phrase, and somewhat an expressive one, a horse in this part should be what is called 'well over the heart,' that is, he should be deep in his girth, round or well arched in his ribs. I mean by this, that a rider on the back of a race-horse (as they are generally better about the chest than horses in common use), should feel he has some breadth or substance between his legs; and there should be a good swell of muscle before his knees, or the centre of the flaps of the saddle. The chest, thus spaciously formed, gives room for respiration, so that in training the horse's wind can be brought to the greatest perfection, which enables him to run on in long lengths. The next part to be treated of is the abdomen or belly, or what is usually called the carcass. It may perhaps appear a little strange, but I have a great aversion to what is commonly called a good-carcassed horse, nor am I particularly partial to a large sheathed one. I like both these parts to be in the medium, as I do also that of his being well ribbed up. It is true that a horse being well ribbed up denotes strength, and a short close-made race-horse is, in running, handy at his turns, and, as I have already noticed, he is generally a pretty good one under high weights

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over a small round cock-pit course; but this description of course and sort of running is not now so much practised as formerly, or rather it is a sort of racing that does not exactly suit long-striding horses, as most of those are that run in Newmarket. Another thing is, that horses with large carcasses are mostly great gluttons; they put up flesh very rapidly, and are very difficult and troublesome to train, in consequence of their constitutions being too strong, or proportionably too much for their feet and legs. Such horses not only seldom remain long in training, but they cannot remain long in condition without their becoming stale in themselves, as also on their legs, and those are my reasons for objecting to very large-carcassed horses; yet I do not wish horses to be what is termed 'tucked up' or waspish in their carcasses. I like a horse's carcass to be in the medium; that is, it should be straight and handsome from behind the girths of his saddle; and what will make up sufficiently well, and give him sufficient strength of constitution, is the well formation of the parts already noticed, as the chest, the loins, and the fundament.

"To return to the fore extremities. The shoulders commence from a little below the withers; they should lie most particularly well back, should be deep, broad, and muscularly strong; yet those muscular parts should appear to the eye as being moderately so, that is, not unproportionally loaded. These muscles should be distinctly seen, there should be no appearance of fat, or, as it is technically termed, 'adipose membrane.' The shoulders cannot well be too oblique in their descent to the front of the chest; here, on each side, a joint is formed by the lower part of the scapula or shoulder-blade being united with the upper part of the humerus or arm-bone. Those joints, thus formed, are usually called the points of the shoulders, which points should appear straight or level. There should be no coarse, projecting, or heavy appearance about the points of the shoulders of such horses as are intended to race; nor indeed does this often occur, unless where it happens that the chest or counter of the horse is unproportionally wide. In taking a front view of the chest, it should appear moderate as to breadth; and if its prominency is at all to the extreme, it should be in consequence of the fulness or substance of those muscles covering the breast, which muscles should be lengthy, and their divisions distinctly to be observed. The fore-arm should be broad and long, and most particularly well furnished with muscles on its top parts, inside as well as out; I mean by this, that the muscles on the top and inside of the arm should here be so large as to leave but a moderate space between the fore-legs, immediately under the chest, and which muscles should appear, as those in front of the chest, distinctly divided. The posterior part of the top of the arm is called the 'elbow,' this should appear (the horse in condition) somewhat on a level with the body; if it at all deviates from this appearance, I would prefer its standing in, to that of its standing unproportionally out. The knee-joint should be large, broad, and flat in front; generally speaking, the larger and broader all joints are in reason the better and stronger they are; and the longer, coarser, and rougher, their projecting points or *processes* are, the greater and more secure will be the lever for the muscles or tendons to act upon, provided such projecting parts or joints (as the hocks and pasterns) do not amount to disease, as that of producing spavins and ring bones. The legs from the knee to the fetlock cannot well be too short, neither can they well be too broad or too flat, nor their flexor tendon scarcely be too large or appearing too distinctly divided, as it were, from the leg. The fetlock-joint should also be large, and the pastern proportionally strong, but its length and obliquity should be in the medium. The wall or crust of the feet should also be moderately oblique, with the heels open, and frogs sound; this, indeed, is generally the state of racing-colts on first bearing their paddocks, if their feet have been paid proper attention to during the time they may have remained there. Yet the feet of such of them as have been some time in work will occasionally get out of order; they grow upright and strong; the horn gets hard and brittle, and the heels more or less contracted; almost all of which defects are too often occasioned from the want of proper attention being paid to them at the time of shoeing, and of proper applications being applied to them in the stables. Previous to concluding my remarks on the fore extremities, it may not be amiss to observe to the reader, that, supposing him to stand opposite to those parts of the horse, if the animal is formed in them, as I have already described, the centre of the top part of the fore-arm, to be well placed, ought to be nearly or quite in a parallel line with the top or fore-part of the horse's withers; and again, from the top part of the form-arm down to the foot, for the horse to stand firm and well, and have the power of using his fore-legs well, he should stand perfectly straight on them; I mean by this, they are not to appear too much under him, or too much out or away from him. Suppose again, for example, a man standing in front of the horse, and here taking a view of the foot, the centre part of the wall or crust should be in or on a parallel line with that lower part or joint of the shoulder, commonly termed its point. A horse's feet, thus placed, will neither be too much out nor too much in; but should his feet deviate from what I have here observed, by amounting to a fault, in turning too much out or too much in, I should prefer their being a little out, to that of the other extreme of turning in, and being what is called 'pigeon-toed.'

"I shall now proceed to describe the hind-quarters or posterior extremities. As may be supposed, the well formation of those parts is of the utmost importance to a race-horse in his running; it is, therefore, necessary that they should be, in breadth, substance, and length, of very superior dimensions. The hips should have a great breadth between them; and if they are a little coarse or projecting so much the better, provided such coarse projections are not in the extreme, or appear vulgar or unsightly. From the centre and posterior part of the loins to the top of the tail is called the 'croup,' and should be of great length; and, if it deviates from that of a straight line, it may be somewhat arched in the centre; the croup being thus formed gives great breadth to the top of the quarters, the length of which, from the croup down to the hock, cannot scarcely be of too great an extent, in order that there may be sufficient room here for the attachment of those broad, powerful, lengthy, and distinctly divided muscles on the outside of the quarters and thighs; and there should also be a similar portion of such muscles on the inside of the quarters and thighs; so that a man, who is a good judge, taking a posterior view, may observe how the horse is made. In this position he should be, as it were, struck by the appearance of the great breadth and length of the back part of the quarters, and as he moves his head to the right or left, the centre and outside of the quarters and thighs, and the swell of the muscles, should appear beyond a level with the hips. The upper part of the muscles on the inside of the quarters should appear quite close to each other, so that no vacant space should be visible between them, as that of an appearance of the horse being (if I may thus express myself) chucked up in the fork. Such should be the lengthy and muscular quarters of a well-made race-horse.

"The stifle-joint should be in a direct line under the hip, and the length from this joint to that of the hock cannot reasonably be too long, and the farther out of the angular or oblique position of the thigh-bone the better, so as to admit of the back part or projecting point of the hock appearing some distance out beyond the top of the hind-quarters; those parts being thus formed, admit of a very considerable lever for the main tendon here to act upon the tendon Achilles, which, like the flexor one of the leg, can scarcely be too large or too distinctly seen in its commencement, from the lower part of the quarter to its insertion into the posterior or projecting point of the hock, the *os calcis.* The hock should be broad and wide, with a clean lean appearance, and those soft parts which are occasionally the seat of through-pins and bog spavins, in a sound well formed hock, should appear more as cavities than as having the above-mentioned projections, and which are sometimes the cause of lameness. The hind-leg, like the fore one, should be short, broad, flat, and straight; the trifling angle formed by the hock should, together with the moderate obliquity of the pastern, bring the extremity of the toe nearly under the stifle-joint.

Action of the Race Horse.

As amongst the Egyptians the lion was the hieroglyphic of strength, so was the horse of agility; and truly nothing displays it more elegantly than he does, when in a state of liberty. In the race-horse, action, as in eloquence, is the next thing to substance; and *virtus in actione* should be the horse-breeders' motto. But the action of the race-horse is of a nature peculiar to his calling. He must not only possess great stride in his gallop, the result of great proportion in his limbs and moving levers, but also a quickness in repeating that stride, or he would lose in time what he gains in space. It is then when stride and quickness are united, that the fleet racer is produced; and in his race with Diamond, Hambletonian is asserted to have covered twenty-one feet at a stroke at the finish of it; and Eclipse is generally believed to have covered eighty-three and a half feet of ground in a second, when going at the top of his speed, which, by a calculation by Monsieur Saintbel, amounted to about twenty-five feet of ground covered at a stroke. Different ground requires different action; and the long striding horse may be beaten on a hilly, or turning course, by one of a smaller size, but with a shorter stride, which prevents the Newmarket courses being a certain criterion of a good runner at Epsom, which is very trying ground. The state of the ground, likewise, whether wet or dry, soft or hard, tells so much in a race, as often to give it to a horse very little thought of at starting, as was the case with Tarrare and Saucebox, winners of the St Leger, at Doncaster, in 1826 and 1855. The celebrated Euphrates, the winner of so many gold cups, and who ran till he was in his teens, was nearly a stone below his usual form, after even a hard shower of rain. This variation of fleetness corroborates our assertion, that the virtue of what is termed blood is mechanical, or that the excellence of all horses is mechanical, and that the smallest deviation from a true formation of the acting parts operates so powerfully as to render them, under certain exertions, nearly valueless.

Wind.

It is true, "speed wins the race;" but to make it available to the race-horse, it must be accompanied by endurance, or "bottom." A great promoter of this is clear wind, or freedom of respiration, the want of which makes the war-horse rebel in the manège, the hunter run into his fences, the draught-horse fall, as if he were shot, and the racer either stop, or bolt out of the course. In fact, when the organs of respiration are fatigued, all animals are nearly powerless. The cause of good wind may be distinguishable to the eye, and arises chiefly from depth in the forequarters, which implies a capacious thorax or chest. However wide a horse may be in his foreparts, he will not be good-winded unless he is, at the same time, deep. But still wind in the race-horse depends on something more—on the nature of his constituent and component parts, which, if in proper proportion, impart to him strength and agility, giving him that easy action which will not readily fatigue these organs of respiration; and so enable him to run on, when others, less gifted by nature than himself, are forced to slacken pace. The good effect of clear wind in a race-horse is in fact twofold; first, it gives him signal advantage in a race; and, secondly, horses thus organized require less work to make them fit to start.

The following passage on this point is worthy of remark:—"When the animal powerfully exerts himself, a more ample supply of pure blood is required to sustain the energies of life, and the action of the muscles forces the blood more rapidly through the veins; hence the quick and deep breathing of a horse at speed; hence the necessity of a capacious chest, in order to yield an adequate supply, and the connection of this capacity of the chest with the speed and the endurance of the horse; hence the wonderful relief which the mere loosening of the girths affords to a horse blown and distressed, enabling the chest to expand, and to contract to a greater extent, in order to yield more purified blood; and hence the relief afforded by even a short period of rest, during which this expenditure is not required, and the almost exhausted energies of these organs have time to recover. Hence, likewise, appears the necessity of an ample chest for the accumulation of much flesh and fat; for, if a considerable portion of the blood be employed in the growth of the animal, and it be thus rapidly changed, there must be provision for its rapid purification; and that can only be effected by the increased bulk of the lungs, and the corresponding largeness of the chest to contain them" (*Farmers' Series*, "The Horse," part vi., p. 182).

Certain thorough-bred horses would deceive an inexperienced observer as to the real state of their organs of respiration, by an appearance of difficulty of breathing, which in reality they do not possess. The term for this apparent defect is, in one instance, hard breathing, or high-blowing; and, in another, "cracking the nostrils." Of the first description was the celebrated Eclipse, whose breathing in his gallop could be heard at a considerable distance; and of the latter (still more common) may be reckoned many of the best racers of past and present days. Indeed, a race-horse cracking his nostrils in his exercise, and snorting well afterwards, are considered indicative of good-windedness. On the other hand, when a race-horse becomes a roarer, which is a common effect of a severe attack of the epizootie, called the *distemper*, he is rarely able to struggle in a race, although there have been several instances of winners under such very unfavourable circumstances.

Temper is a property of much importance to the race-horse, subject as he is to its influence under more trying circumstances than most other descriptions of horses. In the first place, his fine and nearly hairless skin, softened and cleansed as it is by frequent copious perspiration, is so highly sensible to the friction of the wisp and brush, as to induce him to try to rid himself of his tormentor by attacking the person who is dressing him, and thus becomes vicious in the stable. It will also be recollected that he is at this time perhaps in the very highest state of condition and good keep of which his nature is susceptible. On the race-course, again, he has often to encounter the (to him) unnatural sound of music, and many strange objects; perhaps two or three false starts before he gets into a race; and too often, when doing his best in a race, very severe punishment both by whip and spur. It is in his race, however, and chiefly in the last struggle for it, that the temper of the race-horse is most put to the test; and, if really bad, he either runs out of the course, to the great danger of his rider, and to the inevitable loss of his owner and those who have betted on his winning, or he "shuts up," as the term is, and will not head his horses. It is evident, then, that breeders should not send mares to stallions of known bad temper, as nearly all those propensities are found to be hereditary.

It would be absurd to draw a comparison between the English race-horse in training and the horse of the desert "educated," as Mr Gibbon eloquently says of him, "in the tents, among the children of the Arabs, with a tender familiarity, which trains him in the habits of gentleness and attachment." Nevertheless, we are inclined to believe that the tempers of many naturally quiet horses are made uncertain, and oftentimes decidedly vicious, by want of proper judgment, as well as good temper, in those also who have the management of them. Brutes, like men, demand a peculiar mode of treatment when we require them to do their utmost for us; and it is certain that this principle holds good in regard to both—namely, *that in general kindness gains its point, cruelty provokes resistance, and a proper degree of severity produces obedience.* The panther in the fable knew who fed her with bread, and who pelted her with stones; and we may be assured, that so noble and high-spirited an animal as the horse feels with acuteness sensations of pleasure and pain.

We often hear it asserted that the British thorough-bred horse has degenerated within the last few years, and is no longer the stout and long-enduring animal that he was in the bygone century, particularly during the last twenty years of it. We are inclined to believe that there is some truth in this. We do not think we have such good four-mile horses, as they are termed, as formerly, which we consider easily accounted for. They are not wanted, very few four-mile races being now run, even at Newmarket or in the country, and therefore a different kind of race-horse is sought for. It may, however, be true that the inducement to train colts and fillies, at a very early period of their lives, for these short races, has had an injurious effect on their stamina, and, consequently, on the stock bred from them. Formerly a horse was wanted for a lifetime, now he is cut up in his youth to answer the purposes of perhaps but one day—a system, we admit, quite at variance with the original object of horse-racing, which was intended to benefit the community, by being the means of producing, as well as displaying, the constitutional strength of the horse in its very highest perfection. Another cause may have operated in rendering thorough-bred horses less powerful than they were, or less capable of enduring severe fatigue. During the period of high weights and long courses, horses and mares were kept on in training until after they had arrived at the age of maturity, neither did they begin to work so soon; whereas now, no sooner have they won, or run well for some of our great three-year-old stakes, than they are put into the stud to produce racing stock, which is perhaps to be used much in the same manner as they themselves have been used, or, we should have rather said, abused. The amount of work which horses now get through at two years' old is enormous. Lord Alfred, for instance, ran twenty-four races at this age, and won nine; and Clothworker won twenty-nine out of fifty-nine; and Rataplan thirty-eight out of sixty-three races during two consecutive seasons. Zohrab, and Isaac and Naworth, also retained their racing powers for seven or eight seasons; and Alonzo, who began to race as a two-year-old in 1849, is still in good winning form in 1856.

But to return to the alleged alteration for the worse in the British race-horse. We admit the fact, that he is not generally so good at high weights over the Beacon at Newmarket, or any other four-mile course, as his predecessors were, whose descent was closer than his is to the blood of Herod and Eclipse, and the descendants of that cross, said to be the stoutest of any. Nevertheless he is, in his present form, more generally adapted to the purposes to which the horse is applied. He has a shorter but more active stroke in his gallop than his predecessors had, which is more available to him in the short races of the present time than the deep rate of the four-milers of old times; and as he is now required to start quickly, and to be on his legs, as the term is, in a few hundred yards, he is altogether a more lively active animal than formerly; and, as such, a useful animal for more ends than one. In former days not one trained thorough-bred horse in fifty made a hunter. Indeed few sportsmen had the courage to try the experiment of making him one. He went more upon his shoulders, as well as with a straighter knee, than the modern race-horse does, and required much greater exertion in the rider to pull him together in his gallop. All those sportsmen, however, who remember such horses as the late Earl Grosvenor's John Bull and Alexander must admit that in form and substance they were equal to carrying the heaviest weight across a country, and the last-mentioned horse was the sire of several very powerful, at the same time very brilliant hunters. But as it is action, after all, that carries weight, the thorough-bred horses of this day are not deficient in that respect, unless undersized; and there are more thorough-bred hunters at this period, and have been more for the last thirty years, than were ever known before. This improvement in action also qualifies the full-bred horse for the road; whereas formerly not one in a hundred was fit to ride off turf.

"The Druid," in his new work, *The Post and the Paddock*, after mentioning that the late Lord George Bentinck had thirty-eight horses in training one season, and that his losses on his colt Farintosh, in stakes and forfeits alone, reached L.3000, thus epitomizes the leading points of the turf as it is:—"Mr Mostyn's winnings in stakes are said to have been about L.22,500 in 1847, an amount which has, we believe, never been exceeded. In value the L.6325 Derby of 1849 still keeps the lead; while the L.3378 which was taken at the Doncaster Grand Stand in Stockwell's year is said to be the largest sum of the kind on record. The subscribers to the above Derby numbered 237, and the luckiest of handicaps was the Chester cup of 1853, when 131 out of 216 horses accepted. This cup also brought out forty-three starters in 1852, which is more than have ever been seen at the starting-post in the memory of man before or since the handicap era—that inevitable result of railway facilities for "getting a length" set in with such intensity. None of these "great facts" bear date in 1855; but taking Weatherby's *Calendar* as our guide, we may characterize the turf of that year as a vast institute for sport, comprising 144 meetings in Great Britain and Ireland, which were attended by 1606 horses, of whom only 680 were winners, fed by L.60,000 of added money, inclusive of the value of cups and whips, and diffusing L.198,000 in added money and stakes, "more or less."

Speed of the Race-Horse.

All animals in a state of domestication exhibit powers far beyond those that are natural to them in their wild state, and writers on the horse have advanced to the utmost verge of possibility, in recording the maximum speed of the English race-horse. Most of the instances stated by them, such as Flying Childers having run a mile in a minute, are unsupported by authority, and therefore not worthy of regard. That the horse, however, has ever been considered the swiftest beast of the forest, may be gathered from the frequent allusions to his fleetness by inspired as well as by heathen writers. Thus, the chariot-horses of Oenomaus, King of Elis, were said to be begotten by the winds, emblematical of their prodigious swiftness; and Homer represents the steeds of Achilles to be the produce of Zephyrus (the west wind, said to be the swiftest of any), and Podarge,

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whose name signifies speed. Nor is Virgil far behind the rest in his encomium on the fleetness of his colt, which he makes to challenge the very whirlwind itself. As it is speed, however, that wins the race, it is most essential to the race-horse, provided it be accompanied by stoutness; and unless we wish to fly through the air like Pacolet on his wooden horse, we may be contented with the speed of the present English race-horse. One minute and forty-five seconds is considered first-rate time for a mile; and the one mile six furlongs, and one hundred and thirty-two yards, St Leger course, is done, on the average, by three-year-olds, carrying 8 st. 7 lbs., in 3 minutes 20 seconds. West Australian's Ascot cup race, in 1854, when he ran the very severe 2½ miles course with 8 st. 5 lbs. in 4 minutes 27 seconds, is the best modern time we have.

Expenses of a Breeding Racing-Stud.

Some persons must be breeders of race-horses, but whether to profit or loss, depends on various circumstances. Amongst them may be reckoned the following:—Judgment in selecting the parent stock or blood; conveniences for keeping the produce well and warm, and on land suitable to breeding; and plenty of money at command to enable a breeder to purchase mares of the very best racing families, and to put them to the best of stallions. When this is the case, we think breeding (we mean quite distinct from risk in racing) would seldom fail to pay, if the foals were sold off at weaning time, or even at a year old. The price fetched by the two hundred blood yearlings, which are usually brought to the hammer in England, averaged, during the racing seasons of 1854-55, about 127 guineas, which is calculated for all prices, from 10 guineas to 1000 guineas, or in the case of Lord of the Hills, 1800 guineas. Within the fifteen months which preceded this remarkable (1855) sale at Doncaster, to Mr S. Crawfurd, 1000 guineas, 1020 guineas, 1000 guineas, 1200 guineas, and 1400 guineas, were got for yearling colts in public and private; and 900 guineas and 810 guineas for yearling fillies. The average price at the royal sale of 1854 was 441 guineas for fourteen, many of whom were of the Orlando blood, which fetches a higher price than any other we have. No doubt, in all studs, great loss is sustained by a certain proportion of the young stock which promise to be small and not worth training; but here breeders are often deceived. For example, the late Lord Grosvenor sent Meteora, the best mare in England of her day, to Chester Fair, when two years old, to be sold for L.16, because she was considered as too small; and he also suffered Violante, the best four-mile racer of her day, to be sold, *untried*, for L.50, but fortunately purchased her again. The great prices, however, occasionally paid to breeders for some horses (4000 guineas, for example, to the Earl of Jersey for Mameluke, and 3500 guineas for Bay Middleton), make up for the loss inseparable from such as, by misshape, diminutive size, and casualties, are culled out, and sold for what they will fetch, which seldom amounts to much. Five thousand guineas was refused for Plenipo; and the greatest price ever given for a race-horse was 6500 guineas for the two-year-old, Hobby Noble, in 1851. We may, however, cease to wonder at such prices, when we find that the Flying Dutchman won his owner nearly L.20,000 in stakes alone, and that the winnings of himself and his half-brother, Van Tromp, who belonged to the same owner, amounted to nearly L.34,000. Cotherstone won, at three years old, L.12,765, West Australian, L.10,975, and Surplice, L.10,375.

Colour of the Thorough-bred Horse.

The prevailing colour of the thorough-bred horse is peculiarly elegant and chaste, being a bright bay, with black mane and tail, and black legs to correspond, although occasionally relieved with a small white star on the forehead, or a white heel. It is remarkable that what may be termed vulgar colours, such as light sorrel, or dun, or brown with mealy muzzle, are very seldom met with in the thorough-bred horse; and we know but one instance of the pie-bald, and very few roans.[1] Black is not common, nor approved of, although several of our best racers, almost all of the Trumpator blood, have been of that colour. The real chestnut prevails a good deal, and is quite equal to the bay in the richness and brightness of its hues. Such was the colour of Eclipse; and, as is the case with game-fowls, in the breeding of which there are instances of a reversion to the original colour, after fifteen descents, it is not uncommon for thorough-bred stock to be chesnuts, although got by a bay stallion out of a bay mare, or from a sire and dam of any other colour, provided the blood runs back to his, Eclipse's, source. Indeed, a small dark spot which that celebrated horse had on his quarter, has been frequently found in his descendants in the fifth or sixth generation. It is an old and trite saying, that "a good horse cannot be of a bad colour;" nevertheless, colours of horses are, to a certain extent, indices of their physical powers. Such has proved to be the case with men; and it was found in the ill-fated Russian campaign, that men of dark complexions and black hair bore the severity of the climate better than men of an opposite appearance to them. It is, however, rather a remarkable fact, that by far the greater number of eminent English prize-fighters have been men of light, not dark, complexion. The ancients reckoned thirteen colours of horses, giving the preference to bay (badices); and the dark bay, or "Jersey bay," is still the favourite English colour, though foreigners prefer a "black brown."

Race-Horse.

A second-rate description of racer was once very prevalent in England, known by the term "cock-tail," or *half-bred* horse, as he is called; but improperly so termed, because the stain in him is generally very slight indeed, and too often difficult to be traced. Many objections are raised by sportsmen, who are thorough racing men, and who wish well to the turf, against the cock-tail racer, and for very good reasons. In the first place, if really half-bred, he resembles the royal stamp upon base metal, for no half-bred horse is deserving the name of racer; and, secondly, what are called half-bred stakes, some of which are very good, have been the cause of a great many frauds being committed, by bringing horses to run for them under false pedigrees, which will ever be the case, from the great difficulty of proving a horse to be thorough-bred, whose dam may have been purchased by accident, or in some clandestine way, and still perhaps of pure racing blood. An animal is produced against which no half-bred horse, in the proper acceptation of the term, has a chance, and he sweeps the country of all the good stakes; and some such horses (Habberley and Combat, for example) have proved themselves superior to many of the thorough-bred racers of their year. But the breeding of horses for these stakes is anything but beneficial to the country, the great object of racing. It encourages a spurious race of animals, often possessing the faults of the blood horse without the strength and activity of the hunter, and it was for the latter description of horse that this stake was first intended. *Bona fide* hunters' stakes would be advantageous, if *open to all horses* bringing certificates of their having been regularly hunted throughout a season, but not merely ridden by a boy to see a fox found; and giving no allowance to the horse called "half-bred." Let the best hunter win, which would encourage the breeding of strong thorough-bred horses, which make the best hunters of any;—a fact no one who has ridden many of them will deny.

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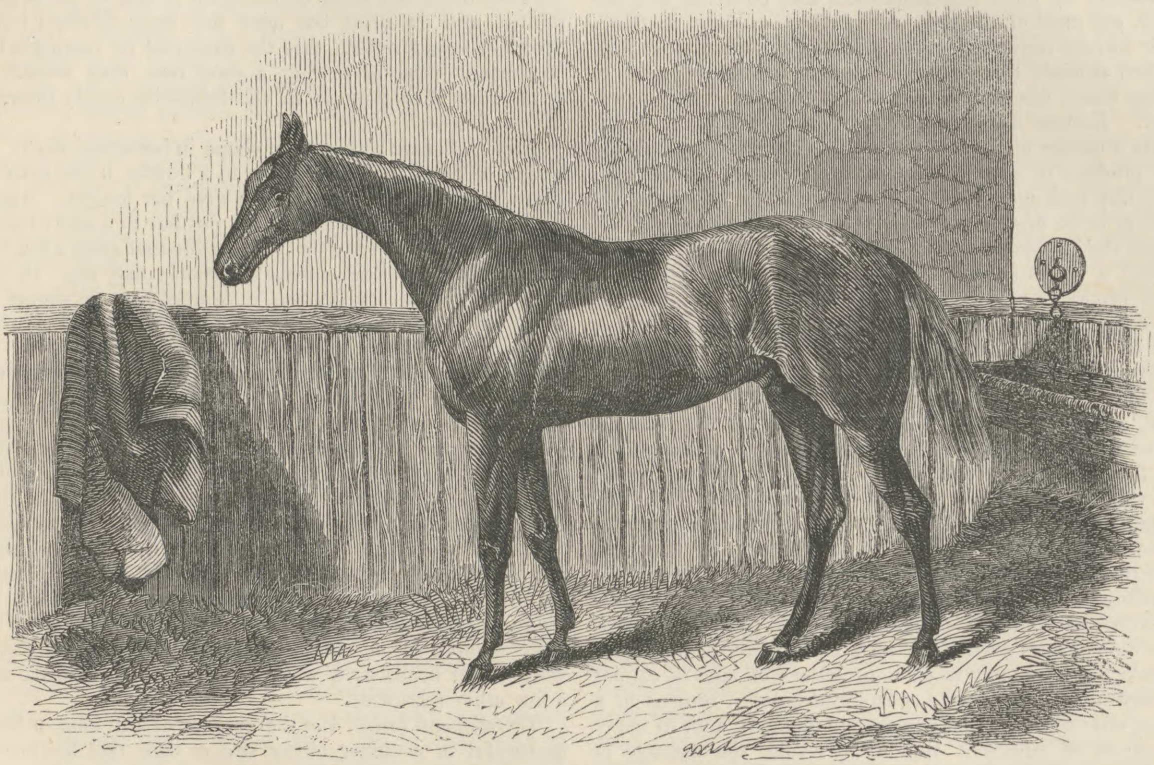
[1] See "*The Cocker,*" by W. Sketchley, Gent. London, 1814.

Weatherby's General Stud-Book.

To assist in the detection of spurious blood, and the correction of inaccurate pedigrees, is the chief purpose of this excellent publication, now increased to a seventh volume, and forms a part of every sportsman's library; but, unfortunately, many breeders who do not race are careless about entering their foals in it. "The Druid," in his recently quoted work, gives it as his opinion, that about 1550 blood mares annually bring 1150 foals to the birth in Great Britain. Taking 1851 as the basis of his calculations, he considers that about 1160 foals were born in that year, of which not 1100 were alive on the next new-year's day. Of these 574 ran in 1853, which number decreased in 1854 to 516, but in 1855 the remnant of that high-bred band only numbered 280.



THE HUNTER.

There is no description of horse which could be applied to so many purposes, racing excepted, as the powerful English hunter. Setting aside his own peculiar services in the field, he is fit to carry a man on the road, in the field of battle, and he answers for every kind of draught. Indeed, we are inclined to believe no horse would equal him in ploughing; and as for road-work on harness, either slow or fast, nothing could touch him, in a carriage properly suited to his powers. It is, however, no less true than singular, that out of a hundred sportsmen assembled at the meeting of a pack of fox-hounds, not half a dozen would be found mounted on horses which they themselves had bred. This arises from two causes: First, the greater part of them have not patience to await the arrival of a young horse at his best, and consequently sell the few they do breed, without giving them a fair trial; and, secondly, such has, of late years, been the prejudice against riding mares in the hunting field, that they have been chiefly left in the hands of farmers and yeomen, who are become the principal breeders of English hunters. Neither do hunters find their road direct from the breeder to the studs of noblemen or gentlemen. They generally go through the hands of an inferior country dealer, from whom they are bought by the principal London and country dealers, and sold by them to the sportsmen of the various hunts. There are, of course, exceptions to this proceeding. A great proportion of English yeomen and farmers are very excellent horsemen, and, as such, having the capability of making their young horses into hunters, and, distinguishing them by riding them afterwards with hounds, obtain now and then as high a price for them as they fetch after having passed through the hands we have described. It is, however, to be lamented that the last-mentioned description of persons, the breeders and trainers of young hunters, do not, for the most part realize such large prices as the first, although fully entitled to it, as a reward for their trouble and skill.

It is impossible to lay down any precise rules for breeding hunters, so many collateral circumstances being necessary to be taken into consideration. For example, Pennant, in his *Zoology*, says, "Our race-horses are descended from Arabian stallions, and the genealogy faintly extends to the hunter." From this we learn the interesting fact, that a wonderful change, within the last sixty or seventy years, has taken place in the form and character of this sort of horse, inasmuch as, in the opinion of some of the first of our English sportsmen, and such as put the powers of the horse to the most severe test, the hunter of the present day is not in his perfect form unless quite thorough-bred. This part of the subject we shall discuss hereafter; but as there are several of our hunting counties not at all suited to this description of horse, the thorough-bred hunter, and a large portion of our sportsmen who, some by reason of their weight, and others from prejudice against them, neither can nor will ride them, we may safely assert, that not more than a twentieth part of English hunters are at this time of quite pure blood. We will, however, set forth what we consider the best properties of the full-bred and the half-bred hunter, as he is called, as also the most probable means of breeding each kind to advantage; at the same time venturing an opinion, that, when their individual capabilities are put into the scale of excellence, the balance will incline to the former.

One great obstacle to the general success in breeding hunters is, not so much the difficulty of access to good stallions, but of making breeders believe that it would be their interest to send their mares to such as are good, although at an extra expense. Most rural districts, in other respects favourable to horse-breeding, swarm with covering stallions, the greater part of which have proved very bad racers; but which, falling into the hands of persons who are popular characters in their neighbourhood, and covering at a low price, get most of the farmers' brood mares sent to them, their owners never reflecting, as they gaze upon these misshapen animals, that nature will not go out of her course to oblige them, but that, in the animal creation, "like begets like." Neither does the evil stop here. So much is this made a matter of chance instead of one of judgment, should the produce of a mare sent to one of these bad stallions be a filly foal, and she proves so defective in shape and action, as to be unsaleable at a remunerating price, she remains the property of her breeder, and in time becomes herself a brood-mare. What, then, can be expected from such produce? Why, unless chance steps in and supplies the defect of judgment, in the first instance, admitting that she is sent to a better stallion than her sire was, by the procreative powers of the male so far exceeding those of the female, as to produce a foal free from the defects of the dam, another shapeless, unprofitable animal is produced. Nevertheless, in the course of time, perhaps this produce, if a female, however bad she may prove, is also bred from, and thus a succession of shapeless horses is produced, to the certain loss of the breeder, and much to the injury of the community. Under the most favourable circumstances, and with the aid of good judgment, we cannot consider horse-breeding to be a certain source of gain; yet there are many inducements to try it as one branch of rural economics. The money goes out a little at a time, or by degrees, and therefore it is suitable to such occupiers of land as cannot embark in more extensive speculations, and it returns in a lump, oftentimes at a most welcome moment, and, in many instances, of sufficient amount to render the average of former less profitable years sufficient to cover expenses, if not to leave a profit. There is likewise another inducement to breeding horses; we mean the interest inseparable from all human speculations, from which more than an ordinary return may be looked for, which is the case here; added to the nearly universal interest attached to the breeding and rearing of every species of domestic animals.

With respect to brood-mares designed for breeding hunters, we admit that circumstances, not always within control, have their weight. An occupier of land is possessed of a mare or two which he thinks *may* breed hunters, and having them, it may not be convenient to him to replace them by those which might be more likely to breed good ones. But the choice of a stallion is always within his control, and he should not spare trouble, and moderately increased price, in his selection. It is well known to all hunting men, that the stock of certain horses have been remarkable for making good hunters (President, Belzoni, and Sir Harry Dimsdale, for instance), and that there are such horses always to be found, on seeking for them. A few pounds extra, laid out by the breeder in putting his mares to such horses, were sure to be amply repaid; for the produce would be generally sought after and purchased, even previously to their being tried. Englishmen know of no such restrictions, nor do we wish they ever should; but the interference of the governments of several European states as to stallions for the use of their respective countries, reads us a useful lesson on this head; for it is well known, on the other hand, that a great number of stallions to which English hunting mares have been put, have been equally remarkable for begetting soft infirm stock, quite unequal to endure, for any length of time, the severe work of a hunter. It should also be borne in mind, that even a first-rate racer may not be a propagator of first-rate hunters. The former is called upon to exert his powers on very different grounds and under very different weight to the latter, and the action which may suit one may not suit the other. This accounts for the stock of certain thorough-bred horses, which were very indifferent racers, proving very excellent hunters. We have already given it as our opinion, that a cross of Arabian blood is a great desideratum in that of an English hunter, and we need not urge this point farther; but if breeders would reflect, that the expenses of rearing a bad colt equal those of rearing a good one, they would attend more than they do to the following nearly unerring directions:—

First, Observe similarity of shape in horse and mare. As length of frame is indispensable in a hunter, if the mare be short, seek for a stallion likely to give her length. Again, if the mare be high on her legs, put her to a short-legged stallion, and *vice versa;* for it is possible that even a hunter's legs may be too short, a racer's certainly may be. In fact, to form a complete hunter, it is necessary he should be more perfect in his shape than a racer, which will admit of imperfections that would quite disqualify the other.

Secondly, Look to constitution. As no description of horse endures the long-continued exertion that a hunter does, this is a point to be attended to. But it may be overdone. Horses of a very hard nature, very closely ribbed up, consequently great feeders, with large carcasses, seldom make the sort of brilliant hunter now the fashion in England. Besides, one of this description requires so much work to keep him in place and in wind, that his legs must suffer, and often give way when his constitution is just in its prime. Horses with moderately sized carcasses last longest; and, provided they are good feeders, will come out quite as often as they ought to do, and are invariably good winded and brilliant, if well-bred and of good form, with a few other requisites.

Thirdly, and *lastly,* Let the breeder of any kind of horse be careful in avoiding either sire or dam that has proved constitutionally infirm. As has been already shown on very high authority, perfect or defective conformation is not more likely to be the result of a proper selection of horse and mare, than disease to be inherited from parents that have been constitutionally diseased. We could name stallions whose stock have been blind; others afflicted with splints, curbs, and spavins, and a mare which produced three roarers by three different sires. But it may be said, that splints, curbs, and spavins, are the result of malformation of the parts. Granted; but avoid all such malformation which is quite apparent to the eye in a breeding stud. It may perhaps be carrying this objection too far, were we to say, we would not breed from a mare or horse, which had become groggy or lame in the feet, from diseased navicular joints. Had the feet been more vigorously constituted, perhaps such lameness might not have occurred; yet it is but too probable that here the predisposing cause may be traced to over-severe treatment, and not to constitutional defect. The choice of sires is by no means limited, as there are about 300 blood sires in the United Kingdom, at the service of the public, at all prices for blood mares, from 50 guineas to 2 guineas, or even gratis, if the mare is the dam of a winner. Birdcatcher (whose winners number 148), Touchstone, Melbourne, and Bay Middleton, are at the head of the senior division, and Touchstone has no less than 26 of his stock, headed by Orlando, at the stud. Beeswing was very successful as a brood mare; but the same cannot be said of many very high class mares who have worked hard for some seasons on the Turf. Barbelle, the dam of the Flying Dutchman and Van Tromp, left the turf early, and the dam of Alice Hawthorne and Rebecca never had a bridle on.

Next in importance to the judicious selection of sire and dam, is the rearing of the colt which it is intended should make a hunter. It was the remark of a gentleman who kept fox-hounds more than half a century, that "great part of the goodness of a horse goes in at his mouth;" and nothing is more true. Nimrod, in his *Letters on the Condition of Hunters* (p. 223, first edition), says, "It is my confirmed opinion, that unless a colt be what is called 'deformed,' it is in the power of good keep, exercise, and physic, to make him what is termed 'a fine horse,' and one which will sell for a large price, either for harness or the saddle. No one who has not witnessed it, is aware of the improvement in shoulders, thighs, gaskins, &c., from good old oats, accompanied by regular work and proper riding." Breeders of hunters may be assured that such is the case; and that it is of little use to breed colts with the expectation of their making first-rate horses, unless they keep them *very well* in their colthood. They should also be treated *as horses* at a very early age. They should be ridden gently, and by a light man, or boy, with good hands, at three years old, across rough ground, and over small fences; and at four they should be shown hounds; but they should only follow them at a distance, and after the fences are broken down; for, if put to take large leaps at that tender age, they are apt to get alarmed, and never make first-rate fencers afterwards. Above all things, avoid getting them into boggy ditches, or riding them at brooks; but they should be practised at leaping small ditches, if with water in them the better, in the middle of a field, the rider putting them at them in rather a brisk gallop. This gives them confidence, and, the natural result, courage. With respect to the use of the bar, and teaching colts to leap standing over it, the practice is now condemned, and the system of letting them become timber jumpers, by taking it, as it comes, in crossing a country, is preferred, the present rate of hounds not admitting of the time occupied in a standing leap.

Some sportsmen adopt, and we believe with good effect, what is termed the "circular bar." Every description of fence that a hunter is likely to meet with, is placed within a prescribed circle of ground, and in this is the colt lodged, the man who holds him standing upon a stage in the centre. As another man follows him with a whip, he is forced to take his fences at a certain pace; and, in a very short time, a good tempered colt will take them with apparent pleasure.

At five years old it is customary to consider a horse as a hunter; but we are inclined to demur here. It is true, that if a colt has been very well kept, on the hard meat system, he is enabled to go through a good day's work with hounds at five years old, being quite equal to a six-year old, which has been kept on soft food, and not sufficiently forced by corn; yet it is always attended with danger of injury to his joints and sinews, if not to his general constitution; and we cannot pronounce a horse to be a hunter until he has passed his fifth year. As muscular action, however, produces muscular growth, he should not be kept in idleness during his fifth year, but should be ridden to cover, or with harriers, before Christmas; and when the ground gets dry and light in the spring, a good burst with fox-hounds may not do him harm. We do not, however, consider any five-year old horse fitting or safe to carry a gentleman over a country, as he cannot be sufficiently experienced to take a straight line.

We have known some masters of fox-hounds who have preferred purchasing yearling colts, or weanlings, at Michaelmas, to breeding them for their own use.

There are undoubtedly certain advantages attending purchasing yearly colts, with the view of making hunters of them. Such only may be selected as appear calculated for the country they are intended to cross, and the weights they will be called upon to carry; whereas, were the master of hounds to depend on the produce of his own mares, he might be disappointed in being able to select the number he would require to replace, in due time, the vacancies which occurred annually in his stud. We should consider the sum of 35 or 40 guineas for a good colt, at weaning time, a fair remuneration to the breeder, and well laid out by the purchaser.

Previously to giving directions for the purchase of a full-grown hunter, we shall proceed to exhibit him in his highest form, although we are aware of the difficulty, on certain subjects, of conveying, clearly, an idea from our own mind to that of another. We shall, however, endeavour to make ourselves understood by describing each individual point. As to the form and shape of a hunter's head, as we do not ride upon it, it is not of much consequence, provided it be well hung on; and that is of the very highest importance, not only, as we have shown in the race-horse, on account of his respiration or wind, but unless it be so, he cannot be pleasant to ride. Not only must his jaws be wide, but when we consider that the head of a horse hangs in a slanting position from the extremity of the neck, and that the neck itself projects a considerable distance from the chest, on the muscular strength and proper formation of the neck must also depend whether a horse be light or heavy in hand, and consequently pleasant or unpleasant to ride. A weak or loose neck may not be so material, as we have before observed, to the race-horse; he is generally ridden in a martingal, and in that case always; add to which, his race is soon run. Nevertheless, we like to see the neck of the race-horse rise out of the shoulder with a tapering curve, in which case he is pleasant to ride in his gallop, and, if a hard puller, his jockey has much more power over him than if his neck were loose and low. But, in a hunter, the proper position of his head is a *point of the greatest moment*, as without it his rider cannot handle him properly at his fences; and if he be not a regular star-gazer, he is always dangerous to ride over a country. The proper junction of the head with the neck, and the carrying of it well or ill, depend chiefly on two particular muscles contained in the neck. The most important of these is called the splenius muscle, which constitutes the principal bulk of the neck above, and its action is sufficiently evident, namely, very powerfully to elevate the head and neck. The principal beauty of the neck, indeed, as well as the carriage of the head, depends on this muscle; and its ample developement is a point the sportsman should attend to in the choice of horses that are to carry him with hounds. A certain degree of muscularity of the neck is absolutely necessary in a hunter, and it is greatly promoted by good keep in colthood; also by delaying the period of castration till the second year, which should invariably be done, when the want of this muscularity is apparent in the first. It must, however, be observed, that there is a medium in this muscularity of the neck, although excess is the better extreme of the two; for when the neck of a horse appears, like that of a sheep, to rise out of the chest, and so far from being arched above, and straight below, is hollowed above, and projects below, such a horse is nearly worthless for any pleasurable purpose, as his head cannot, by any means whatever, be got into a proper place.

It has been said that a horse with a long neck will bear heavy on the hand. We do not believe that either the length of the neck, or even the bulk of the head, has any influence in causing this. They are both counterbalanced by the power of the ligament of the neck. The *setting on* of the head is most of all connected with heavy bearing on the hand; and a short-necked horse will bear heavily, because, from the thickness of the lower part of the neck consequent on its shortness, the head cannot be rightly placed. The head and neck, however, should be proportioned to each other. A short head on a long neck, or a long head on a short neck, would equally offend the eye.

Although length of neck in a hunter is not desirable, length of shoulder is indispensable. Horses have raced well with short upright shoulders; but it is impossible that one so formed, however good he may be in his nature, or even in his general action, can be a safe hunter, and for this reason: A hunter is constantly subject—by down-hill leaps, leaping into soft ground, and getting his fore-legs into grips or unsound ground—to have the centre of gravity thrown forward beyond the base of his legs; and it is more or less recoverable according to the length or shortness of his shoulder. By length of shoulder is meant obliquity of the scapula or shoulder-bone, by which the point of the shoulder is projected forward, and which, added to the obliquity of the scapula, enables the rider to sit considerably behind, instead of nearly over the fore-legs or pillars of support, which, on a short and upright-shouldered horse, he must do. One remark, however, must be made respecting the oblique shoulder. It is sometimes not sufficiently supplied with muscle, with which the upright shoulder generally abounds. We therefore recommend purchasers of young horses for hunters to give the preference to what may *appear* coarse shoulders, nay, even inclined to be somewhat round or flat on the withers, provided they are accompanied by the necessary and absolutely essential obliquity of the shoulder-bones.

The setting on of the arm—which should be strong, muscular, and long—is of much importance to a hunter. By the length of this part in the hare, as we have already observed, added to the obliquity of her shoulder, she can extend her fore-parts farther than any animal of her size; in fact she strikes nearly as far as the greyhound that pursues her, by the help of this lever. The proper position of the arm, however, is the result of an oblique shoulder. When issuing out of an upright shoulder, the elbow joint, the centre of motion here, will be inclined inward; the horse will be what is termed "in at his elbows," which causes his legs to fall powerless behind his body, and he is seldom able to go well in deep ground. There are exceptions, but they are rare. A full and swelling fore-arm is one of the most valuable points in a horse, for whatsoever purposes he may be required; and although we have occasionally seen hunters with light thighs carry weight well, we never have seen it so carried by horses deficient in their arms.

If sportsmen were to see the knee of the horse dissected, they would pay more attention to the form and substance of it than they generally do. It is a very complicated joint, but so beautifully constructed that it is seldom subject to internal injury. Its width and breadth, however, when considerable, are great recommendations to hunters, as admitting space for the attachment of muscles, and for the accumulation of ligamentous expansions and bands greatly conducive to strength. Below the knee is a point on which we will not say much here, as we have already alluded to it in our remarks on the race-horse; we mean the shank or cannon bone, and its appendages. It can scarcely be too short in a horse that has to carry a heavy man; round legs are almost sure to fail; those of the hunter should be flat, with the back sinews strong and well braced. This constitutes what sportsmen call a "wiry leg."

The fetlock is also a complicated joint, and very liable to injury. In a hunter it should be large and strong. But, as regards his action, the pastern is still more material, and also to his standing sound. Very few horses with short pasterns can go well in deep ground, and for this obvious reason: The action of the joint is destroyed by getting below the surface of the ground, and is of course sooner immersed than when it is longer. But a greater evil than this attends a short pastern; it is the predisposing cause of navicular lameness, particularly in horses carrying weight, owing to the foot being deprived of that elasticity which a longer pastern affords, and which consequently relieves the concussion on the foot coming to the ground in galloping and leaping, as well as on the hard road. Horses with short, and consequently upright pasterns, cannot be pleasant to ride, and they seldom stand many seasons' work. Excess in either should be avoided, but of the two a hunter is less objectionable from the extreme of length than of shortness in this most material part.

That the foot of the hunter should be wide, and not low or weak at the heel, is also obvious to the meanest capacity, independent of its being the form most conducive to health. The nature of the ground he has to travel over requires at times the widest base he can present to it as a foundation for his great bulk, and thus the farmer carries out his manure upon tender land in a broad cart. Xenophon relates that certain people of Asia were accustomed, when snow lay deep, to draw socks over the feet of their horses, to prevent them sinking in it up to their bellies; and we know why an ox sinks less in soft ground than a horse does. It is because his foot enters it expanded, by means of the division of the claws, and when he draws it out it is contracted. The foot of the hunter, however, should not be too wide, or it may operate against his speed.

The position of the fore-legs of the hunter admits of more latitude than that of his hinder ones, or indeed of any other part of his frame. We have seen brilliant hunters standing in all positions and postures as regards their fore-legs. Some very much over the knees, that is, with the knees bent and projecting outward; many upon very twisted fetlocks, turning the toes out; and a few, though only a few, turning the toes in. In the human frame, a certain squareness in the position of the feet is consistent with strength, as we see in the statues of Hercules, but the lightness of a Mercury is indicated by the direction of the toe outwards. This is to a certain extent the case with the horse. Although, if measured by the standard of perfection, his toe is required to be in a direct line with the point of his shoulder, yet we have seen and heard of some of the speediest and best racers and hunters, the position of whose fore-feet have deviated considerably from this supposed essential line; but the inclination of the toe outwards is so common in horses used for these purposes, that it can scarcely be called a fault. Indeed, some persons argue that a leg so placed affords a broader base to the superincumbent weight than when quite in a line with the shoulder, that is, provided the twist arises from the fetlock, and not from the setting on of the arm. Be this as it may, we are well assured that, provided the hinder legs and quarters are good, a hunter will admit of a considerable deviation from the true line in the fore-legs, and carry his rider brilliantly. It is well known that a much more twisted fore-legged horse could not well be seen than the celebrated Clipper, for many years said to be the most brilliant hunter in Leicestershire; and one of the best hunter-sires in Shropshire had this deformity.

But there is one portion of the fore-quarters of the hunter to which a rule must be applied that will not admit of an exception: he must be deep in his chest or brisket, that is, from the top of the withers to the elbow. Numerous are the narrow, but deep horses, in their "girth," as the term is, that have carried heavy weights in the first style with hounds; but no matter how wide a horse may be, if he have not depth he cannot carry weight, and is very seldom a good-winded horse, even under a light man. One of the greatest compliments, then, that can be paid to a hunter at first sight is, that he appears 2 inches lower than he really is. Such, however, is the case with horses whose growth has been forced in their bodies by good keep when young, and thus they come under the denomination of "short-legged horses," so much esteemed by hard riders. They are likewise, for the most part, better leapers than such as have less growth in the body and stand upon longer legs.

We have before observed, when speaking of the race-horse, that large bone is not required in his cannon or shank (the part from knee to fetlock), neither is it in the hunter. The real power of all animals is in the muscles, sinews, and tendons; and the leg best calculated to carry weight and endure to a good old age is that in which the bone is small, but of a dense and perfect texture, and in which three convexities can be very plainly distinguished, namely, the bone, the elastic ligament behind the bone, called the sinew, and, behind that, *the flexor tendons, large, round, and strong.* The rare combination of strength with lightness is here beautifully displayed, and is one of the many instances which might be produced to show how nature delights to work with the least possible expense of materials.

The hunter should have length in his shoulders and quarters, and to a certain extent also in his back. It is true that horses with short backs carry weight best up a steep hill, which, as that is the worst method in which this animal can employ his strength (in man it is the best), shows that heavy men should ride short-backed horses. For hunters, however, that are ridden in our best hunting countries, which, previously to being laid down in grass, were thrown up by the plough into high ridges, with deep furrows, must have *moderate* length of back, or they cannot go smoothly over such ground. Good loins, with width of haunch (the *vis a tergo* being so necessary in leaping as well as galloping on soft ground), need scarcely be insisted upon; and we now proceed to the hinder-legs, the proper or improper form of which makes the difference between a good or bad hunter, if a horse with badly formed hinder-legs can be called a hunter at all. But a horse with short, straight, and weak thighs, cannot make a *good* hunter. Even admitting that they are not weak, but short and straight, yet the objection remains, because he cannot, in the latter case, be pulled together in his gallop, nor have his stride collected to enable him to take his fences properly; and, what is not generally known, he is almost certain to be a hard puller. Indeed, some good judges go so far as to assert that horses with straight hinder legs never have good mouths, and there is much truth in the remark, as their form will not admit of their being "pulled together," as the horseman's term is, in their quick paces, and without it no horse is safe. A long and muscular thigh, then, with a clean well-placed hock, is one of the most material points in a hunter, and also one by which the duration of his services may very nearly be measured; as when much out of the true form, either inclining inwards, like the cow, or outwards, like the bandy-legged man, disease is almost certain to attack this very complicated but beautifully contrived joint, when put to severe exertion, especially in soft ground. The shank bone of the hinder leg, below the hock, ought to be equally well supported by sinews and tendons with that of the fore-leg; and the pastern of the hind-leg should resemble that of the fore-leg, moderately long, strong, and oblique.

But such is the paramount importance of the hock in the hunter, that we transcribe the following admirable description of one most material point in it (from part ix. of *The Horse*, Farmer's series, p. 272):—"The most powerful of the flexor or bending muscles are inserted into the point of the hock or the extremity of the *os calcis;* and in proportion to the projection of the hock, or, in other words, the length of this bone, will two purposes be effected,—the line of direction will be more advantageous, for it will be nearer to a perpendicular; and the arm of the lever to which the power is applied will be lengthened, and mechanical advantage will be gained to an almost incredible extent. Suppose this bone of the hock to be 3 inches in length, the joint formed by the *tibia* and the *astragalus* is evidently the centre of motion, and the weight concentrated about the middle of the shank is the obstacle to be overcome. If the weight be four times as far from the centre of motion as the power, a force equal to four times the weight would raise it. It is, however, here to be remembered, that it is not merely the weight of the leg which is to be raised, but the weight of the horse, for the time resting upon the leg, and that weight to be propelled or driven forward. At what shall we calculate this? We may fairly suppose that the muscles, whose tendons are inserted into the point of the hock, exert an energy equal to 4000 lb. Let us further suppose that an inch is added to the point of the hock, which will be an addition of one-third to its length; a muscular power of less than 3000 lb. will now effect the same purpose. The slightest lengthening, therefore, of the point of the hock will make an exceedingly great difference in the muscular energy by which the joint is moved, and a difference that will wonderfully tell in a long day's work. On this account, the depth of the hock, or the length of the bone of which we are speaking, is a point of the greatest importance. There is, however, a limit to this. In proportion to the length of this bone, must be the space which it passes over, in order sufficiently to bend the limb; and in that proportion must be the contraction of the muscle, and consequently the length of the muscle, that it may be enabled thus to contract; and, therefore, if this bone were inordinately lengthened, there would require a depth of quarter which would amount to deformity. A hock of this advantageous length is, however, rarely or never met with; and it is received among the golden rules in judging of the horse, that this bone of the hock cannot be too long."

Hunters which carry very heavy men cannot excel in the field, unless they exhibit those just proportions in their limbs and all the moving levers necessary to produce full liberty of action, but not too long a stride. Well placed hinder legs, with wide hips, well spread gaskins, and great depth of chest, are essentials, and as much of the *vis a tergo* as is consistent with a not unsightly back, commonly called "hog-backed." Well knit joints, short cannon bone, moderately oblique pasterns, with rather large feet, are not only points from which great physical powers may be expected, but they are necessary to the duration of them in the horse we are now alluding to. As, however, it is an axiom in the animal creation that the parts which add to strength diminish swiftness, hunters to carry more than 16 st. well with hounds, at the pace they now run, are always difficult to be procured, and ought to command good prices. The stamp of animal most approved of for this purpose is the short-legged, thick, but well-bred horse, not exceeding 16 hands in height, but appearing to the eye half a hand below that standard. As for his general appearance, it is "handsome is, that handsome does," in this case; and we must not look for beauty in all his points.

Having now described each individual external part of the horse essential to his being a good hunter, we shall, in a few words, exhibit him to the reader's view in what we consider his best form. He should have a light head, well put on, with a firm, but not a long neck; lengthy, and consequently oblique shoulders, with very capacious chest, and great depth of girth; a long, muscular fore-arm, coming well out of the shoulder, the elbow parallel with the body, neither inclining inward nor outward; a short cannon or shank, with large tendons and sinews, forming a flat, not round leg; an oblique pastern, rather long than short, and an open circular foot; the back of moderate length, with well-developed loins and fillets, and deep ribs, making what is termed by sportsmen a good "spur-place." From the loins to the setting on of the tail, the line should be carried on almost straight, or rounded only in a very slight degree. Thus the haunch will be most oblique, and will produce a corresponding obliquity in the thigh-bone, which formation is peculiarly characteristic of the well bred horse. The dock of the tail should be large, the buttocks close together, and the fundament small, and somewhat resembling the front or eye of the pippin apple. The thighs should be muscular and long, rather inclining inwards, with large lean hocks, the points appearing to stand somewhat behind the body, which will bring the lower part of the hind-leg, or shank, under it. The shank, fetlock, and pastern of the hinder-leg, should exactly resemble those of the fore-leg, as also should the foot. The legs should appear short, from the great depth of chest, and well-proportioned substance of the body, or middle-piece.

The stature of the horse is no more absolutely fixed than that of the human body, but a medium height is considered as best for a hunter, say 15 hands, 2 or 3 inches. For one good horse over this height, there are a hundred under it. In fact, there are, in the operations of nature as well as of art, limits which they cannot surpass in magnitude, and no very large animal has strength in proportion to its size. That the horse has not, the pony affords proof, if any other were wanting. Even the heaviest weights find horses about the height we have fixed upon best calculated to carry them. There have been many extraordinary instances of horses, little more than 14 hands high, being equal to the speed of hounds over the strongest counties in England, for example, Mr William Coke's "Pony," as he was called, many years celebrated in Leicestershire, and Mr Green's "Piccolo;" but they are not pleasant to ride, by reason of the fences, when high, appearing higher to the rider than when he is mounted on a taller horse.

Temper and mouth are essential points in a hunter. The former adds much to his value, not only as it contributes to the pleasure and safety of his rider, but a horse of a placid temper saves himself much in a long day's work with hounds, and especially when there is much leaping. Indeed, fretful horses are proverbially soft, and not generally to be depended upon at a pinch, which caused Shakspeare to make them the symbol of false friends. Thus Julius Cæsar exclaims,

> "Hollow men, like horses, not at hand,
> Make gallant show, and *promise* of their mettle;
> But when they should endure the bloody spur,
> They fall their crest, and, like deceitful jades,
> Sink in the trial."

A hunter should have courage, but nothing more, to make him what he is required to be, namely, not afraid to leap at any fence his rider thinks proper to put him at. His mouth will depend upon two things; first, upon the judgment of the person who breaks him in, in his colthood, and, secondly, upon the position of his hinder legs, but chiefly upon the first. It ought to be endowed with so great sensibility, that the slightest motion of the bit should give him warning, and direct his course, which is significantly implied by Horace, when he said, "the ear of a horse lies in his bridle." It is true, that what we call the "mouth" of a horse, is an artificial feature, at all events, a figurative term for his being easily acted upon by the bridle; but it is a point of the utmost importance in a hunter. Without it, in short, he is absolutely dangerous to ride; for although the skill and power of his rider may prevent his running away, yet he is always in danger of being placed in some unpleasant situation or other by him. In the first place, he cannot be a large fencer, nor safe at all sorts of leaps, if he will not suffer his rider to pull him together, to collect him for the effort of rising at them. Secondly, he is as dangerous in going through gates only partly opened. Thirdly, if the horse immediately before him should fall at a leap, he is very apt to leap upon him, or his rider; and, lastly, his strength is sooner exhausted than that of a horse, perhaps not naturally so good, which is going quietly, and within himself, by his side.

No doubt many of the ancient writers were good judges of horses, although they were deficient, compared with the moderns, in availing themselves of their highest capabilities. Were a purchaser of a hunter to look no further than the first chapter of Zenophon *περι ἱππικης*, he would find hints that would be well worthy his attention; and nothing can be more expressive of the evils attending a bad mouth, in a horse of this description, than the following sentence from Pliny, "Equi sine frænis deformis ipse cursus, rigida cervice, et extento capite, currentium," which may be thus translated:—The career of a horse without a bridle is disagreeable, carrying his neck stiff, and his nose in the air. When we consider how often it is necessary to pull up, or to turn a horse very short in crossing inclosed countries, the value, even on the score of comfort, of a good mouth cannot be too highly appreciated by the sportsman.

We now come to the action of the hunter, which, after all, is the main consideration. He should have energy in all his paces, but he may have too much of what is generally called action. Nothing conveys to us a better idea of that which is adapted to his business, than the concluding sentence of a huntsman of former days, when describing to his master a capital run with his hounds. "The old mare," said he, "*carried me like oil.*" The action of the hunter should be *smooth*, or it will not last. His stride in his gallop should be rather long than otherwise, provided he brings his hinder legs well under his body; and the movement of the fore-legs should be round, but by no means high. Above all things, there should be no "*dwelling*," as it is called, in the limb, coming to the ground; a great obstacle to speed, but often the accompaniment of excessive action in the fore-legs. But the test of action in the hunter, is in what sportsmen call "dirt," that is, in soft, tender ground, or when passing over such as appears dry on the surface, but is not sufficiently so to bear his weight. It is not exactly in the power of the best judges to determine whence this peculiar excellence, which some horses possess over others apparently well-proportioned, arises, for which reason the eye should never be depended upon in the selection of horses for the field. Wisdom here can only be the produce of experience; and many sportsmen have paid dear for it on this particular point. In fact, nothing next to ascending steep hills under great weight, puts the physical powers of a horse to so severe a test as carrying a heavy man, at a quick rate, over a country that sinks under him at every step. Mere strength alone will not do it. It must be the result of a combination of strength with agility, good wind, and speed, to produce which the most perfect arrangement of the acting parts, although the exact symmetry and proportion of them may not be exactly discernible to the eye, are requisite, and, we may be assured, are present. As the beauty of all forms is, in great part, subordinate to their utility, a horse of this description, that is, one which can carry sixteen stone well up to hounds in any or in all countries, at the rate they now run, not only, as has before been observed, commands a very high price, but, to a person who loves to study nature, presents a feast to the eye.

A hunter should be what is called very quick as well as very fast; by which is implied, that he should not only have great speed, but that he should be very quick in regaining his speed after taking his leap, or being pulled up from any other cause. One so gifted will cross a country, especially a close one, in less time than one that is more speedy, but not so "quick on his legs," as jockies term it. It is also very agreeable that a hunter should be safe in his slow paces on the road; and, if a fast trotter, he relieves himself by changing the action of the muscles, when the pace of hounds so far abates as to allow him to break into a trot.

Leaping.

One of the greatest accomplishments in a hunter is being a perfect and safe leaper. The situation of a sportsman riding a horse that is "uncertain," as the term is, at his fences, may be compared with that of the philosopher whom Cicero describes in his Tusculan Questions (5, c. 21) as seated on the throne of Dionysius, gazing upon the wealth and splendour that surrounded him, with a naked sword suspended over his head by a single thread. But a horse following hounds often leaps under very great disadvantages, which accounts for the numerous falls sportsmen get. Putting aside the labour of rising from the ground, which, to the horse, with a weight on his back, must be great, from the earth's attraction and the body's gravity, he has often to take his spring without any fixed point for support; whereas, in most other cases, leaping takes place on a fixed surface, which possesses the power of resistance in consequence of its firmness. Nevertheless, although the surface yield to a certain degree, leaping can still be performed, notwithstanding the retrograde motion of the surface produces a great diminution in the velocity of the leap, compared with that which is made from firm ground; and the velocity is always greater in proportion as the resistance is perfect. Thus it is, that we find horses able to cover much greater obstacles in Leicestershire, and the other grass countries, where the taking off for the leap is generally good and sound, than they can cover in ploughed and marshy districts, where they have not that advantage, from the less firm state of the soil. We shall now endeavour to point out the form most likely to constitute a good leaper.

The very worm that crawls on the ground first carries its contraction from the hinder parts, in order to throw its fore parts forward; and it is chiefly from the *vis a tergo*, or strength of back, and hinder quarters, that the power of leaping in a horse is derived. It must, however, be admitted that oblique shoulders give him a great advantage, by enabling him to extend his fore quarters; but if his loins be loose and weak, and his hinder legs ill placed, with weak hocks, he cannot make, in any one's hands, a safe and perfect leaper. But the position of his head has something to do with it. A plank placed in equilibrio cannot rise at one end unless it sinks at the other; and although a horse in light harness cannot, for appearance sake, carry his head too high, provided he be obedient to the rein, the hunter should carry his low. A colt, running wild, never raises his head when he leaps, but rather lowers it, and so should the hunter; and he is always less liable to fall in galloping over a country when he carries his head low; likewise, in horses with lengthy shoulders, the seat of the rider is rather benefited than injured by it.

The sort of fence that stops hunters more than any other description of obstacle, is a wide brook; and, like all other wide places, it takes a good deal out of him, if he clears it. Lengthy horses are the best brook jumpers; but they require good loins and hinder quarters as well, and, above all things, *courage*. Unless a horse takes a wide brook in his stroke, he is almost sure to be in it; for which reason he is generally ridden fast at it, and, for the most part, not allowed to see it till he comes close to it. Immense space has been covered by horses when jumping brooks, particularly when there has been a difference of elevation of the banks in favour of the horse. We have heard of thirty feet and upwards from hind foot to hind foot; but half that space *in water* is considered a good brook, and even if the banks are sound, stops a great part of the field. When unsound, it requires a horse coming under the denomination of a "good brook-jumper" to clear it without a fall, and particularly if towards the end of a run.

To be a good timber leaper is a great desideratum in a hunter, although many horses are great timber leapers, but, from their form, can never make good hunters. It only requires a short backed, truss-horse for this purpose; and he can dispense with the general length so necessary to the complete hunter. Good and well-formed thighs, however, are necessary. For those hunting countries, such as Cheshire, where the hedge is generally placed on a bank or "cop," as it is there styled, rather a short but very active horse performs best. But he must be very good in his hinder legs, and very quick in the use of them. Wall jumpers come within the same class with timber jumpers as to make and shape.

There is one faculty in which the horse is wanting, that would, if he possessed it, give him a great advantage in leaping. In the human species, the power and influence of feeling are inherent, in a great degree, to the very tips of the fingers; but the horse has no proper organ of feeling or touch. When a man takes his spring for a leap, or leaps on the top of any substance, he has a distinct and certain sense or knowledge of the nature of the ground from which he has sprung, and of the substance on which he has alighted; but, from the insensible nature of the horse's hoof, such feeling is, in a great measure, denied to him, and indispensably so too. Still, however, there are a few instances upon record of horses going very well over a country even after having undergone the operation of neurotomy, by which all sensibility, from the fetlock downwards has been destroyed.

The *necessity* for the thorough-bred horse in the field is belied, by the experience of all unprejudiced sportsmen, and in Leicestershire, where the best studs are to be found, very many of the hunters have a bend sinister in their escutcheon. But this perhaps arises from three causes. First, there is a difficulty in procuring full-bred horses to carry even moderate weights, and speed is but a second attribute to a hunter. He must have sundry other qualifications, and the most prevailing objections to the thorough-bred horse are generally these: He is apt to be deficient in substance to carry high weights over rough and deep countries, without trespassing too much on the virtue of his high descent. Secondly, he is inclined, and especially if he have been trained, to be shy of facing rough and thorny fences, by reason of the delicate nature of his skin, rendered so by repeated sweats in clothes, when in training. It often happens, indeed, that even the cheering influence of hounds, which has so much effect on other horses, will not induce him to take them. In fact, which may appear extraordinary, he does not appear to have in the field the courage of the half-bred horse. Lastly, his feet are apt to be small, in which case he sinks deeper in soft ground than does the lower-bred horse, whose feet are larger and wider, and thus suffers more than the latter does, in crossing a deep country. As for his powers of endurance under equal sufferings, they doubtless would exceed those of the cocktail, and being, by his nature what is termed a "better doer" in the stable, he is sooner at his work again than the other. Indeed, there is scarcely a limit to the work of full-bred hunters of good frame and constitution and temper.

A sportsman, partial to thorough-bred hunters, should either breed them, or purchase them, not exceeding two years old. If he breeds them, he should select large and bony mares, putting them to horses who have hunting action, such as Tramp had; and, if he buy them, it will be his fault if he do not buy those of the right stamp. From their never having been trained, but ridden over rough ground in their colthood, they would have freer and higher action, and, when castrated at a proper age, would very rarely fail making first-rate hunters. The reason for subjecting them to the enervating operation of castration is, that by far the greater number of entire horses, used as hunters, are either dangerous in a crowd, and when pressed upon in gateways; or given to refuse their fences, when they feel themselves somewhat distressed; and, if once well tired, are not to be depended upon afterwards. The late Earl of Lonsdale's Julius Cæsar was, nevertheless, a good instance to the contrary; and so was Mr Arkwright's Dr

Faustus. If free from these defects, they are doubtless superior to either geldings or mares.

Purchase of a Hunter.

Although it may not be necessary that a person should be perfectly acquainted with the mechanical structure of the horse's frame, according to the laws of nature, to render him a good judge of a hunter, yet, fortunately for such as have them to sell, vast numbers of persons purchase hunters from very slight experience of them, regardless of the proverb of, "he hath a good judgment who doth not rely on his own." There is also another proverb, prevalent, we believe, in Spain, which well applies here: "He that would buy a mule without a fault must not buy one at all;" and, although faultless hunters may be as rare as faultless riders of them, we will offer a few hints to a person in the act of purchasing one, addressing him in the colloquial style.

First, bear in mind the country you are about to hunt in, whether flat, hilly, firm, soft, open, or inclosed, and refer to the remarks we have made on the sort of horse we have adapted to each; only be assured that in an open country, especially if a hilly one, nothing has a chance with a thorough-bred horse, in good form, and not over-weighted. Secondly, consider well your weight, and be sure to have at least a stone to spare. A light man on a light horse throws away all the advantage of being light, and can go no faster, or leap larger fences, than a heavy man on a strong horse, *for strength will be served.* Until you try him, it is hard to say what horse will make a hunter, but the following indices may induce you to try him:—If he appear well-bred, with a loose, bright skin, which may be called his complexion; observe that his hair does not stand hollow from the skin, particularly about the poll of his neck. If you find him standing over a good deal of ground, it is a sure sign that he has got length where it ought to be; not in the back, but from the obliquity of his shoulders, and the arm being set on at the extreme point of his shoulder, which so much contributes to the act of extension of the fore parts in galloping, leaping, and clearing grips. Next examine minutely his thighs and hocks, being especially careful to observe the position of the point of the hock bone. Above all things, avoid a short, or an overtopped horse. The former will never carry you to your satisfaction, however good he may be in his nature; and the latter, from being too heavy for his legs, will seldom last many years. As for the minor points, common observation alone is wanting. Have his head placed in such a situation as will enable you to satisfy yourself that he has perfectly organized eyes, free from incipient cataract, sometimes rather difficult to be detected; and as for his age, there are but two ways of satisfying yourself on that point. By his teeth till about eight years old; afterwards by the state of his legs, which are, in fact, the best test of his value, the best proof of what he has done, and the sure source of speculation as to what he may hereafter be expected to do. Observe, also, his joints, that no material injury has been done to them by blow, &c., and that they are strong.

But the purchaser of a hunter must not trust to his eye. Neither must he be satisfied with him, how well soever he may gallop with him upon *sound* land. It is the peculiar excellence of "going well through dirt" that renders a horse valuable for all our best hunting countries; and no man can assure himself that a horse has this peculiar excellence, until he puts him to the test. The best method of doing it is this: The rider should put him along at a good pace, with a slack rein, upon sound ground, letting him find himself all at once upon that which is soft and holding. If, on quitting the former, he cringes more than might be expected under the weight, and shortens his stroke much, he must not purchase him for a hunter. He may go well over a light, down country, but he will never distinguish himself over a heavy one, as he will be going in distress, when other horses are going comparatively at their ease. Horses possess gradations of excellence in this natural qualification, or gift, more than in any other, but in it consists the *summum bonum* in a hunter; inasmuch as, whatever may be his other good qualities, they are all useless, when the acting parts are, from this cause, deep ground, easily over-fatigued. With regard to his wind, he must not judge hastily of that, in a horse not in work. Should he not perceive anything like whistling in his respiration when he puts him along at a quick pace, and his chest is capacious and deep, and his head well set on, he is not to reject him in case he appears blown by a short gallop. Condition and work will rectify that; but many a good hunter has been rejected on this account, by persons not taking into consideration the state of his bodily condition, in a trial of this nature.

The price of the hunter varies with the times, and, no doubt, is as much regulated by the price of wheat as the quartern loaf is. During the war prices, the sum of 1000 guineas was occasionally given, and that of 500 guineas frequently. From 150 guineas to 300 guineas now commands a first-rate hunter. But first-rate horses, in all ages of the world, have ever produced extravagant prices; and it is recorded of Alexander the Great, that he gave four Roman talents for the celebrated Bucephalus, by mounting which the young prince gave the first token of the skill and daring which carried him through so many difficulties.

THE HACKNEY.

Under this term are comprised the following:—The Cover Hack, the Pack Hack, the Lady's Horse, the Roadster, the Cob, the Galloway, and the Pony.

The difficulty of procuring really good hacks is admitted by all persons who have kept them for the various purposes of either business or pleasure, and for the following obvious reasons. First, very few people try to breed hackneys, therefore, although we require them to be nearly perfect in shape and action (and perfect they should be to be "really good hacks"), they may be said to be failures in the breeding stud after all. Secondly, by reason of their appearing to be failures in their colthood, they are not forced into good shape, as more promising young horses are, by high keep and care. Lastly, if a man has a really good hack, he is unwilling to dispose of it at the price generally given for such animals. But a question arises, What is a good hack? It cannot be answered but with reference to another question, namely, What description of person is he to carry? The horse that a sober citizen of London or Edinburgh would call a perfect hackney to carry him to his country seat, would not be worth five shillings to a Newmarket or a country jockey, or as a cover hack to a Leicestershire or Warwickshire sportsman. We will commence, then, with the cover hack, and describe the others in their turns.

The cover hack of the present day is very difficult to be procured, because he must unite, with the good qualities of the roadster, the requisites and accomplishments of the hunter. In fact, he must be a hunter in miniature; and after all, the form of the hunter is the best calculated for a roadster. He must be fast in all his paces, able to gallop well on deep or soft ground, and equal to carrying his rider over moderately sized fences; and if taught to leap timber, standing, his value is proportionally increased. But, above all things, he must go from 12 to 15 miles in the hour, when wanted, without showing any symptoms of distress; and he is too often unnecessarily called upon to perform much more than this, by his owner delaying the period of his leaving home in the morning, for the purpose of

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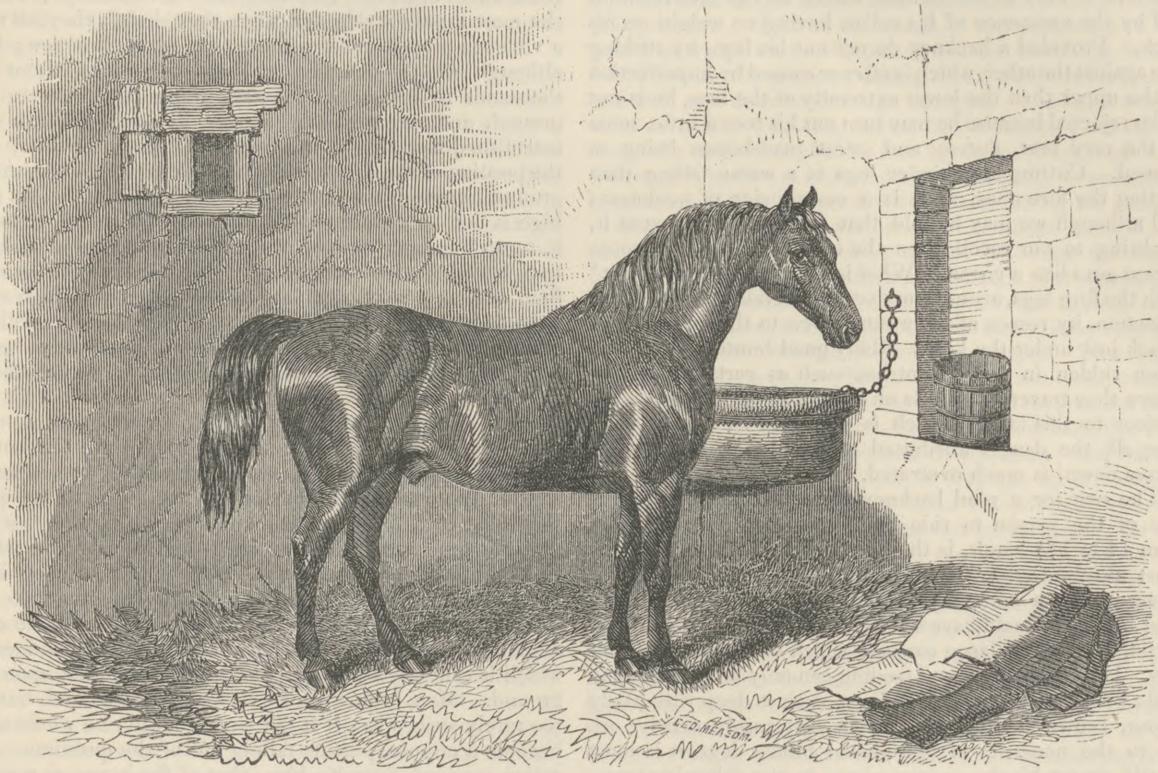
meeting hounds. It may also be observed, that it is not every sportsman who keeps two cover hacks, although he may keep six or eight hunters; and it often happens that the cover hack does more work than any horse in the stable, although in justice it should be stated, that the same care in the stable is now taken of him as of the best hunter in it.



Unless to carry a great weight, the cover hack should be all but thorough-bred, if he cannot be procured of quite full blood; with excellent legs and feet, lengthy and elevated shoulders, and with a susceptibility of mouth that will not only enable his rider to keep him well on his haunches, to guard against danger when going fast on all sorts of roads, but as tending to lessen the fatigue of riding him; and the strength of his rider should be reserved for his day's diversion after hounds. The chief pace of a cover hack should be the canter, and his temper should not be overlooked, for if fractious, and a puller, he will add much to the fatigue of a severe day's sport. A horse of this description, nearly 15 hands high, young and sound, will command from L.60 to L.100. The other points essential to a good road hackney, which will be noticed hereafter, apply equally to the cover hack.

The park hack of the present day is the race-horse in miniature. To be quite *à la mode*, he should be thorough-bred, with a very neat head, beautifully set on, and a switch tail; and so well bitted as to be ridden with a slack rein. He should have much liberty in his walk, which, and the canter, should be his chief paces. He must have great obliquity of shoulder, with a corresponding true formation of hinder quarters, and above all, the well-bent hinder legs; in which case, if the position of his fore legs enable him to put his feet down properly, which will be explained in describing the general action of the hackney, he will be, if good tempered, and not given to fret, the perfect park hack.

The lady's horse is, after all, the most difficult to obtain, because he ought to approach very near to perfection. His paces, mouth, and temper, should each be proportioned to the power and capability of his rider; and he should be proof against alarm from either noises or sights, which otherwise might cause him to run away. This description of horse should likewise be well bred, as in that case his action will be easier, and his appearance and carriage more in character with the generally elegant appearance of his rider. His pace should be the canter; the trot causes an ungraceful movement in the person of a woman, to enable her to rise to it; and if she do not rise to it, she is much shaken in her seat. Neither is the form of the side-saddle fitted for the trot; and the canter of a well-bitted horse is more safe, because his haunches are more under him in that pace than they can be in the trot. A good, bold, walk, however, with the head in proper place, is essential to a horse that has to carry a woman; and his action should be very true, that is, he should not "dish," or throw, his legs outward, as the term is, in any of his paces, or he will cover the lower garments of his rider with mud when the roads are wet and dirty. To provide against the latter inconvenience, however, all horses intended for this purpose, should not be much under 15½ hands in height, which size corresponds with the lengthened drapery of a lady's riding costume. As a preventive against accidents, ladies' horses, however well broken and bitted, should not be too highly fed; and, if at all above themselves, should be ridden by a careful servant, with good use of his hands, before ladies mount them. It is, however, an acknowledged fact, that horses go more quietly under women than they do under men, which is accounted for by the lightness of their hand, and the backward position of the body in the saddle. We have, in fact, known several instances of horses being very hard pullers with men, standing up in their stirrups, and, consequently, inclining their bodies forward, but going perfectly temperate and at their ease under women.

The power and parts conducive to action in the roadster, or hackney, are derived much from the same shape and make as we have shown to be best fitted for the hunter; but it is desirable that he should be more up in his forehand than the hunter is required to be, as such form gives confidence to the rider. *The most dangerous* form he can

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exhibit, if we may be allowed such a term, is, with his fore legs standing too much behind the points of his shoulders, *and those points loaded.* Even with the best-formed hinder legs, the centre of gravity being thrown so far forward beyond the pillars of support, is, in this case, with great difficulty preserved on the horse making a stumble; but with straight hinder legs, a horse so formed in his fore quarters is only fit for harness, where he can recover himself by the assistance of his collar, having no weight on his back. Provided a hackney do not cut his legs, by striking one against the other, which is oftener caused by imperfection in the upper than the lower extremity of the legs, he is not to be rejected because he may turn out his toes a little, some of the very best, fastest, and safest road-horses being so formed. Cutting the hinder legs is a worse failing than cutting the fore ones, as it is a certain sign of weakness; and although we may be told that shoeing will prevent it, we bring to our recollection the old adage, that "a goose always goes like a goose." What is called the "speedy cut" with the fore legs, arises from excess of action, and is a great objection, by reason of the wound given to the leg, which is struck just under the knee. Many good hunters, especially when ridden in hilly countries, such as parts of Surrey, where they traverse the hills on loose and stony ground, are subject to this failing, which is remedied by a boot; and, after all, the danger attributed to speedy cut, in throwing horses down, is much overrated.

The size for a road hackney must be regulated by the size of the person to ride him; but, generally speaking, from 14 to 14½ hands, is the proper height. His strength must also be thus calculated, for a light man does not ride pleasantly on a horse equal to double his weight. But a road hackney should have strength of shoulder, with a round barrel, but not a large carcass, which only wears out his legs. His constitution and feeding can only be proved upon trial; but there are certain indices, such as deep ribs, hardy colour, brown muzzle, &c., which very rarely deceive us. As to the necessity of well-placed hinder legs, it is most clearly shown by the answer given to the following question:—If a horse make a serious blunder forward, and the centre of gravity of his body fall beyond the pillars of support, and is for a moment lost, what restores the equilibrium? Is it merely the chuck under the chin to an animal of his bulk and weight, and that "chuck" given perhaps by the weak, powerless wrist of a feeble old man, or delicate young lady? No: the main effect of the bit, or curb, in this case is, first, warning the horse of his danger; and, next, by the momentary raising of his head, he is better able to bring a hinder leg *instantly* to his assistance, by advancing it under his body, and thus restoring the equilibrium. In the walk, in fact, the horse actually begins to move by advancing the hinder leg under the body, before the fore leg quits the ground; and if he did not do so, there would be no equal support for the body, during the suspension of the fore leg in the air; nor could the body be moved forwards, until the hinder leg had, by quitting its station, taken a new point of support. Seeing then, that in the walk, as in all other paces, the centre of gravity in the horse is maintained, as well as the body propelled, by the action of the hinder legs, the greatest attention should be paid to the position and action of them in the hackney, as the best safeguard against his falling. We should observe, then, when he is exhibited to our view, that, in his walk, the hinder foot oversteps the fore foot, at least a shoe's length, which a horse with straight ill-formed hinder legs cannot do; and if such action be accompanied by generally good hind quarters, it is a great indication of safety, as far as one-half of the body of the horse is concerned. But as the false step is made, not with the hinder, but the fore leg, the chief safeguard against falling is to be found elsewhere, namely, first, in the length of the shoulder, which throws the centre of gravity further back than a short one; and, secondly, proceeding also from the free use of the shoulder, in the act of setting the fore foot down on the ground. It is a general but very mistaken notion, that the safety of a roadster depends upon his lifting his fore feet high from the ground, when he is said to "go well above his ground;" whereas it all depends on the manner in which he places them down upon it. Not only are the highest goers often the most unsafe to ride, for, when they do fall, they fall with a violence proportioned to the height of their action; but, although we do not advocate such extremes, there are thousands of instances of horses going *very near* to the ground, and never making a trip. It is, however, a well established fact, that if the form of a horse's shoulder, and the position of the fore leg, enable him to put his foot to the ground *flat*, with the heel well down, his lifting up his foot high is not at all necessary; whereas, on the other hand, if, by an improper position of the leg, issuing out of a short, upright, ill-formed shoulder, the toe touches the ground first, and, as it were, digs into it; no matter how high such a horse may lift up his leg, in any of his paces, he will always be dangerous to ride. And this will be clearly shown, if we consider the position of the fore leg, when off the ground, or in action. It is bent in the form of a *C*, and the foot suspended in the air, turning inwards, with a curve towards the body. When in this state, were the foot to come in contact with a stone, or any other substance, it would pass over it without resistance, the limb being at that time in a flaccid state; but when it approaches the ground, the limb being extended, and having the whole weight of the fore quarters about to be thrown upon it, if it strike against a stone, or any hard substance, then the case is greatly altered, and a stumble is the inevitable consequence. The base now requires to be firm and even, which it can only be by the foot being placed flat upon the ground. Man, in fact, walks very near the ground, but his toe rarely strikes it. If it did so frequently, he would soon become a cripple, putting falling out of the question. His action proceeds from his hips; that of the horse, as regards the fore legs, from his shoulders; but the principle is the same with each; each is a piece of curiously-wrought mechanism, and according to the correctness of that mechanism is their action true. A wrong notion, however, prevails here, which may lead the purchaser of a hackney astray. It has been asserted by various writers, that if the shoe of a roadster be found worn at the toe, it is a sure sign of his possessing the dangerous action to which we have alluded. This is false; many horses wear at the toe, solely by the act of picking up the foot, and quite independently of placing it down. That many hackneys, however, fall from their shoes being neglected and suffered to wear too much at the toes, we are well aware, as well as from their pressing upon the heels and quarters, from the want of being removed in proper time. When a horse is given to wear at the toe, the wearing part should be steeled.

The best method of ascertaining the manner of putting down the foot, on which we have shown the safety of a hackney depends, is, to ride a horse with a slack rein, on a footpath, on which there are trifling undulations, scarcely perceptible, but sufficient for our purpose. If he walk smoothly over such ground, and do not strike it with his toe, we may be sure he puts his foot properly down, and will not, from that cause, be a tumble-down. But there are various ways in which horses fall on the road; bad shoeing, as we have already said, being one of them, and bad condition another. What is called a false step, very different from a stumble, may occur to any horse, and is occasioned by his accidentally putting his foot on a loose stone, that rolls away from under it, when, of course, his footing is lost. In this case, his chance of recovering himself is in his shoulders being oblique and lengthy (for upright shoulders are always short)

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and well placed hinder legs. Thrushes and corns are likewise the cause of stumbling; as likewise is starting, one of the worst failings a hackney can have. In some horses it is a nervous affection, rather difficult to account for in animals of such strength of frame; and often arises from imperfectly formed eyes, such as flatness of the cornea, or outward surface of the eye, generally a small one, causing short-sightedness. In the latter case, this fault in a hackney may be guarded against, by employing a veterinary surgeon to inspect him previous to purchase.

The old adage of "no foot, no horse," applies particularly to the road-horse. The hunter can cross a country upon feet that are very far from good; and by the help of bar-shoes, the coach-horse, with no weight on his back, and with the support the harness gives him, gets pretty comfortably over his stage on unsound feet; but the road-horse must have sound feet. Previously to the use of horse-shoes, the value of a solid hoof was so great as to have been made the image by which the Prophet Isaiah set forth the strength and excellence of the Babylonish cavalry, "whose hoofs," says he, "shall be counted as flints." Both Homer and Virgil mention it as an indispensable requisite in a good horse, the latter making it to resound as it strikes the ground—

> "——— et solido graviter sonat ungula cornu."

We are not going here to enter on a long discussion upon the foot, but only to observe, that the wide hoof and expanded heel of the hunter is not so essential to the road-horse as many persons suppose. Indeed the hoof that has been found to stand *severe* road-work best, is one rather high at the heel, and not very wide, provided the pastern above do not approach too near the perpendicular; forming what is called "an upright pastern," which, by the jar the foot receives from it, when it comes to the ground, is nearly certain to produce disease. The strong foot, however, of which we are speaking, is one that requires care, by being frequently drawn out with the knife, to prevent its becoming too strong; and by giving moderate pressure to the frogs, to prevent the heels getting nearer together than we find them, and they already approximate to contraction in a foot of this description. The just form of the hoof in front, upon which mainly depends its form behind, is said by Clarke to be at an elevation from the ground of 33°;[1] and we are inclined to think, that a much greater elevation than this would approach too near the perpendicular, for any kind of foot. As the inner heel or quarter has more weight thrown upon it than the outer, it is the principal seat of corns and sandcracks, for which reason great care should be taken that an even bearing to the whole of the crust be given by the smith to the foot of the hackney, previously to his setting on the shoe, the inner heel being given to wear away more than the outer on that account.

In the action of the hackney consists his chief merit. It should be smooth, and with not too long a step, or stride, or he will tire. He should also go straight on his legs, as the term is; for although horses that dish their legs may be, and commonly are, safe goers, yet they are disagreeable to ride in wet roads, as they cover the rider with mud. As we have already observed, the action of a hackney should not be high, as that tends to fatigue the rider and destroy himself; and if he puts his foot well down on the ground, he will never fall by reason of his action being low, and he will last the longer for its being low.

The paces of the hackney are in a great measure dependent on the will of his owner. The walk and the canter are most essential to what may be called the pleasure hackney; but for general purposes, the trot is the most useful and available pace in a roadster, and one in which he will continue longer, according to the rate he is going at, than in the canter. There are instances, however—and here is perfection in a hackney—of horses with very oblique shoulders, and excellent hinder legs, being able to carry their riders in a canter, over every variation of road, downhill as well as uphill, without offering to break into a trot, for a great distance of ground; and although not *appearing* to go more than at the rate of nine miles in the hour, are really going twelve. This is the result of the perfection of the points to which we have alluded, and can never be looked for in horses of a contrary make, whose shoulders are short and stiff, and their hinder legs straight. Above all things, what is called "fighting action" in a hackney should be avoided; neither ought the fore leg to be thrown out with a dart, as it is always attended with a dwelling or temporary suspension of the foot previously to its reaching the ground.

Most horses have some peculiarities about them, if not absolute "tricks," as vicious practices in horses are designated. Starting has already been noticed; but plunging is still more dangerous, as in that case a horse seldom stops until he have unseated his rider, at least made many attempts to do so, or thrown himself upon the ground. This latter trick often proceeds, not from sheer vice, but from a sense of pain in the horse, from being too tightly girthed; or from the to him very unpleasant sensation of a cold saddle, with a weight upon it, being pressed to his back; and having once taken a dislike to it, he is very apt to continue it. Against each of these evils it is in our power to provide. Against the first, by not girthing the horse tightly, for the doing of which there is no good reason; and against the second, by having the saddle put on an hour before the horse is wanted, in which time it will become warm, and not disagreeable to the skin of his back, which, in some horses, we know to be extremely susceptible. It is upon this principle that the collars are left day and night upon such road coach-horses as are given to "jib" at starting, the consequence of tender shoulders. But there is one failing to which hackneys are subject, not proceeding from vice, but still attended with danger, as it is often the cause of their falling; and we will endeavour to exhibit this failing. We need scarcely insist upon a good mouth, with neck and head in good place, in the best description of roadhorse; nevertheless, if he will not suffer his rider to avail himself of those advantages, they are useless to him. Such, however, is the case when a hackney, as he is going along in his fast paces, throws his head backwards, which he has always the power to do, his rider being unable to prevent him. Twofold danger attends this fault. First, when in the act of doing it he sees not where he places his feet; secondly, his rider loses his mouth for the moment, and in that moment he may fall. Independently of this, it gives the rider the idea that the horse is becoming fatigued, and doubtless it is an indication to that effect. Our idea, then, of a *perfect* hackney to carry a gentleman is this: A well-bred, short-legged, lengthy horse, with *very good legs and feet*, not under fourteen nor above fifteen hands high, that will walk four miles in the hour, trot eleven or twelve, and, if wanted, will go fifteen in that time in a canter or hand-gallop, *without once throwing up his head*, or requiring to be pulled up. We are, of course, supposing him to be in good condition, and in strong work, or it would not be fair to exact so much from him. But it is only in cases of necessity that any horse should be made to perform the latter task; for we are averse to trespassing unnecessarily upon the powers and capabilities of so noble an animal. On the contrary, we recommend every indulgence that can be granted to him on a journey, and especially in hot weather. At all times, indeed, it is our interest to do so; but, in very hot weather, a few sips of soft water, often given, keep off

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[1] White says forty-five.

fever, and replenish the loss he sustains by exhaustion from excessive perspiration.

One word more respecting action. We are no advocates for *very fast trotting*. It forces the animal to the very extent of his powers, which, of course, wears him out; it induces his owner either to be constantly displaying these powers in private, or matching him against time in public. Add to this, fast trotting is not a gentlemanlike pace; that is, it has not a gentlemanlike appearance, neither is it agreeable to the rider. This is apparent at first sight, when we follow two horsemen on a road, one on a fast trotter, and the other on a good canterer; although going at the same rate, the cantering horse and his rider are both much more at their ease. With the ancient Romans, indeed, a trotting horse was called a tormentor. Nevertheless, we admit that fast trotting is a proof of action, in excess, but of a peculiar nature, and is, perhaps more than any other, transmitted from sire to son, as the produce of the various Norfolk and American trotters have shown. The amble is a pace very little known in England, although very general on the Continent, where the act of rising in the stirrups by the horseman, in the trot, is not practised. We wonder, however, that horses are not oftener broken to this pace than they are, for the use of women, or of men unequal to fatigue. Although the amble is not allowed to be a pace in the manège—the walk, trot, and gallop being all—it is said to be the first pace of the horse when a foal, but when he has strength to trot, he quits it. Another peculiarity attends it. A horse, we know, can be put from a trot to a gallop without stopping, but he cannot be forced from an amble to a gallop without a halt.

The Pack-Horse.—This description of horse is not now in use. His capabilities were prodigious in carrying weight, but were abused by being trespassed upon. When crossed with the heavy cart-horse, a most useful breed for draught was produced, as also what was called the farmer's hackney, that is, a sturdy animal between the cart-horse and the hackney, useful for all purposes of agriculture, as well as for carrying his owner, and always ready to give help upon a pinch, either in the plough, the harrow, or the harvest-cart.

The Cob.—The word cob is one of new mintage in the sporting world, signifying a powerful, short-legged horse, about fourteen hands high, without any pretensions to blood, but able to carry a great weight, at a certain pace, on the road. He is generally the produce of a light, active cart-mare, and either a thorough-bred or half-bred stallion; and, failing to grow in height, often increases in lateral growth to substance equal to that of the old pack, or miller's horse, of former days. When gifted with action, combined with good shape and appearance, this description of horse is much sought after in London, as also in the country, and often sells for a hundred pounds, to carry heavy elderly gentlemen. The attempt to breed him, however, is a hazardous one, as in case of fault in his action for the saddle, he is not suitable to the coach-horse market, the present rate of travelling requiring more lofty as well as higher bred cattle.

The term *Galloway* now applies to any horse not exceeding 14 hands in height, although it originated with a breed peculiar to the county of Scotland known by that name. In the early days of English racing, there were several capital thorough-bred Galloways in training, at the head of which was the Bald Galloway, sire of Cartouch, and also of the Carlisle Gelding, who, as the *Stud-Book* informs us, "was remarkable for having supported the fatigue of running as a trial horse in private, and with success in public, till the age of eighteen, at which period, after winning a heat near Stilton, in Huntingdonshire (1731), he broke his leg, and died." The celebrated Mixbury Galloway, of the middle of last century, was only 13 hands 2 inches in height.

Previously to the improved system of coaching, and the cheapness and expedition of that mode of travelling, the well-bred galloway was the favourite hackney of jockeys, graziers, horse-dealers, and cattle jobbers, and in fact of all light weights who had occasion to travel long distances on the road in a short space of time; and no description of horse is better adapted to the purpose. Many years since, there was a little entire horse in Devonshire, called Katterfelto, the sire of many most extraordinary galloways, to whose labours on the road, indeed, there appeared scarcely to be any limit.

The Pony.—A horse is called a pony when under the height of 13 hands, 4 inches to the hand. It is difficult to account for this diminutive breed, unless we believe it to have been imported from countries farther north than Great Britain, which appears probable from the fact of ponies being found in greater abundance in Scotland and Wales than in any other part of the island; the effect, no doubt, of climate. In Ireland they are very rare.

There is no animal that improves in form and character so much as the pony does from the effect of good grooming and high keep. A real Welsh mountain pony, in very good condition, especially if not castrated, is a perfect war-horse in miniature, uniting almost every good property his species possesses. As a proof of one essential quality, we can state upon authority, that the Earl of Oxford had a mare pony, got by the Clive Arabian, her dam by the same horse, out of a Welsh mare pony, which could beat any of his racers 4 miles at a feather weight. Whether Welsh, Scotch, or Hampshire (New Forest), ponies have properties belonging to them, which should attract the notice of the hippopathologist, among the most prominent of which are the following:—They are never lame in the feet, nor become roarers. A broken-winded pony is a very rare sight, and they live to the extreme of old age, if not unfairly treated. They are also very little susceptible of disease, in comparison with other horses; and as for their powers of endurance, they stagger belief. A rare instance of the latter excellence may be produced, from the well-known fact of the pony Sir Teddy, only 12 hands high, accompanying the royal mail from London to Exeter, and arriving in that city fifty-nine minutes before it, distance 172 miles, in twenty-three hours and twenty minutes. It may scarcely be necessary to state that he carried no weight, being led between two horses all the way; nevertheless it was a task that we think no full-grown horse would have performed. A correct likeness of this pony was painted by the elder Marshall, of Newmarket. In 1784 a Shetland pony, 11½ hands high, carried a rider, weighing five stones, from Norwich to Yarmouth and back, 44 miles, in three hours and forty-five minutes. As a proof, also, of their powers in crossing a country, the fact may be stated of the late Sir Charles Turner riding a pony 10 miles in forty-seven minutes, and taking thirty leaps in his course, for a wager of 1000 guineas with the late Duke of Queensberry, then Earl March. During the drawing of the Irish lottery, the expresses from Holyhead to London were chiefly conveyed by ponies, at the rate of nearly 20 miles in the hour.

THE CHARGER.

No kind of horse, no animal, indeed, of any sort, makes so prominent a figure in history, sacred or profane, as "the goodly horse of the battle," or war-horse. The description of him by Job is admitted to exceed the powers of human eloquence; "and," as M. Rollin says of it, "every word would bear an explication to display its merits." The *Guardian* (No. 86) has a very ingenious critique upon it;

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and Bochart devotes seventeen pages to this and all the other passages in Scripture in which the horse is mentioned. Virgil's representation of him, in his third Georgic, is considered as the nearest approach to that of the sacred writer; and the speech, in the tenth *Æneid*, of the hero Mezentius to his favourite charger, when on the point of sallying forth to avenge the death of his son, is not exceeded, in the pathetic, by any other passage in the poem. Homer is blamed for his too frequent allusions to the horse; but the history of all wars produces materials for panegyrics on this noble animal. The far-famed Bucephalus is said to have preserved the life of Alexander, by carrying him out of reach of the enemy, although he had received his mortal wound, and dropped down dead immediately on his (Alexander's) alighting from his back. In the battle which was to decide the fate of Persia, on the ground upon which the great Nineveh once stood, the merit of the victory was chiefly ascribed by the Byzantine historians, not to the military conduct, but to the personal valour of their favourite hero, in which his horse bore his share. "On this memorable day," says the eloquent Gibbon, "Heraclius, on his horse Phallas, surpassed the bravest of his warriors. His lip was pierced with a spear, the steed was wounded in the thigh, but he carried his master safe and victorious through the triple phalanx of the barbarians." How many British soldiers have owed the preservation of their lives to the courage and docility of their horses.

The movement of turning being the most difficult with the horse, by reason of the inflexible nature of his backbone, the one selected for a charger should have great freedom of action, having his hinder legs well bent under his body, so that he may be easily thrown upon his haunches; also much liberty in his shoulders, and pliancy in the muscles of the neck; in which case he will seldom fail in having the proper requisites for his calling. The position of his hinder legs, however, is most particularly insisted upon, because, should they be straight, that is, not inclining inwards from the hock, after the form of the ostrich's leg, he will with great difficulty be made the supple, short-turning, handy animal that he ought to be, to render him perfectly available to his rider, at the head of his regiment, or in the ranks. Perhaps those horses which were destined to mount our ancient nobility, or courteous knights of old, for feats of chivalry, and gained them the palm in that field of romantic honour, were more highly "dressed," as the term is, in the manège, than an officer's charger of these days should be; nevertheless, as Colonel Peters observes, in his *Treatise on Equitation*, London, 1835:—"Although it might spoil a good horse for military purposes to form him perfectly after the higher manège principles, yet he would be equally unfit for that duty if he were left in a raw and ignorant state."

Amongst the ancient Greeks, all horses, as well as all men, were strictly examined before they were admitted into the cavalry; and the precedent cannot be too closely followed. It is well known, that in the various campaigns of the last war, several British officers lost their lives, in consequence of being mounted on chargers not equal to their weight over every description of ground. In one particular instance, a colonel of a light dragoon regiment was cut down in retreating, by reason of his handsome, but powerless charger, being unable to gallop with him over a deeply-ploughed field. At the battle of Waterloo, the ground became excessively wet and soft, owing to continued rain; and, in consequence of it, the Duke of Wellington gave a large price to an officer on his staff for a fine, powerful mare, which had been purchased out of an English fox-hunting stud. In fact, the sort of horse best fitted for an officer's charger, is one which possesses most of the essential qualifications, as well as accomplishments, of a hunter, as his rider, when on service, knows not how soon they may be called for. He should, however, be of airy form, with light action, and well-bred, or he will not look in character with the smart costume of his rider; but to his appearance there must not be sacrificed those essential points, substance and strength, which will enable him to struggle through difficulties, in which a weaker, though more highly-bred, animal might sink. But a trifling deviation in form in the charger, from the points insisted upon in the hunter, may be admitted. For example, the shortness of leg, that is, in the cannon or shank bone, is not exactly desirable in the charger, as his action is required to be of a grander and more showy appearance than we wish to see in the hunter. A moderate length of leg, then, is favourable to such action, and gives lightness, as well as gracefulness, to his movements.

Troop-Horse.

We cannot imagine any brute animal more likely to insure the gratitude of man than the horse which has borne him in safety throughout even a single campaign; and it is not be wondered at its having been made a subject for rebuke to Cato, that he left his charger in Spain, to avoid the expense of bringing him home; or that it should be recorded in praise of Andromache, that she fed the horses of Hector with her own hand. A case parallel with the first, we would not produce if we could; but without having recourse to history beyond the period of our own time, we may set forth a flattering resemblance to the second. The late Duchess of Wellington, during her grace's residence at Strathfieldsaye, in Hampshire, seldom omitted for a day feeding, with her own hands, the favourite charger of her gallant husband.

The height of a charger should not exceed fifteen hands and a half, horses of that size being more easily set upon their haunches, and also made to turn more readily than taller ones. His colour must depend upon circumstances; but next to the silver gray, which best displays his trappings, and which, we may presume, was the colour of the celebrated Phallas (the Greeks called a gray horse φαλιος), bay, black, and chestnut, are the best.

THE TROOP-HORSE.

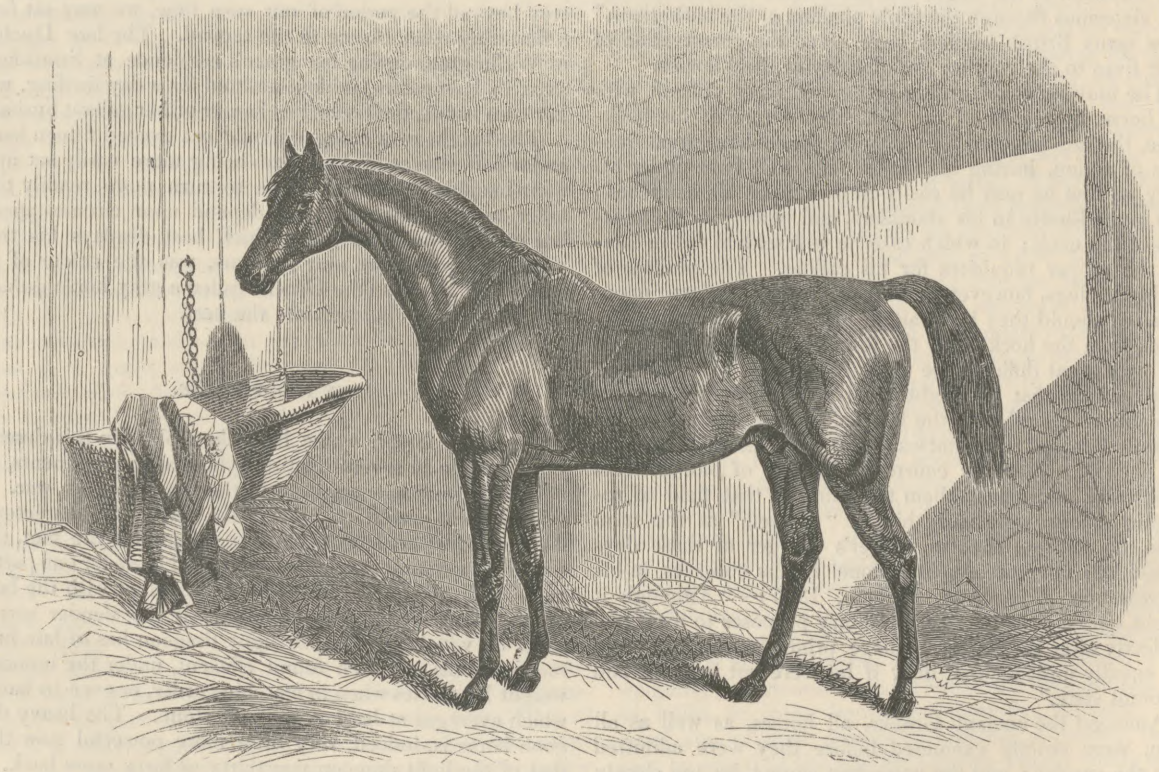
A change for the worse has taken place in this description of horse, in several British light dragoon regiments, the effect of which was apparent in the last European war. It originated in a wish to imitate the style and character of the hussar, without taking into consideration the fact, that that description of cavalry was intended more for out-parties and skirmishing, than for coming in contact with the body of an enemy; and that consequently the slender sort of horse on which the English light dragoon has of late been mounted, has not been found efficient, under the immense weight he carries when in marching order, or even in battle, which averages at least seventeen stone. The heavy dragoon horse is, indeed, very little more powerful now than that of the light dragoon was thirty or forty years back.

The horse best calculated for a light dragoon trooper, is something between the modern coach-horse and the hackney; upon short legs, with good bone, and with much substance in the body. His back should be short, and well ribbed up, his barrel round and large, to allow plenty of room for food, as he is often a long time without it; and hardiness of constitution is a very material point in a soldier's horse. It is true they are purchased when young, many of those for the household troops, at three years old; and their good keep, upon hard food of the best quality, forces them into shape, and makes them what we see them. Most of the troop-horses are picked up at Stourbridge Fair; but the late Sir Walter Gilbert considered that the dragoon guards were never so well mounted as they were in India, when the Cape-bred hackneys were imported for their use. The Duke of Wellington was always very particular about giving them regular exercise, and it is stated by the Druid in the *Post and the Paddock*, that they did 6 miles out of Brussels and back again every morning in two hours; 8 miles of it at a sharp trot, and the other 4 in a walk.

THE COACH-HORSE.

If it cannot be absolutely asserted that the first use of the horse was in harness, it is quite certain that the chariot-horse was held in high estimation in very early times, and is alluded to by poets and historians of all nations and in all languages. Homer says that Diomed, an Asiatic prince, had ten chariots, with a particular sort of horses for each; and he also makes Nestor, at the funeral games of Patroclus, harness the horses for his son with his own hands; and, by his skill in directing him in the race, he wins it. But the Grecian bard goes still further into minutiæ. He even represents Menelaus, on the same occasion, using Œthe, one of the horses of Agamemnon, with one of his own; and Priam is found harnessing his favourite steeds to the car, in which he returns, with the dead body of his father, from Achilles's camp, on the plains of Troy. It would be endless to turn to other writers to show the estimation in which the chariot-horse has been held.

In its present acceptation, the term "coach-horse" includes two varieties; namely, the horse that draws the gentleman's carriage, and the one that is employed in those public conveyances called "stage-coaches." As regards the former animals, we believe a similar alteration has taken place in the form, appearance, and breeding of them, as has been seen in the English hunter within the last half century. The Flanders mares, so highly esteemed, and seen only in the carriages of families of distinction; the well buckled-up, long-tailed blacks and roans—have all disappeared, and we find in their stead the sort of horse nearly approaching to the one which was formerly considered quite well-bred enough for the chase. But the fact is, that nothing but well-bred horses have a chance to stand what is called harness-work on our roads. Those used also for "town-work," as the term is, are of a superior description, amongst which hundreds of good hunters might be selected; but such have been the high prices given for them by the dealers, at an age which would not admit of their being tried in the field, they have found their way into harness, and when once there they remain in it.



The form, however, of what may be termed a splendid town coach-horse, need not be, by any means perfect; and were a judge to examine minutely the points of vast numbers of those handsome horses seen in the carriages in London, or other large towns, he would find them very deficient in several points, essential to any purpose but harness—shoulders and hinder legs especially. But it is fortunate for breeders of horses, that it does not require true symmetry and action to form a grand coach-horse. His false points are, for the most part, concealed by his trappings; and if he be anything near the following form he will make an excellent appearance in harness. His head is not so material, as the bridle covers so much of it; but his neck should rise well out of his shoulders, as the higher he carries his head the better, provided the form of his neck admits of its being drawn inward by the bearing rein, when only moderately tight, in which case he will be easily acted upon by the driving rein. The back of the coach-horse is a material point, as, without an easy slope behind the withers, his forehand will not appear grand, nor will the pad sit well upon him. His hinder quarters should be straight and blood-like; his gaskins well spread; and his tail should be set on high. His action should not be too short for town-work, but the knee should be thrown well up in the trot, to give him a grand appearance. This peculiar action, the result of strong flexor tendons, suited nearly to this purpose only, is observable in colthood, but is increased afterwards by the horse being thrown more upon his haunches by the bit; and the act of drawing is not unfavourable to it. Light work in harness, indeed, is favourable to all action, that of galloping excepted.

The North and East Ridings of Yorkshire may be called the modern Epirus, as the greater part of the London coach-horses are bred there, and get into the dealers' hands at Howden and Northallerton fairs. The most usual cross is between the thorough-bred horse and the Cleveland-bay mare; but the appearance of too many of them incline us to believe that breeders resort, oftener than they should, to the half-bred horse, as well as to the half-bred mare. This, added to the rich grass land they are bred upon, accounts for the coarse, ill-placed shoulders, and flat, fleshy feet that so many of the London coach-horses exhibit. For road-work, in noblemen and gentlemen's carriages, horses cannot be too nearly full blood, provided they have strength equal to their work. Here, as over a country, "it is the pace that kills;" and as, in considerable velocity, the power of a horse is nearly exhausted in moving his own body, he needs every advantage we can give him.

The colour of the gentleman's coach-horse is, for the most part, bay or brown; but by far the most imposing in harness is the silver-gray, with black mane and tail. This colour was held sacred by the ancients; and Camillus is said to have given great offence to the Romans by being drawn through Rome, in his triumph, by four gray horses, no general having before ventured to do so. Gray coach-horses, however (in which Sir Henry Peyton latterly delighted), require the nicest grooming, and the best appointed harness. The piebald look conspicuous, but very few like to drive them. The skewballs are equally unfashionable, although the late Duke of Beaufort, whose taste in these matters was irreproachable, would have nothing else in his carriage. Virgil was partial to the piebald, or party-coloured breed, and mounts young Priam upon one of them in the fifth, and Turnus in the ninth *Æneid*, both Thracian horses.

There are, however, a few points very necessary to be observed in the purchase of the road coach-horse. As in drawing, the force applied proceeds from the fulcrum formed by the hinder feet, well spread gaskins and thighs form a main excellence. His fore legs also should be good to make him a safe wheel-horse, nor can he throw his whole weight into his collar, unless he be sound in his feet. But alas, how many are thus deprived of their natural powers, by being worked upon unsound feet, and expected to exert themselves to the utmost.

There is no truth so easily proved, or so painfully felt by the post-master, at least in his pocket, as that *it is the pace that kills.* A horse at a dead pull, or at the beginning of his pull, is enabled, by the force of his muscles, to throw a certain weight into the collar. If he walk 4 miles in the hour, some part of that muscular energy must be expended in the act of walking; and, consequently, the power of drawing must be proportionally diminished. If he trot 8 miles in the hour, more animal power is expended in the trot, and less remains for the draught; but the draught continues the same, and, to enable him to accomplish his work, he must tax his energies to a degree that is cruel in itself, and that must speedily wear him out.

Let it be supposed, what every horse cannot accomplish, that he shall be able, by fair exertion and without distress, to throw, at a dead pull, a weight into his collar, or exert a force equal to 216 lb.; or, in other words, let him be able to draw a load which requires a force of 216 lb. to move. Let him next walk at the rate of 4 miles in an hour; what force will he then be able to employ? We have taken away some to assist him in walking, and we have left him only 96 lb., being not half of that which he could exert when he began his pull. He shall quicken his pace to 6 miles an hour, more energy must be exerted to carry him over this additional ground. How much has he remaining to apply to the weight behind him? 54 lb. only. We will make the 6 miles an hour 10; for it seems now to be the fashion for the fast coach, and for almost every coach, and every vehicle, to attempt this pace. How stands the account with the poor beast? We have left him a power equal to 32 lb. only to be employed for the purpose of draught.

The load which a horse can draw is about fifteen times greater than the power exerted, supposing the road to be hard and level, and the carriage to run with little friction; and the horse which, at starting, can throw into the collar a weight or force equal to 216 lb., will draw a load of 3200. Let him, however, be urged on at the rate of 10 miles in the hour; deduct the power used in swiftness of pace from the sum total of that which he possesses, and what remains? not a sixth part, not that which is equal to a quarter of a ton, or, if it be a stage-coach, the energy exerted in draught by the four horses will not be equal to a ton.

The coach, and its passengers, and its luggage, weigh more than this, and the whole is still drawn on, and must be so. Whence comes the power? from the overstrained exertion, the injury, the torture, the destruction of the horse. That which is true of the coach-horse, is equally true of every other. Let each reader apply it to his own animal, and act as humanity and interest dictate.

It would be in vain to attempt any standard for road coach-horses. They must be picked up where they can be found, and, if possessed of action, the rest must be left to chance. A good constitution is desirable, for many die in the "seasoning," as it is called, on the road, and a young, green horse cuts a poor figure in a fast coach. Coach-masters are too much given to purchase infirm horses, by which they incur loss, for, if quite sound, it is as much as can be expected that they remain so for any moderate length of time; and we believe the average duration of horses in fast work is not more than four years, if purchased sound. Unsound horses, then, cannot be supposed to last nearly so long, independently of the cruelty of driving them. The most likely horse, however, to stand sound, and do his work well in a fast coach, is one that, with sufficient strength and a good set of limbs, has action sufficiently speedy to admit of his keeping time without going at the top of his pace. When this is the case, he runs his stage, from end to end, within himself, and is as good at the last as he was at the first; but when he cannot *command* the pace, he soon becomes distressed, and is weak at the end of his stage. This accounts for sundry accidents having occurred by wheel-horses being unable to hold back a loaded coach down hill, at the end of the stage, although they would have been more than equal to it at the beginning of it. In fact, many coach-horses are very good for 8 miles, but very bad for 10, so nicely are their powers measured in harness. Above all things, we recommend good legs and feet in working horses, if they are to be had; and an extra price is well laid out in procuring them. Whether they are strong in their harness, in very fast work, cannot be discovered until they are tried; but well bred ones, having substance, are most likely to prove so.

Coach-horses are subject to many accidents, and some diseases nearly peculiar to themselves. Amongst the former is the fracture of a leg, or the coffin-bone of the foot, occasioned generally, it is supposed, by treading on a stone, or any other uneven surface, when the limb is strained in draught. It, however, sometimes happens when the horse is trotting along on very fair ground, and in such cases the accident is rather difficult to account for. In very heavy draught, when the foot is much overcharged with the weight and pressure of the body, a fracture will sometimes take place at the first step the horse takes. Perhaps these accidents may be independent of what is called shape and make, but coach proprietors would do well to purchase their horses with good legs and feet, and then they are less liable to these accidents, and, with good care and good shoeing, may last many years in very quick work.

The diseases peculiar to coach-horses are the megrims and the lick. The former attacks the head, and is caused by irregular motion of the fluids within the vessels of the brain, stopping, for a time, all voluntary motion. The horse in consequence staggers and falls, if not immediately pulled up, and that does not always prevent him. This species of vertigo is generally produced by the effect of a hot sun, especially if the horse be running in the face of it, for which reason horses subject to megrims are generally worked at night. In fact, many coach-horses are good horses by night, although they cannot keep their time by day, in the summer, particularly thick-winded horses. Blind horses also do not like sun, but "as healthy as a blind horse in the winter" is a proverb.

The lick can scarcely be called a disease, but it greatly injures the condition and appearance of coach-horses. When under its influence, they are almost constantly, when not feeding, licking each other's skins, or else the rack or manger. It proceeds from a heated state of the stomach, from the excitement of high food, and almost daily profuse sweating, and is invariably removed by alterative medicines or physic.

A great mistake is made by too many coach-masters in being *under* instead of *over* horsed for their ground. Instead of keeping five horses to work a certain length of ground, and feeding them very high to perform it, it would answer them better to keep six horses on the same allowance of corn that the five horses are eating. The stock would last longer, and the money they cost be "kept together," as the term is, longer, by such means. Each horse would then rest two days out of six, when they were all fit for work, which would keep him very fresh in condition; and there would always be one spare horse left, in case either of the six wanting physic or rest. It is the almost every-day excitement that breaks down the constitution of coach-horses.

THE GIG-HORSE.

Once on a time a country parson and his wife, or a wealthy old farmer, were the only persons seen in England in two-wheeled carriages, then called Whiskies. They were useful though far from ornamental vehicles, having what is termed a "head" to protect the inmates from weather, and, with a very quiet horse, were considered as nearly equal in security to close four-wheeled carriages. In the character and appellations of these carriages, however, a wonderful alteration has taken place within the last fifty years, and even royalty itself has been seen seated in gigs, cabriolets, Stanhopes, and Tillburies; the two last taking their names from the inventors of their peculiar forms. The build of these two-wheeled carriages has reached the very summit of perfection, not only as regards their firmness but their elegance; and it is scarcely necessary to add, that the horses driven in them, as likewise their harness, have equally altered their character. From 200 to 300 guineas (and, in one instance, 700 guineas were paid) have been no uncommon prices given for gig and cabriolet horses; and for gentleman's work we might put 70 as the average of the last forty years.

The choice of a gig-horse (for we confine ourselves to that term for the present) must be regulated by local circumstances. If for London streets, his action should be rather lofty or "grand," as the term is, than fast; that is to say, he should step with his knee much elevated, which of course is unfavourable to speed. His appearance also should be of the first order of his species, not under 15 hands 2 inches in height; and if of a fancy colour, the more money will he fetch in the market. He must be well bitted, carrying his head high, and very quick in getting into his trot, or "upon his legs," as coachmen say, to enable his driver to make his way in crowded streets. We should also add, that this quickness in his motions should be accompanied by perfectly good temper, and freedom from all vice; in which case he is always worth 100 guineas, or more, if in the prime of life and sound.

For the country a different sort of gig-horse is required. In drawing a gig on a soft or newly gravelled road, the resistance is much the same as a continual hill; and therefore a horse with a quick, short step is best calculated for the road, as such action fatigues less than that which we have recommended for London. For all purposes, however, a horse in single harness, to be safe, should be well up before; that is to say, he should go with his fore quarters high up, and not boring on his shoulders. In this case, if he have well-placed shoulders, good legs, and sound feet, free from corns and thrushes; good natural courage to induce him to "run up to his bit," and a good mouth, there will be very little danger of his falling down in a gig; but accidents from vice must depend upon other circumstances. These accidents, however, are often the result not of real vice, or even of ill temper, but of want of knowledge in his owner of putting him properly into his harness, as well as of driving him afterwards.

Innumerable accidents to horses in gigs arise from some part of the harness pinching him, particularly about his withers or back, when he will endeavour to kick himself out of it, to rid himself of the torment. Indeed we have more than once seen a road coach-horse, in regular work, set a-kicking merely from a twisted trace rubbing edgeways against the outside of his thigh.

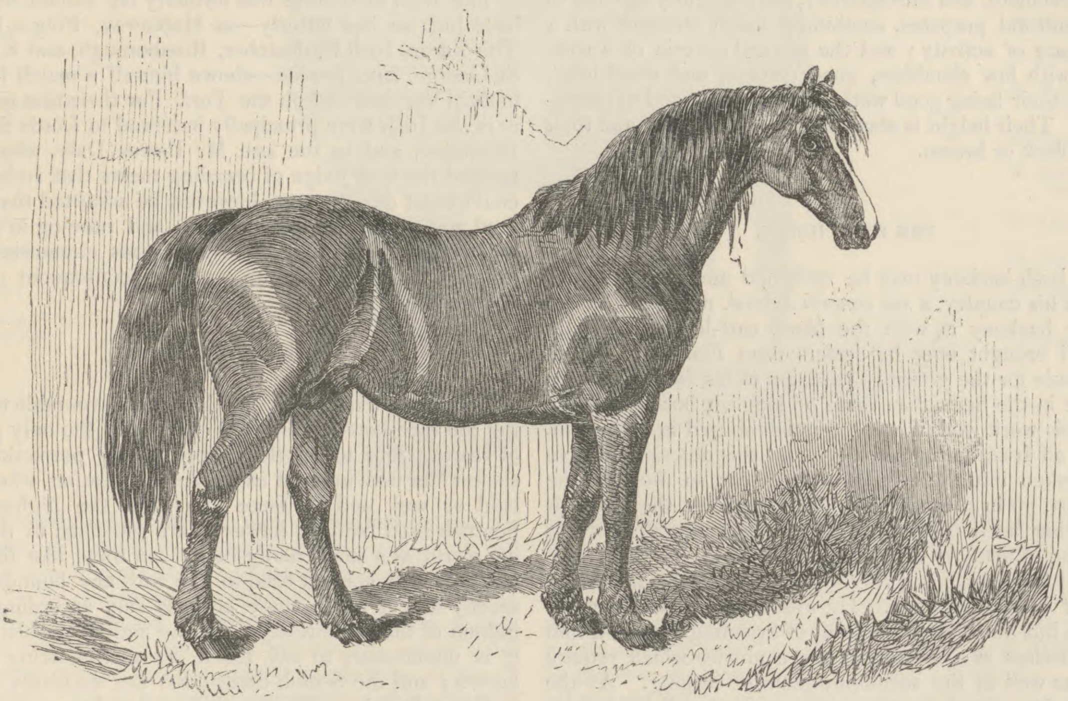
We consider mares objectionable in single harness, for reasons which are obvious; and few of them are to be trusted at certain periods of the year, particularly in the case of a rein getting under the tail. When driven, the precaution of the safety rein should not be omitted. We are also of opinion that numerous accidents from gigs would be prevented, if horses intended for them were to be broken in to them in bridles without winkers, as a great portion of the horses on the Continent are driven. The not knowing what they have behind them is a natural cause of alarm, and would by this means be obviated.

THE POST-HORSE.

This description of horse, although its day is quite gone by, is one of the most useful we have. He is spoken of by Xenophon, in allusion to the posts instituted by the first Cyrus, and as the most expeditious method of travelling by land (*Cyropædia*, lib. viii., p. 496, edit. Hutchinson); although, perhaps, he was chiefly made use of to forward public despatches. Augustus was the first to introduce post-houses, and consequently post-horses and post-chaises, amongst the Romans, disposed at convenient distances (Suet. *in vit. Aug.* vi., 49), but these were chiefly for the purpose of political intelligence. Thus, in a letter from Pliny to Trajan, we find him informing the emperor of his having granted a courier a warrant to make use of the public posts, as he wished him to be quickly in possession of some important facts, communicated to him by the King of Sardinia; and he subsequently (Letter cxxi.) apologizes to his royal master for having ventured, on his own responsibility, to grant an order for his wife to be forwarded by post-chaises, on occasion of a domestic affliction. His letter produced a kind answer from the emperor, approving, *in this peculiar instance*, of the use of the warrants which he had entrusted to his care.

The character and appearance of this class of horses, as well as of all others, has undergone a marked improvement in comparatively modern times. Up to the end of the last century the post-horse was, except in a few instances, an object of commiseration with travellers. With galled sides and sore shoulders, and scarcely a sound limb, he would not go without the lash or spur; whereas he now comes out of his stable in high condition, and runs his 10 miles stage in an hour with a carriage of the average weight, and 12, if required, with a light one. He is also seen to perform either of these tasks without being distressed, unless in immoderately hot weather, when humane persons would check his speed. Montaigne says, "There is a certain general claim of kindness and benevolence which every creature has a right to from man," a sentiment in which we heartily concur; for, although man may be considered as the delegate of heaven over inferior animals, he has no right to go to the very extremity of his authority. It is, however, much to be feared that a thoughtless indifference to the sufferings of the post-horse is too frequently to be laid with truth to travellers in our own country, who, without any sufficient reason, urge him to a rate of speed which cannot be unattended with suffering.

The form of the good post-horse should resemble that of the hunter, which is generally ridden in the deep and close hunting counties of Great Britain; that is, with as much blood as can be got, in conjunction with good bone and strength. The riding horse of the pair must have sound legs and feet; but, if a little the worse for wear, an old hunter makes an excellent hand-horse (if he will not lie down the moment he has to take to his collar at a hill), and innkeepers generally avail themselves of the saving occasioned by putting horses of a less price in that place than the one which carries the driver. Notwithstanding this, the average purchase money of a useful pair of post-horses cannot be estimated at less than from L.50 to L.70.



THE CART-HORSE.

Errors detected by experience are allowed to be equal to demonstration; but this truism is not admitted by a vast majority of English farmers, who persevere in the use of the heavy horse for agricultural purposes, for which, solely, he is by no means fitted, from the slowness of his step (independently of his weight), unless very highly fed. As long, however, as the ponderous vehicles made use of in London and elsewhere for the transmission of heavy goods are persevered in, this equally ponderous animal, which sometimes weighs a ton, may be necessary; but it is certain that lighter horses in lighter vehicles would do the business better, that is, more speedily and at less cost. Notwithstanding the objections to him, the heavy cart-horse pays well for rearing; for, being always saleable at two years old, a certain profit is insured, as for the first year the expense of keeping him is trifling. If on a large scale, and promising to be fit for the London market, or the best-conducted road waggons, he commands a price that leaves a handsome surplus to the breeder.

The chief desiderata in the cart-horse are substance and action. If possessed of the latter, his shoulders and fore-quarters can scarcely be too coarse and heavy; for drawing being an effort of the animal to preserve himself from the tendency which his weight gives him to the centre of gravity when he inclines forward, so the more weighty he is before and the nearer he approximates this centre, the more advantageously will he apply his powers. Notwithstanding this, we are not advocates of heavy horses for farmers' work, much less on the road. The lighter horse gets over in eight hours what would take the heavy one ten; and the great improvement in the present mode of culture, and the implements used for agricultural purposes, do not require more weight or strength than what the Suffolk, Clydesdale, Cleveland-bay, and other lighter breeds, are masters of. Besides, there are periods of the year when despatch of business is of great moment to the farmer, which he cannot command in those mountains of horse-flesh which we see labouring in most of the finest districts in England, tiring themselves by their own weight.

Travellers on the Continent, occupying land in England, should carry in their eye the form and action of the horses which draw the public carriages, particularly those bred in Picardy, in France. The prevailing colour is *iron* roan, and their nature appears to sympathize with that colour; for, Irish Horse.

speaking figuratively, they are as hard as iron itself. It is not unusual to find four or five of them drawing those cumbrous diligences, weighing perhaps 6 or 7 tons, a 20-mile stage at the rate of 6 miles an hour, preserving up their condition to the highest pitch; and this with hay and corn very inferior in quality to that grown in England. To keep up the condition of the English cart-horse, requires him to consume nearly as much as his labour is worth; and unless he lives well he is only half alive, which his sluggish action denotes. In fact, his chief fault lies in his having too great a body and too little spirit, consequently he exhausts himself in the mere act of carrying that body. The nimbleness of the smaller kinds of cart-horses to which we have alluded, is owing to their moderate size; and their immense powers in lifting weight (with the Suffolk Punch, and Clydesdale breeds, in particular) to the same cause, combined with the low position of the shoulder, which occasions weight to be acted upon in a just and horizontal direction. The Welsh cart-horses, especially those in use in the counties of Denbigh, Merioneth, and Montgomery, are eminently adapted to all agricultural purposes, combining much strength with a great share of activity; and the general criteria of a wide breast, with low shoulders, good carcase, and small head, indicate their being good workers, with hardihood of constitution. Their height is about 15 hands 2 inches; and their colour black or brown.

THE IRISH HORSE.

The Irish hackney may be reckoned amongst the indigenæ of his country, a *sui generis* animal, not mixed as the English hackney is, with the black cart-horse, originally and still brought over by dealers from Flanders. He is remarkable for the general soundness of his feet, which are stronger in the heels than those of English horses, and he stands his work well, if not too much abused in his youth. Almost all Irish horses coming under this description have been broken into the plough and the car, so they, for the most part, go in harness; but the worst fault they have is not having been properly broken in, and bitted, which is the cause of many of them being restive.

The Irish hunter is a very different animal from what he was half a century back. He was always celebrated for leaping, but until lately the want of breeding rendered him nearly useless as a hunter, in the countries which require speed, as well as the accomplishment of leaping. At the present time great numbers of excellent well-bred Irish hunters are annually imported into England, and being found to answer well, fetch good prices. This is the result of horse-breeders in Ireland seeing the necessity of putting their hunting mares to thorough-bred stallions, and not, as before, to the slow, *great-jumping* hunter, no matter how low his breed. The improved cross, being again put to the thorough-bred stallion, of course has produced a still better kind of animal, and thus are Irish hunters "progressing" towards perfection.

The method of leaping of the native Irish horse is peculiarly suited to some of our English counties, Cheshire and Lancashire, for example, and likewise to those inclosed with walls both in England and Scotland. To use an expressive Irish phrase, "they have always a leg to spare," implying that they have a ready use of their hinder legs; which is the fact, in tipping or touching walls or banks, with one or both, which gives them a fresh fulcrum, from which they can extend their leap, in case of their finding an unforeseen difficulty or obstacle on the landing side. In the wall counties of Ireland, indeed, the horses are taught to alight on their hinder legs upon the summit of the wall, after the manner of the dog when he leaps a gate, which, if the wall be broad and firm, adds to the facility of the exertion, as also to the safety of the rider. Irish hunters are generally good brook jumpers, being educated, indeed bred, amongst drains; but field gates, or stiles, being of rare occurrence in the pastoral districts of Ireland, they are not to be relied upon as timber leapers, until they have been initiated to that description of fence.

Scotch Horse.

Persons who have had experience in Irish hunters have found them very shy of having a whip, with a thong to it, made use of by the rider, either for the purpose of smacking it, or to strike an unruly hound. This, we fear, proceeds from unnecessary severity in the exercise of the whip in breaking, but which would be obviated if breeders were aware of the inconvenience it occasions to servants, who are called upon to ride Irish horses with hounds in the capacity of huntsmen or whippers-in. We have seen a few of these horses nearly useless from this cause, as servants' horses; although well suited, in every other respect, to this peculiar purpose from their style of fencing and hardiness.

The Irish race-horse was formerly far behind the English; but he has latterly—as Harkaway, Foig-a-Ballagh, The Baron, Irish Birdcatcher, Russborough, and Knight of St George, have proved—shown himself a match for them both in the stud and on the Turf. For their first good runners the Irish were principally indebted to Lords Sligo and Rossmore, and to the late Mr Bowes Daly, who was esteemed the best judge of breeding racers that Ireland ever could boast of. It must, however, be admitted that horses bred and trained in one country, and running in another, meet their rivals under disadvantageous circumstances, in consequence of the loss of condition consequent on a sea voyage.

THE SCOTCH HORSE.

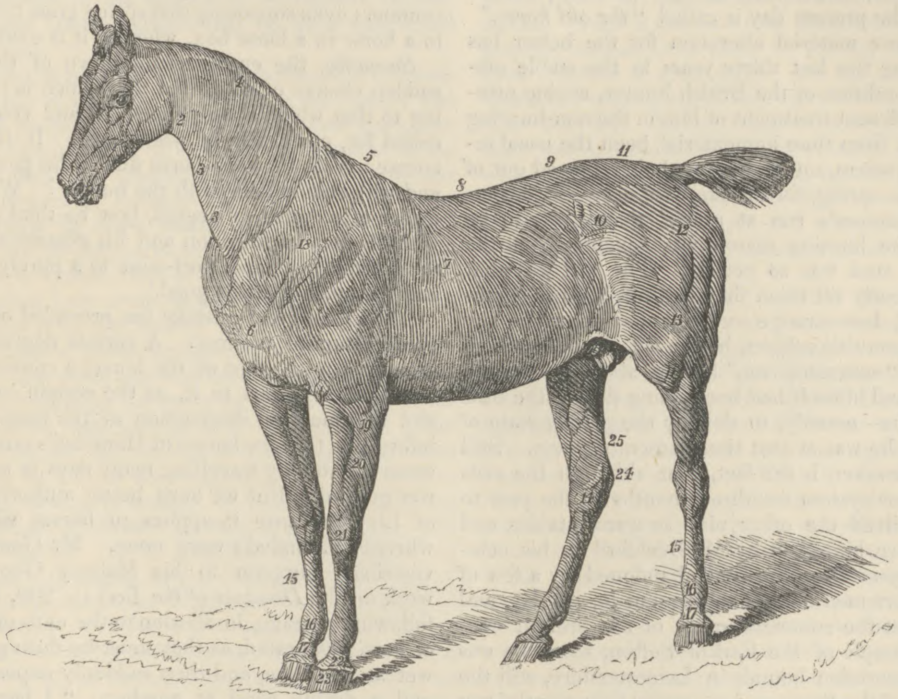
Like all cold countries, Scotland is unfavourable to breeding the race-horse in his best form; and the only prospect of rearing him to anything approaching perfection is to shelter him with unusual care from the weather, when either cold or wet, and to force him with the highest keep. Scottish-bred hunters, however, are esteemed in the hunting world as a stout, hardy race; and they, like the Irish, are now well enough bred to live with any hounds at the speedy rate at which those animals run, according to the fashion of the present day. Of the native Highland pony it is unnecessary to say much, its merits being so well known; and the Scotch cart-horses are decidedly the best in Great Britain. The peculiar variety known as Clydesdale horses stand first in repute. Of the origin of this race various accounts have been given, but none of them so clear or so well authenticated as to merit much notice. They acquired their appellation, not because they are peculiar to Clydesdale, as the same description of horses are bred in the other western counties of Scotland, and over all that tract which lies between the Clyde and the Forth, but because the principal markets at which they are sold—namely, Lanark, Carnwath, Rutherglen, and Glasgow—are situated in that district, where they are also preserved in a state of greater purity than in most other parts. They are rather larger than the Suffolk-punch, and the neck is somewhat longer; their colour is black, brown, or gray; all the essential points for heavy draught are very conspicuously developed; and they are extremely docile withal, and excellent at what is called a dead pull. Mr Charles Philips, of Cracrop, Cumberland, is the best English breeder of them; and some of his two-year-olds, according to *The Druid*, have been sold in Canada at 4 shillings and 8 pence per pound! Some magnificent specimens of this breed are to be seen in the streets of Glasgow, in the service of merchants and carriers. We have reason to believe that, if tried by a dynamometer, the Clydesdale horse would exceed

Treatment of Horses.

any other of his inches and weight in his powers of draught; and his quick step adds much to his value.

GENERAL TREATMENT OF HORSES.

Humanity and mercy are esteemed the choicest characteristics of man; and there is hardly a greater instance of ill-nature, or a more certain token of a cruel disposition, than the abuse of dumb animals, especially of those who contribute to our convenience and pleasure. Judge Hale beautifully expresses himself on this subject in his *Contemplations.* "There is a degree of justice," says he, "due from man to the creatures, as from man to man; and an excessive use of the creatures' labour is an injustice for which he must account. I have therefore always esteemed it a part of my duty to be merciful to my beasts." We know of no remedy for this; but it is pleasing to reflect that in all classes of society so noble, generous, and useful an animal as the horse, is now freed from many evils to which he was formerly subjected. In fact, if the Society for the Suppression of Cruelty to Animals hear of a case, they will send their agent any distance to prosecute it. The short-docking of the cart-horse, the effect of prejudice and ignorance, it being supposed to add strength to his back, is very generally discontinued, and he is allowed the use of a full tail, the only natural defence against the torment of flies in the summer. Those barbarous operations, nicking the tail, and cropping the ears of pleasure horses, are very seldom had recourse to; neither is firing the limbs nearly so frequent a remedy as it was, veterinary science having substituted other equally efficacious, but less painful means. And, though last, not least, the improved condition, and the effect of better stable management, on all horses employed in fast work, has very considerably lessened their sufferings. On this subject we offer the following remarks:—



1. 1. 1. Muzzle, parts about the mouth.
2. Gullet.
3. 3. Windpipe.
4. Crest.
5. Withers.
6. Chest, or counter.
7. 7. Girth.
8. Back.
9. Loins.
10. Hip, or ilium.
11. Croup.
12. Haunch, or quarters.
13. Thigh.
14. Hock.
15. Shank, or cannon.
16. Fetlock.
17. Pastern.
18. Shoulder-bone, or scapula.
19. Elbow.
20. Fore-thigh, or fore-arm.
21. Knee.
22. Coronet.
23. Point of the hock.
24. Ham-string.

Condition, or Stable Management of the Horse.

The improvement in training the race-horse has been the result of two distinct causes, each equally likely to produce the desired effect. First, practical experience, an excellent schoolmaster in such matters; and, secondly, both breeders and trainers of this animal now look into books, not only reading them, but reflecting upon what they read. As we have already observed, trainers dislike green meat, and a racing-colt may now be said to be in training, if not from the day on which he is foaled, from that on which he is weaned; for his condition, at least the foundation of it, is from that period in progress. Again, the early period of his going into work, compared with what it formerly was, but now become so general, has not been without its effect. It has called forth additional exercise of the trainer's professional skill; for it may easily be imagined that bringing very young horses to the post, in the perfect state of condition and full development of muscular power in which we now-a-days see them at every race-meeting in our island, is a very difficult task, and that it is a still more difficult one to preserve them in that state, even for a few days. On the whole, the training system of the present day is not nearly so severe as it was; and railways have done much towards keeping horses in condition, by allowing them to stay at their own stables and training-ground till within a few hours of the race, instead of losing condition by a long walk on the road, and even to say nothing of a fresh stable and fresh water every night. Many of the great favourites have now their own food and water brought to a race-meeting with them for fear of risks, as change of water especially is most detrimental to a horse in form. Both constitution and temper being to be consulted, the very refinement of the art is called for; in fact, the trainer must act upon principle, and very cautiously too, in his efforts to forestal nature. Inasmuch, however, as muscular action produces muscular strength, the racer of the present day, reared as he is reared, and consequently in a more condensed form, does not, with few exceptions, require the very severe work which it was formerly necessary to give him to increase his natural powers, as well as to rid him of the bulk of flesh and humours he acquired in his colthood under the old system of rearing him. A sight of our two-year-olds at the starting-post is the best demonstration of what is here stated. They exhibit a developement of muscle in their forced and early maturity almost equal to that of the adult horse, and carry 8 st. 7 lb. and even upwards, at a racing pace; a weight unheard of upon so young an animal in former times. How far, however, this forced maturity and its consequences—namely, severe work, and the excitement of high keep, at so tender an age—are favourable to him or to his produce in after life is another question; but the use of a system should never be estimated by the abuse of it. If our race-horses are not, and we believe they are not, so stout in their running as formerly—that is to say, twenty years back—the cause may fairly be traced to the great value of produce stakes and others, which bring them to the post at so early an age; so much so, that, in the language of the turf, a four-year-old colt of the present day is called "*the old horse*."

But a still more material alteration for the better has taken place during the last thirty years in the stable management and condition of the British hunter, arising principally from a different treatment of him in the non-hunting months. It had, from time immemorial, been the usual remark of the sportsman, on his hunters being turned out of their stable in the spring, for the *supposed* necessary advantage of the "summer's run at grass," that it was to be lamented that the hunting season was concluded, as the condition of his stud was so perfect. The fact was that until then, or nearly till then, they had not been in condition at all; and, how strange soever it may appear to any one reflecting upon this subject, by the act of turning them to grass for this "summer's run," he was about to undo all that his groom and himself had been doing during the nine preceding months—namely, to destroy the perfect state of condition which he was at that time lamenting over. Still more strange, however, is the fact, that although the evils of this out-of-door system for three months in the year to an animal who lived the other nine in warm stables and well clothed, were hinted at by Mr Beckford in his celebrated *Letters upon Hunting*, and abandoned by a few of our first-rate sportsmen of, and subsequent to, his day, and particularly about the commencement of the present century, by the example of the Earl of Sefton, when he was owner of the Quorndon hounds in Leicestershire, still the ruinous system of the three, and generally four months' run at grass (viz., from 1st of May to the 12th or 20th of August) continued to be practised until these evils were exposed in all their appalling deformity, and the advantages of an opposite system made manifest in a series of letters in the *Old Sporting Magazine*, under the signature of "Nimrod," which have since been published in a separate form, and very widely circulated. We may also add that the effect of this exposure has been nearly a general abandonment of the grazing system in the studs of all men who mean to ride near hounds.

Previously to our enumerating the real advantages of the modern system of "summering the hunter," we will state the imaginary ones of the old one, and which, as may be supposed, are still held to be such by those who reluctantly acquiesce in any kind of reform. First, the purging by spring grass is insisted upon. Secondly, a relaxation of the muscles, and what is called a letting down of the whole system to its natural state. Thirdly, the benefit the feet receive from the dews of the evening, and coming in contact with the cool earth. Fourthly, the saving of expenses. Fifthly, a kind feeling towards the animal, who, they say, is entitled to his liberty for a certain period of the year, also to the free enjoyment of his natural state. And, lastly, the absolute necessity of rest to the limbs, after the labours of the preceding season. We will now make our own comment on each of these presumed facts.

And, first, we admit there is a laxative, and therefore a cooling, property in early spring grass, but as a purgative it is insufficient, which is admitted by the fact of its having been generally considered necessary to give two doses of physic to hunters previously to their being turned abroad for the summer (thus administering the antidote, as it were, before the poison), and to physic them immediately when taken up. Here, then, is at once an answer to the first objection to the improved system of in-door treatment in the summer; even supposing that spring grass could not be given to a horse in a loose box, whereas it is evident that it can.

Secondly, the entire letting down of the system, by a sudden change of food from that which is highly invigorating to that which is only succulent and relaxing, is neither called for, nor can it be wholesome. It is never had recourse to with the race-horse during his period of inactivity, and why should it be with the hunter? We would ask the owner of a horse so treated, how he thinks it would agree with his own constitution and his *digestion*, to be suddenly taken from beef and port-wine to a purely vegetable diet; and the analogy holds good.[1]

Thirdly, a great mistake has prevailed on this point, the preservation of the feet. A certain degree of moisture is beneficial to the foot of the horse, a continued exposure to wet most injurious to it, as the certain cause of thrushes, and in time total destruction of the frogs. Thus, history informs us that the horses in Hannibal's army were rendered unserviceable by travelling many days in succession in very wet ground. But we have better authority here than that of Livy, because it applies to horses which wore shoes, whereas Hannibal's wore none. Mr Goodwin senior, late veterinary surgeon to his Majesty George IV., in his work on the *Diseases of the Feet* (p. 209, 1st edit.), has the following passage, in allusion to the evils of having the feet of horses saturated, as they must be during a summer, with wet at one time, and then suddenly exposed to a hot sun and a drying wind at another. "I have invariably observed," says Mr Goodwin, "where horses are turned out to grass during the dry and hot summer months, that on bringing them up to be put into stable condition, their feet are in a much worse state than they were when they went out, dried up, and so hard and brittle, that, on the application of a tool to bring them into a form to receive a shoe, the horn breaks like a piece of glass, and all the naturally tough and elastic property is lost, so that it requires some months to remove the bad effects. If it is necessary that a horse should be put out of work during the hot and dry weather, I prefer a large box or shed, and soiling with green food; by which means two objects are gained, viz., all the *injurious* effects of a drying wind or a meridian sun on the hoof are avoided, which create such an excessive evaporation of the natural moisture absorbed into the horn from within, that it not only becomes dry, hard, and brittle, but the whole horny box tightens on the sensible parts, and frequently produces great mischief. But in a loose place, moisture may be applied in any desirable way." In addition to the above, Mr Goodwin says, "Horses at grass are much inclined to thrushes;" which renders it unnecessary for us to say more on this subject at present, although we shall by-and-bye offer the result of our own experience in the treatment of horses' feet in the summer.

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[1] In No. 59, vol. v., p. 645, of the *Veterinarian*, we find the Editor coinciding with Nimrod on this point, in his second review of his Letters on Condition. "These pithy and valuable extracts," says he, "at the same time that they serve to expose our author's views in regard to summering the hunter, demonstrate a sagacity and experience on the subject, no less worthy of the admiration of the professional man, than of the sportsman himself. The leading consideration in summering the hunter is to maintain his condition, or rather, we should say, to guard against his losing that which we know, both by education as medical men, and experience as sportsmen, once lost, will require much time and pains to be re-acquired. Change of food is necessarily productive, in the animal constitution, of alteration of structure; though parts cannot be said to change their nature under their influence, yet they do become greatly altered both in texture and in tone."

Treatment of Horses.

Fourthly, a saving in expense. This is an objection too trifling to be admitted in opposition to any real advantages. It was calculated by Nimrod[1] (allowing only 4s. per week to have been the charge for each horse, supposing him to have been summered at grass), that the extra expense of his six hunters summered after his system, which we shall further explain, amounted to only L.13, 18s. The mere chance in favour of exemption from accidents to which horses abroad are liable, is worth more than this inconsiderable sum to the man who keeps six hunters in his stable; but twice its amount would be realized in the sale of any of the six, if offered at the hammer in November, beyond the sum he would have produced had he been summered solely in the fields.

Fifthly, we would go any length in advocating the extreme of kind treatment to so noble an animal as the horse; but experience has taught us, that neither the open field, nor the shade, is a bed of roses, in the summer months, to the well-bred, and naturally thin-skinned hunter; for the œstrum, or blood-sucker, pursues him in each; and the desperate attempts he often makes to avoid them, shows the horror he has of their attacks. But, unluckily for the advocates of this system, one of the greatest evils of the out-of-door system here stares us in the face. If the horse cannot get away from this host of tormentors, his only remedy against them is, galloping from one end of his pasture to the other, or else stamping with his feet against the hard ground, and often against the roots of trees, to scare them from one part of his body, only to settle upon another. The injury to both feet and legs from a daily succession of these operations, may be left to the imagination of the reader; but against the charge of cruelty, we quote the following remark from *Nimrod's Letters* (p. 268, first edition): "In the very hot weather" (he is speaking of the summer of 1825, which was remarkable for the intenseness of its heat), "I made a few observations, which are not irrelevant to my present purpose, particularly as to the charge of cruelty in keeping hunters in the house in the summer. On the 29th of July, one of the hottest days, the thermometer was one degree higher, at 2 o'clock at noon, in my two four-stall stables, in each of which three horses had stood for sixteen days and nights, than it was in the entrance-hall of my house, which is 23 feet high, and contains three large windows and six doors, and the aspect due east. Now, will any one tell me, that the most tender animal could be injured by breathing such an atmosphere as this? But all is not yet told. I removed the thermometer on the same day, and at the same hour, into the shade, and there it was *four degrees higher than in my two four-stall stables*. Here, then, the objection to horses standing 'sweating in the stables in the summer time,' returns to its real insignificance."

Lastly, upon the subject of rest, and the means of procuring the advantages of it to the hunter by a summer's run in the fields, we cannot do better than quote from the same author. "When discussing the subject," says he (p. 262), "of summering hunters, with a friend who is an advocate for the grazing system, he made use of the following expression: 'I dare say it may be all very well to keep them in the house in the summer, but then they have not the benefit of *the rest* which they get when at grass.' I could not help smiling at this strange perversion of facts; and ventured to ask him, Whether, if he were examined in natural philosophy, and asked, *what is rest*, he would answer, *motion?* and that would not be a whit less absurd. If rest be desirable, as we know it is, for a hunter's legs, after the labours of a winter, surely he must obtain it more effectually in a small confined place, than when suffered to run over a large tract of land, and to stamp the ground with his feet for so many hours each day." Neither does the labour to the legs end here. All persons who have ridden horses whose growth has been forced in their bodies, as that of most hunters has been, must have perceived that, when letting them drink in shallow water, their fore legs totter under them, in the attempt to reach the water with their mouth. Such is the case with the hunter, at least with the properly formed one, when in the act of grazing (for the horse prefers a short bite); and the tremour in his legs shows the stress that is laid upon them, to enable him to reach his food. In fact, many horses (and we could name some well-known hunters) cannot reach the ground at all with their mouths, unless it be by the painful position of placing one fore foot close to their mouth, and the other even with the hinder legs; and consequently their owners have not been able to turn them out, had they been inclined to do so.

It is now our turn to be heard on this important subject to all owners of hunters; and we proceed to state, that the principal objection to summering a horse abroad, consists in the danger we expose him to by the violent change from a stable at the temperature of 63° (the common one of hunting stables), and the addition of warm clothing, to a bed upon the cold ground on a wet night; or, which often happens in the month of May, to the influence of sharp frost; all this, also, when the animal has scarcely any coat on his back to provide against the effects of bad weather; and with a skin highly porous, from long continued friction in the stable. As well might we expect to find animals and plants that can sustain the heat of the torrid, and the cold of the frigid zone, as horses to bear those extremes with impunity! On the contrary, it is the confirmed opinion of most veterinary surgeons, that more hunters have been ruined by becoming roarers, broken-winded, or blind, from this cause, than from any other to which they are subjected; and they are backed in their opinion by reason. For it is not necessary that the newly-turned-out hunter should be exposed to either a wet or a frosty night, to produce disordered functions; the common exhalations from the ground in the evening, are sufficient to produce them, by a sudden constriction of the pores, opened as they have been by the effect of a hot sun during the day. "Heat and cold, moisture and dryness," says Mr Percival, veterinary surgeon to the First Life Guards, and author of the *Anatomy of the Horse*, in his last work on the Horse (p. 64), when treating on the theory of inflammation, "all in their turn become excitants of inflammation; their mischievous agency residing more in the vicissitudes from one state to its opposite, than in any obnoxiousness in our climate, from their excess or continuance. They may operate either directly as excitants, or indirectly, simply as predisposing causes." Few veterinarians, indeed, as Mr Percival expresses himself, now-a-days feel inclined to deny the uncongeniality of cold and wet to the constitutions of horses, or to maintain that they do not very often, in such situations, contract the foundations for disease, which at some future time is apt to break out and prove fatal to them.

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Two tons five hundred-weights of hay, at L.4 per ton	L.9	0	0
Seventy-one bushels of oats, at 4s. 6d. per bushel	14	4	0
Beans	1	10	0
	L.24	14	0
Six horses at grass nine weeks, at 4s. per week	10	16	0
	L.13	18	0

Nor are the remarks of this scientific practitioner and most perspicuous writer, less to our purpose, when speaking of the horse that is turned out of his stable in the winter. "Take a horse," says he, in his chapter on 'Hide-bound' (p. 296), "fat and sleek in condition, out of a warm stable, where he has been well clothed and fed, turn him, during the cold and wet of winter into a straw-yard, and go and look at him three months afterwards, and you will hardly recognise your own horse. You will find him with a long, shaggy, staring coat; a belly double the size it was when in condition; and a skin sticking close and fast to his ribs, which may now be readily counted with the hand, if not with the eye." But here the analogy between the horse turned out to grass in the summer, and the horse sent to a straw-yard in the winter ceases. The latter loses flesh, and becomes hide-bound, both of which will find a remedy in a return to more generous food in the stable, with the assistance of alterative medicine; and he will speedily resume his condition. But it will not be so with the grass-fed hunter. He has accumulated a load of soft, unhealthy flesh, which must be got rid of at the expense of his legs and feet; or, in the language of grooms, "it must be exchanged for better flesh, the produce of hay and corn." By feeding *ad libitum*, however, he has so plethorized his system, and trespassed upon his digestive organs, that this is become not merely a work of labour and time, but one of no small risk to the general soundness of his constitution. Nor is even this the extent of the mischief. Under the most favourable circumstances, it is not in the power of a groom, how good soever he may be, to bring the grass-fed hunter into the field, fit to be ridden, with hounds, until the hunting season is half expired. For proof of this assertion, we need only go to the race-horse, which cannot be made fit to run under at least four months' preparation, although he has not been at grass since he was six months old. Nature will not be put out of her course by violence; and horses can only be got into good condition by degrees, by long-continued slow work at first, increasing in pace as their condition increases; and it has been the attempt to get the grass-fed hunter into something approaching to condition, by hurrying him in his work, under a load of flesh, and with his muscles in a relaxed state, that has ruined thousands of good horses, by the injury done to their legs especially; and will ruin thousands more, if persevered in. The change of food, again, has been the cause of more broken-winded horses than anything else that can be named. "It must dispose," says Mr Percival, "from its being the chief cause of plethora, to general diathesis of the system; and so far it contributes to the production of pneumonia, or any other inflammatory affection." To this we may add blindness, the natural consequence of the dependent posture of the head when feeding, in an animal in the plethoric state that a previously highly-fed hunter must fall into, after being some weeks at grass; and likewise of constant irritation from flies and sun. Neither should the following remark of Mr Percival's be forgotten by gentlemen who turn out their hunters during a wet summer. "Cold," says he, "abstractedly from wet, even although it be alternated with heat, is not found to be near so prejudicial as when moisture is present too; hence we are in the habit of viewing frosty weather as a season of health among horses; and hence it is that the spring and autumnal months are the most unhealthy, the weather being then moist and variable, and the wind generally in a cold quarter." Again, "Two undomesticated horses," says he, "out of three, under five years old, that are taken from cold situations, and kept in warm stables, will receive catarrh. But even domesticated horses that are advanced in years, and that have been accustomed to such changes, do not always escape, unless some precautionary measures be taken; for hunters taken up from grass in August, unless due attention be paid to the temperature of the stable, are often the subjects of catarrhal attacks."

Perhaps the summer of 1835 may be produced in proof of the danger of subjecting stabled horses to atmospherical changes. In the first week of June, 78, 80, 82, and 84 degrees of heat were marked by the thermometer. On the 13th, the maximum of heat was 15 degrees less than that of the preceding day; and on the 23d, the thermometer fell to 47 degrees, succeeded by four days' rain, with wind veering to S.E., back to W., then to N. and N.E., at times furiously high.

We must be allowed two more remarks on the evils of the out-of-door system. Amongst the physical changes which the body is capable of receiving, none is so visibly effected as in the diminished or increased size of the belly; and the latter alternation of form is speedily effected by a horse eating grass, and nothing but grass. When a man goes into training for a match against time, or a prize-fight, the first act of his trainer is, to reduce the size of his belly; for, until that is done, his respiration is not free enough to enable him to make such bodily exertions as are essential to augment his natural vigour, and put him into the best possible condition; and this exactly applies to the grass-fed hunter taken up in August. He has exchanged an active untiring frame for a bloated and breathless carcass; and nothing can be done with him until, by purging and *severe work, when he is not in a fit state to endure it with impunity*, the nature of his frame is altered from weakness to vigorous health. But this must be the work of time, for, although Nature will admit of improvement, she will not allow herself to be hurried by the unreasonable innovations of man.

Our next remarks relate to bodily infirmities and local diseases, to which the horse, by the severity of his labours, is always more or less subject. Several of these, such as splents, spavins, curbs, and ring-bones, are easily checked, if discovered in their incipient state; but when, by being undiscovered for only a short time, a certain progress is made in them, the cure is far from certain, at all events, more difficult. Now, under the old system of the summer's run abroad, this was most frequently the case. Horses, when taken up, were found to have thrown out those excrescences unperceived, which, as soon as they began to work, caused lameness and disappointment; whereas, under the improved system of summering the hunter, they could not have escaped the constant inspection of the groom, and an immediate check would have been given to them. The short-cough, vulgarly and stupidly called a "grass-cough," also too often swelled the catalogue of disasters; and, in six cases out of ten, ended in broken wind or roaring. But it may not here be amiss to address ourselves to owners of hunters, who may adopt either one system or the other of treating them in the summer months; we mean, as regards their legs, the treatment of which now forms a conspicuous feature in the science of the stable, particularly the racing stable. Many valuable animals are ruined in consequence of their owners and their grooms not knowing, perhaps not wishing to know, when their legs are going amiss, and consequently stopping them in their work, before the evil gets a-head. It is irksome, no doubt, to give up the use of a hunter, especially if a favourite one, and in blooming condition; but it is only by such prudent conduct that we can expect a lengthened enjoyment of his services. It is a lamentable fact that, generally speaking, good-constitutioned horses would wear out two sets of legs and feet, which shows the urgent necessity of taking care of them.

We now take our leave of the old, and, we may add, ruinous system of treating hunters in the summer, and proceed to state how, in our opinion (the result of much experience), they ought to be treated in the non-hunting months; as also to offer a few directions for the manage-

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ment of them when in work. To begin, we are far from averse to resting the hunter in the summer, although we cannot shut our eyes to the fact of horses working hard for a great many years in succession, without experiencing what is here meant by "*rest*" (namely, not having a saddle on their backs for three or four months), and remaining sound and healthy to the end of a long life. Our great object is, to give the hunter fair play, by preserving, instead of destroying, his condition at the same time that we rest him; and in this we think, that, by preventing exhaustion in his work when he returns to it, we offer him much more than an equivalent for the fancied enjoyment of his "snuffing the air in his native liberty," and "making his bed on the cool ground," so stoutly insisted upon by many of the old school, who will not march with the times, and who cannot divest themselves of prejudices, how dear soever they may cost them.

The period of "turning *up*," not "*out*," hunters towards the close of the season should depend on circumstances. Those whose legs may be doubtful, should be the first thrown out of work; and after them old ones, who, how well soever they may go over a country when it is soft, are in danger of breaking down when it becomes hard, as it always does in March, particularly in ploughed countries.

The first act of a groom, when his horses have done their work for the season, is to give them two doses of mild physic, which, by their effect on their legs, will greatly assist him in discovering the amount, if any, of the injury that may have been done to them. Should anything serious exhibit itself, we recommend him (unless he be a first-rate professor of his art) to avail himself of the advice of a veterinary surgeon, as to the steps proper to be taken; and the sooner those steps are taken, the better will it be for his horses. The barbarous, the senseless, practice of blistering, generally the two fore legs, and often the hinder ones also, previously to turning out, under the old system, is now, we are glad to say, abandoned, not only on account of its inutility, but, by the spread of veterinary science, sportsmen have found out that the application of blisters to healthy legs is injurious. The merely irritating the surface of the skin cannot be productive of advantage; on the contrary, it often rouses the sleeping lion, which it is afterwards difficult to pacify. As counteractors of internal inflammation, or as counter-irritants, as they are called, blisters are highly useful; likewise to all bony excrescences, such as splents, spavins, or ring-bones, when in an incipient state; but, in order to render them efficacious, they should be repeated till healthy pus is obtained. If judiciously applied in strains, they are also not unserviceable, as they help to unload the vessels near the affected part. Supposing, then, no serious mischief has been done to the legs of a hunter during the season, we thus proceed in our course of treatment of him:—

Prieviously to stripping him of his clothes, he should go through his second dose of physic, and be treated exactly as if he were in work for at least a fortnight afterwards, with the exception of his having only walking exercise, a diminished allowance of corn, and the wisp, without the brush, applied to his body. We now arrive at a point on which there is some difference of opinion, at all events, one which must be left to the option of the owner; namely, whether, as is the practice in the stables of some of our first-rate sportsmen, the hunter is to be kept in gentle work throughout the summer, or to be thrown entirely aside for a certain number of weeks, varying from nine to twelve? We will, however, state the best method of proceeding under each of these systems.

The horse kept in work (we should rather have said exercise) during the summer, should be exercised very early in the morning on soft, but not wet ground (a low meadow, or rather a marshy common, for example), that his feet may have the advantage of moisture, and also that he may not be tormented by flies, or exposed to a hot sun. Two hours will be sufficient, the pace to be varied alternately from the walk to the jog-trot. It is desirable that a horse thus treated should not be tied up in a stall, but have the enjoyment of a large loose-house. Of course, attention should be paid to his feet, removing his shoes every third or fourth week; and they should be stopped with wet tow every second night. To those who object to this in-door treatment of the hunter on the score of danger to his feet, we can only say, from our own experience, that their fears are groundless; and we also refer them to the first cavalry barrack they pass by, or even to the stables of our innkeepers on the road, in which they will find feet in the highest state of preservation, that have been subject to in-door treatment for many years. We prefer damp tow to any other sort of stopping for horses' feet, because, exclusive of the moisture, it affords a uniform pressure to the frog and outer sole of the foot, which is favourable to their healthy state. Indeed, to some of the finely-formed, open feet which we see on first-rate hunters, the soles of which are apt to be thin, this pressure is most advantageous in preventing a disposition in them to become flat or convex, instead of moderately concave; and for this purpose was the "horse-pad," or "elastic stopping," invented by Mr Cherry, veterinary surgeon of London, which may be preferable to the tow, but not always at hand. When the latter is used, it should be forced into the foot with all the strength of a man's fingers or thumb.

The food of hunters thus summered should be regulated by circumstances. Good flesh, we know, is strength; but that which is generated in comparative idleness only contributes to weakness. Our object, then, should be to prevent a horse, treated in the manner we now allude to, from throwing up much flesh, and we must therefore feed accordingly, and also study constitution. At all events, three small feeds of oats (we do not feel ourselves justified in recommending beans—although we know some sportsmen give them—except in very peculiar cases, such as extreme delicacy of constitution, a disposition to scour, or throw off food) per day are sufficient for any horse, with the addition of a large, sloppy, bran mash twice a-week. As to green food, we recommend that with caution. We approve of its being given occasionally for three or four days in succession, merely as soiling, to attenuate the blood, not to produce flesh; and this repeated now and then at intervals, whilst the green meat (be it what it may) is young, but by no means afterwards. Many grooms mix hay with green food, which, after the first two or three times of giving it, we think a judicious plan. But, be it observed, for reasons we have already given, we object to a hunter acquiring a load of flesh in the summer, the produce of succulent food. A moderate use of alteratives is beneficial throughout the summer to horses which live well, but do not work, as, by their mild and gradual impression, a healthy action of the bowels is kept up, as well as insensible perspiration increased.

The horse *not kept in work* should be thus treated in the summer: He should run loose in the bay of a barn, or any large covered place where he gets exercise, and breathes fresh air, without exposure to the sun. His physic, food, &c., should be as before directed; but as he is now unshod, and consequently cannot have his hoofs filled with anything which can impart moisture to them, he should be made to stand two hours every day, under cover, in wetted clay. Unless after firing, or severe blistering, when the sedative powers of cold air are efficacious in checking local inflammation, we prefer the hunter being housed throughout the night, to his lying out even in a paddock, as he is less liable to disease and accidents; but we admit that the danger of exposure to night air is greatly diminished by his having been kept cool throughout the day, by which he is less susceptible of atmospheric influence, or the alternation from warmth to cold, than if his arterial system had been acted upon by exposure to a mid-day sun. The sticklers, then, for the "dews of heaven," and the "bed upon the cool earth," may here indulge their predilections; but, for our own part, we give the preference to the house at night with horses free from disease.

The state of the horses, summered as we have now described, will, in great measure resemble each other, although, as may be supposed, the one which has been kept on in his exercise will be most forward in condition. Neither of them, however, will have lost much of their proper form; but a distinction must be made in our proceedings with them, when preparing them for the forthcoming season. "Suffer a horse to be idle," says Mr Percival (*Hippopathology*, p. 14), "to do little or no work, and feed him well during the time, and the redundant nourishment floating in his blood will be laid up in the form of fat; put the same animal to work, and that blood, which otherwise would have been turned into fat, will now be transformed into materials of strength." Here, then, it is evident that the horse which has been kept in exercise will require somewhat of a different preparation to the one which has remained unshod, and consequently idle. The first will require very little alteration in his proceedings until nearly the approach of the hunting season, as he will soon be prepared for quick work; but it will be by long-continued slow work, increasing in pace as his condition increases, that the second will be quite himself again, from the relaxed state of his muscles, somewhat redundant flesh, as well as his distended belly. In either case, however, there will be no occasion for all that physicking, galloping, and sweating, to get rid of bad, superfluous flesh, that the grass-fed hunter has been subjected to; for if the groom has done his duty by them, neither of these horses will have accumulated much more flesh than we like to see on hunters when they first begin to work, and when that flesh is good. We would have our second horse, the unshod one, taken into his stable early in August; and during the latter end of that month and the next, in addition to his daily exercise, he should, about three times in a fortnight, have a gentle sweat in clothes, which is best effected in a trot, in a large fallow field that has been lately harrowed down, and which is firm, not soft, to the tread.

But we fancy we hear the question asked, Is it not necessary to give physic to all hunters when the summer is past, and previously to their taking the field again in the winter? We answer, *No*. The principal end of physicking hunters is to allay excitement, occasioned by severe work and high keep; and the next, for the benefit of their legs. Thus, for example, as the first-named horse (the one that has been in gentle work throughout the summer), will not sweat so easily as the unshod one, a light dose or two of physic may be serviceable to him during his first preparation for the field, say in August or September, as the means of saving his legs, should he be a strong-constitutioned horse, and have thrown up too much flesh. But there is no absolute necessity for physic at this period to horses that have been properly treated throughout the summer, and not suffered to get foul or fat; and it will be given with more advantage to them after they have been some time at work, or nearer to the commencement of the hunting season, which, after the manner of the racing stable, may be termed a second preparation. We think, however, we cannot do better here than to quote the following passage on this subject from the April No., 1835, of the *New Sporting Magazine* (vol. viii. p. 353), as the ideas exactly correspond with our own.

"To horses summered in the house, physic is now only administered when it is wanted, as is the case with the race-horse; and the groom or his master ought to be able to say *when*. There are many directing symptoms with horses in work, which cannot escape an observant eye; and we do not, as formerly, wait for the swollen leg or the running sore. The barbarous practice, also, of three doses in succession (as was the practice with the grass-fed hunter on being stabled), 'the first to stir up the humours, and the last to carry them off,' with two strong urine balls to wind up, by way of a remedy for consequent debility, is also happily exploded. The strength of the dose is likewise greatly diminished, and consequently all danger is avoided. We take upon ourselves to say, there is no more risk attending administering physic to a horse, than there is in giving him a pailful of cold water, perhaps not so much; that is, provided the drugs are good, and well put together. We, however, strongly recommend all sportsmen and others to obtain physic from the profession, as veterinarians bestow much attention on the making of it up, and obtaining the best aloes, in which there is much difference. The sooner it passes off the better; and this will be much expedited by three loose bran mashes on the day preceding the dose, and exercise previously to its working. Recollect there is no virtue in this case in the aloes, beyond doing its duty in clearing and cleansing the bowels. Calomel, when administered to the horse, should not be hurried, as it is intended to act upon the system, and should therefore be given twelve hours previous to giving the purge. Horses whose bowels are difficult to be moved, should be kept short of hay a day or two before they are physicked, with an additional allowance of bran mashes, and encouraged to drink before they experience nausea."

It may, perhaps, be well to state the "directing symptoms" for administering physic to the hunter, which are thus detailed by Nimrod:—"Among the distinguishing symptoms of foulness in a hunter are these: He appears unwell, without any specific disease: his mouth is hot, his eyes look dull, and sometimes yellow: his coat loses some of its usual gloss, and stares between the hip-bones, and on the poll of the neck: his appetite frequently remains good, but he is more than usually anxious for water: his heels are scurfy, and sometimes crack; he stales often, but a little at a time: his urine is highly-coloured, and his excrements hard, and often covered with a slimy fluid: he is dull when at exercise, and frequently coughs without any appearance of having taken cold: he loses flesh, and looks dry in his skin: his legs and ears are often cold, the latter frequently wet after exercise and sometimes deprived of part of their natural covering: his crest falls; the whole tone of his system appears relaxed; and, without his groom exactly knowing why, he is not the horse he was a week ago." (*Condition of Hunters*, p. 173.) To this we have nothing to add, unless it be to congratulate owners of horses on the terrors of physicking them having vanished with the present improved method of administering the doses; and on the fact, that only a few days' cessation from labour is now required to afford them this relief. We should say, that a hunter is never more fit to go through a sharp run, than on the tenth day after his physic has "set."

But we do not consider that we can close this part of our subject, without a few words on the treatment of the grass-fed hunter, as there are still some who yet abandon him to shift for himself in the summer, and are content to see him return to his stall in August, the very reverse of what he was when he left it in May. Nor is this the worst of it. He cannot be reinstated in the condition in which he was when he went out in May, until hunting is three parts over the the following season. However, we will lay down what we consider the most likely plan to pursue, to fit him for the work he is intended for:—

From the redundancy of blood and humours, and distension of bowels beyond their proper size, which the grass-fed hunter acquires, all violent exertion must be avoided, until such obstructions are removed, which must be the work of time. It is in vain to attempt to hurry a horse in this state into condition, but the first step taken should be to have him clipped, for reasons which we shall presently give. Long-continued slow exercise is the chief agent in hardening his muscles, and strengthening his organs of respiration; but all galloping when in the state in which he will be for the first two months, to get off his flesh, is very highly to be reprobated, as his legs will surely suffer by it, if nothing else does. Two light doses of physic may be useful to him, if he have had none given him at grass; and care should be taken not to use the brush to his coat till the month of November be passed, in case he should not be clipped. Again, veterinary science has informed us, that danger always accrues to horses in the vicissitudes of heat and cold, from one state to its opposite; but more from the latter to the former, as an excitant to general inflammation. Horses taken from grass, then, should be put into very cool stables, and the fewer in one stable the better, for at least the first month. Windows should be left open day and night, merely taking the precaution of coarse matting, or anything else that will stop the entrance of flies; and nothing does that better than matting, frequently saturated with water. Having been clipped, and kept out several hours in the day in slow work (which, by the way, grooms are too often shy of), increasing his pace gradually as his condition progresses, the grass-fed hunter may be brought fit to look at by the first week in November; but he will be at least by a stone a worse horse than he was when he was turned out. We are no friends to quacking in either man or beast; but, knowing that mischief to horses so frequently arises from a long respite from work in the winter, unless some preventive measures are had recourse to, we recommend the repetition of a light dose or two of physic to the grass-fed hunter during frost, or even during open weather, about Christmas.

Having recommended the fashionable operation of clipping to the grass-fed hunter, we will give our reasons for having done so. Nine horses out of ten, treated as he has been treated in the summer, break out into a cold sweat, after work, during the first part of the season, the natural consequence of debility; and the dew on their coat has all the chilling influence of a wet blanket on their body. The removal of the coat by the scissors, then, although it is no remedy for the former, prevents the ill effects of the latter; which, by producing cold on the surface of the body, occasions a determination of blood to the lungs, or other important viscus, and is a great enemy to condition. Although we deny the necessity of clipping a horse that has been *properly* summered (for, admitting that he may have a long coat, he will not in that case break out after work), we allow it the merit of expediting condition, by giving increase of bulk, and promoting the vigour of the horses' renovating powers; and, therefore, in this case useful. Looking at it, however, in another light, we find many objections to it; amongst the greatest of which is the deprivation of the protection of the coat or hair, to an animal so much in want of it as the hunter is, and therefore an outrage on nature. In fact, it is, to a certain degree, a substitute for good grooming, and as such will continue to be in favour with many grooms, as also with such of their masters as submit to be dictated to by them, or who may pay too much regard to appearances.

Having alluded to grooms, a remark or two may not be ill placed. Such of them as have the care of large studs cannot be expected to work, but to overlook those who are under them; and their responsibility is considerable. There is much in the choice of helpers; for none but persons who have narrowly watched it, are aware of the effects of a good dressing to a hunter, not merely in having his skin cleared from impurity, and in improving its elasticity, as well as the tone and colour of the hair, which may be termed the complexion of a horse, but it greatly promotes general health by its effect on the circulation of the blood, as well as all other secretions, and in bad weather is a substitute for exercise.

Good stables are indispensable to the well-doing of hunters, equally so with a comfortable house and a warm bed to those who ride them. Even the veterinary professors have at length acknowledged the benefit of the genial warmth of a stable to horses at work, although, in common with ourselves, they insist on the necessity of well ventilated stables. No doubt it is injurious to any animal to breathe an under-oxygenated air, and the effluvia arising from animal excretions are injurious to eyes and lungs. A hunter should live in a temperature of about 63° of Fahrenheit in the winter, and as much below that point as it can be made in the summer, by means of exclusion of the sun, open doors, &c. But it is essential that a stable in the winter should not only be warm but dry; and if not dry, the ground under and around it should be drained. A delicate horse never arrives at perfection of condition in a damp stable, and it operates powerfully against all others, often being the cause of fever in the feet. Stalls should not be more than six feet wide, nor raised towards the manger; but there should be a slight inclination in the flagging towards the centre of them, to enable the urine to find its way to a drain, which there always ought to be, as it contributes much to cleanliness, and consequently to health. "Loose places," or "boxes," as they are termed, are most desirable for all horses after severe work, and nearly all veterinary surgeons (more especially the late Mr Turner, to whom the public is so much indebted for his illustration of the navicular disease in the foot) have given it as their opinion, that if all horses were suffered to lie loose after work, there would not be half the cases of lameness in the feet that now occur. Desirable as such treatment may be, it is universally impracticable, on account of the space which large studs would occupy; but every sportsman should have boxes about his premises, and his hunters should be invariably put into them for two or three days after work. To their general use there is one objection, although not a serious one. Horses always lying loose are apt to refuse to lie down in stalls, when removed to premises where boxes cannot be had, but they become reconciled to them after a few days. It is, however, the opinion of a celebrated sportsman that if a hunter should have stood his work ten seasons being always tied up, he would have stood it twelve if he had lain loose.

We quote the following extract from Nimrod on *Condition of Hunters*, on the subject of warm stables. After proving, by the fact of the horse degenerating in all cold countries, that warmth is congenial to its existence, he thus proceeds:—"They who attend to such matters will find that the constitution and habit of a horse undergo a change when kept in a warm stable, favourable, no doubt, to the work he has to perform as a hunter in the stable of a hard-riding man. He is not that gross animal which he might otherwise be, if a hard feeder, and kept in a state more nearly approaching to a state of nature. This we may attribute to the increase of insensible perspiration occasioned by increased circulation, whereby the grosser particles of the body fly off and are got rid of. In this state he would bear some comparison with a well-fed English farmer, when put to perform feats of activity with a man of more refined habits of life, where nineteen times out of twenty he would be defeated." Again: "As there is an analogy between a man and a horse in work, let us carry it a little further, and ask, Whether, after a hard day's exercise in the winter, a man would recover sooner if he passed his evening in a warm room, or if he passed it in a bivouac, or

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in a room that was cold and damp." He concludes by giving it as his opinion, that if it be possible to get a horse to look well in a cold stable, it is not in the power of a groom to put him into the height of condition in a damp one; and in this we heartily concur.

We subjoin Nimrod's plan of stabling for six hunters. "I would have," says he, "two four-stalled stables, in which I would keep only six horses, that is, three in each; and I would have a box at the end of each. If possible, I would have a southern aspect, with windows opening from the top or downward, or else on a pivot in the centre, and placed so high in the wall, that, when open, the air may be circulated through the stable, without affecting one horse more than another, and the height of the interior should be only twelve feet in the clear. I would have the stalls paved nearly flat, with only a trifling inclination to the centre; in each of which there should be a small grating over the drain, and the stalls should be no more than six feet wide. There should be at least twelve feet behind the horses, and the exterior walls and doors should be very thick. The wooden partition walls of the boxes should be only 9 feet high, with wooden bolts to the doors; and each box should not exceed 10 feet square. The saddle-room, well fitted up with saddle-cupboards, boiler, &c., should be in the centre of the building; in the front of which there should be a passage, under cover, for horses to stand in when their legs are washed. Of ventilation I say nothing, that being a matter of course; but I would have the sides of the stalls 9 feet high at the head, with small iron racks, and pillar-reins for each horse to be dressed in. I should be very particular about the stall-posts, for these are frequently the cause of severe injury. When I went to see the king's stables at the palace at Pimlico, I was astonished to see almost every other horse in them with capped hocks. On inspecting the stall-posts, I perceived the cause. They were of fluted stone, and with angles, which proved that Mr Nash (the architect) knows nothing about the inside of stables. Stall-posts should be made of wood, quite smooth and circular; and they should extend to the ceiling, or be at least ten feet high."

Paddocks.—Some persons turn their hunters into the fields in the summer, because they have no small paddocks, or any outlets to their buildings, and are averse to their horses remaining all the year round in the house. Nothing, however, is easier than making temporary paddocks, or outlets that will restrain stallions, or any horse that may be put into them, without the chance of their breaking out of them. Let a small space, say 30 or 40 yards, be hurdled around, and the hurdles lined with faggots reared up from seven to eight feet high. The faggots will be all the better for the exposure to the air during a summer; and as horses cannot see through a fence of this sort, they will never attempt to break through it.

Food.—The proper feeding of hunters has much to do with their condition, and likewise with their remaining sound. Food should be proportioned to work, and it should also be of the very best quality. Hay that has been much heated in the stack is above all things to be avoided, as, from its powerful diuretic properties, it debilitates, and creates thirst; and mow-burnt or heated oats are equally productive of mischief. Eight or ten pounds of hay per day are as much as any hunter should eat, and that which is produced on dry upland ground is best. Indeed, we are far from thinking that rich meadow hay, finely scented as it is, and apparently so full of nourishment, is fitted for any description of horse that is required to go fast, and we are quite certain that thousands of horses are destroyed annually by the effects of hay and water. The latter cannot be too soft, and when not so, it should be kept in the stable some days previous to use, and with a small portion of bran in it. Mr Percival (*Hippopathology*, p. 25) mentions forty-nine horses being killed in one stud, in France, by a disease produced by eating bad hay and oats.

But nothing puts the groom's knowledge of the art of feeding hunters more to the test than the management of such as are either naturally thick-winded, or afflicted with chronic cough; and as in man the digestive organs are oftener than any other disordered, so the respiratory organs in the horse are the most common seat of disease. It is, however, in the power of a groom, by great attention to feeding, keeping the habit of body from becoming foul and plethoric, and well regulated work, to make horses of this description tolerably fit to go with hounds; whereas in bad hands they would be nearly useless, at all events dangerous to ride. Such horses are generally hearty feeders, and when so, should have a setting muzzle, as used with race-horses, put on them on the night before hunting, unless they have been out with hounds within three days. Water also should be sparingly given to them on that day, and not after three o'clock P.M. Frequent mild aperients, or alterative medicines, are very efficacious here; for, as in the human subject the lungs often become the seat of disease as a second cause of indigestion, the state of the digestive organs should be minutely attended to with horses of this description.

A broken-winded horse is never seen in a stud of hunters; but Nimrod's remark on this subject is in accordance with what we have now written upon it. "Most veterinary surgeons," he says, "attribute this disease to the consequences of high keep. Here, no doubt, they are in a great measure correct; but if good grooming were not for the most part a match for the effect of high keep, what would be the fate of our race-horses, which eat almost as much corn as they can swallow from the first month of their existence? Amongst them a broken-winded horse is a rarity."

Many nostrums are prescribed for thick-winded horses—amongst them, carrots in the winter, and green meat in the summer. We approve of a few carrots in the winter, but object to green meat, unless in small quantities. Is not flatulency the distinctive feature of a disordered respiration? And what promotes that equally with loading and distending the stomach with green food? The small dimensions of a horse's stomach evidently show what nature intended him for, namely, *to go fast;* and the pathologist would very soon convince us that, in proportion as that organ is distended, will the respiratory organs be oppressed. Hence the indispensable practice of not allowing hunters their usual allowance of food and water on the morning of hunting; as also of putting the setting muzzle on the racer the night before he runs. The food most proper for all horses, but particularly for such as are not perfect in their wind, is that which contains most nourishment in the smallest compass or space.

But we must not overlook the treatment of the *sound* hunter before and after hunting; as we consider the lives of more than half of those hunters which have been lost from the effects of severe chases, to have been lost from want of knowledge of how they should have been treated, at either the one or the other of these periods. Nimrod, in his letters on this subject, doubts whether it be in the power of hounds to maintain a chase long enough to cause the death of a horse, fairly ridden with them, provided that horse have been properly treated in the summer, and is in what is called strong work, or quite fit to go, on the day of the run. Without stopping to argue this point, which is not capable of proof, we will proceed to show in what state a hunter ought to be taken into the field, to meet fox-hounds, giving him fair play; and the man who takes him there when not fit to go, must always be prepared for the consequences.

We consider a hunter, in proper condition, equal to at

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least three days' hunting in a fortnight, taking the average of sport, which will, of course, at some certain periods, send him oftener into the field in one given time than in another, as, after a severe day, he should have a week's clear rest. But since the second-horse fashion has been so general, it is impossible to speculate on this point, as it so often happens that one of the two horses the sportsman sends to cover, returns home without having done much. The chief point, however, to be insisted upon is, that the hunter should have a good gallop, causing him to sweat freely, on the day before he goes to hounds, and if for half a mile on rising ground, it will be more favourable to his wind. His food on that day should also be attended to, in reference to his constitutional peculiarities; for, if not the best winded horse in the stud, or given to throw off his meat on his road to cover, he should have no water after three o'clock the preceding afternoon, with the exception of a few swallows to make him relish his corn, on the morning of hunting. Sending hunters out now with full bellies has no excuse; whereas one was found for it, when they left their stables five hours sooner in the morning than they do at present, and returned to them often five hours later. We allude to past days in which there were few artificially made covers, and when foxes were found by the "drag," through long chains of woods, and certainly ran over much more ground than modern foxes do, which, being generally bred near game preserves, run shorter, and are not so stout as formerly.

After Hunting.—The treatment of a horse now will depend on what he has been doing. If not a severe day, no further notice of him is requisite than to ascertain whether he feeds as usual; and if not, an alterative ball,[1] with a liberal allowance of tepid water, will soon restore his appetite, by allaying the over-excitement that has checked it. It is after a severe day's work that danger to a hunter is to be apprehended, the consequence of over-excitement of the vascular system, and he should be in this case narrowly watched. If merely fatigued, such are the restorative powers of the animal, rest, in a large loose box, with an hour's exercise daily in the open air, will soon bring him about; but we should be on the alert against fever. Here, however, we generally have notice,—some directing symptoms which cannot be mistaken, such as hurried respiration, extreme thirst, restlessness in his stall, a considerable relaxation of the muscles in the interstices of the hips, reddened eyelids, and a quick pulse. But unfortunately for hard-riding sportsmen, it too often happens, that such is the rapidity with which what is termed accidental inflammation takes place in the horse, that the most prompt measures will not always arrest its progress, and the most common termination of it here is in the feet. Not only does the animal suffer great pain, but should he not cast his hoofs entirely (the fore feet are most commonly affected), he becomes what is called pomice-footed, and of no value afterwards as a hunter. Knowing this to be the case, we are advocates for some prophylactic measures to be taken after a very hard day; something repellant and sedative administered, which may not only prevent an inflammatory attack, but, by cooling the system, and consequently restoring the appetite, enable the horse to go sooner into the field again, than if he had been entirely abandoned to his own restorative powers.

But the most critical period with the over-ridden hunter is when he first appears to show distress, which he often does on his road home, or even before he quits the field; and here mistakes have been made, which have caused the death of many a good animal. In the first place, his rider fancies it necessary to drag him home, perhaps many miles on a cold winter's evening, to "his own comfortable stall," than which, just at this time, a large and cold stable, and the first he could be put into, would be far more beneficial to him. Again, he says, "I'll not do any thing to him till I get him home, when I will have him bled;" whereas, since all horses that die from exertion beyond the limits of vital power, die from suffocation, it will then be, in all probability, too late, as *instant* relief is wanted. A stimulating cordial is likewise at this time good (a pint of sherry as good as any other), but both are bad if inflammation has commenced; also keeping up a strong determination of blood to the surface by friction of the body, head, and legs, with warm clothing afterwards on the body and head; a well littered down stall, with plenty of fresh air. A gallon of blood should be at first drawn; and if the increased action of the heart and arteries continues, the horse should be well blistered behind the elbows, and lose another gallon of blood. Blood-letting from the foot veins is also highly to be recommended in cases of extreme exhaustion, after a hard day with hounds. It is a very simple operation, and can never do harm; but we advise it to be performed by a veterinary surgeon.

They who have never before experienced it, may be alarmed by an inward noise in a distressed horse, which may be mistaken for a beating of the heart, whereas it proceeds from a convulsive motion of the abdominal muscles, or muscles of the belly. It is, however, a symptom of deep distress, and is only relieved by relief given to the lungs, by bleeding and other preventive means.

Treatment of Horses' Legs.—We have already said that the management of horses' legs forms part of the science of the stable, and a most important part too. It is no where so well understood as in racing stables; but from the violent nature of his work, the hunter is equally indebted to it. The barbarous practice of blistering all four legs previously to turning out is now happily exploded; but as in less violent exertion than following hounds, a certain insecurity from accidents is inseparable from the delicacy of all animal structure, the legs of hunters will occasionally fall amiss. It being useless, however, without stating the extent of the injury, to talk of prescribing remedies, we have only to state, that a very efficient one has been found for the torturing one of firing, in many cases where the actual cautery was considered as the only one. For example, for ligamentary enlargements, cases of enlarged joints, tendons showing symptoms of giving way, or any other appearance in the limbs, of a departure from their primitive tone and vigour. This consists in the application, during the non-hunting months, or any other period of rest, of the mercurial charge, in either of the following forms. It consists of the common mercurial *plaster* (not *ointment*) of the shops, made up according to the London Pharmacopœia; and in the proportion of half a pound to a leg, applied in a warm and consequently liquefied state, and when covered by deer's hair, bound to the limb by means of a linen roller. At the end of a fortnight, the stitches of the bandage being decayed, the charge will slough off, when another, if necessary, is put on. It is to the highly absorbent property of mercury that the benefit here derived is to be ascribed; and it is no small recommendation to it that, in addition to the general restoration of the limb, the painful operation of the actual cautery, as also the blemish occasioned by it, are avoided. Major's remedy has also of late years very much superseded firing, and has been applied with great success to the Reiver, Scythian, and several other capital race-horses. It requires, however, to be applied by a very skilful hand, as it has played sad havoc with hair and hoofs, where the operator has not understood his business.

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[1] The following alterative and sedative medicines are found efficacious at this time:—Cinnabar of antimony, 3 oz.; balsam of sulphur, 2 oz.; camphor, 1 oz.; nitre, 4 oz. To be made into ten balls; one ball a doze. These are known among grooms by the term "red balls."

It is, however, a well known fact, that hunters will work and stand sound, for many successive seasons, with legs apparently much out of form. Enlargements take place in the sheath of tendons after strains; also from blows, where the parts become lined by a thick coat of lymph; and sometimes the body of the bone itself is found thickened, from a deposition of bony lamina over the original bone. When all this has been in progress, we question the propriety of any active measures, unless, as is generally the case, a feeling of soreness is expressed after work, by a shifting, or favouring of the limb or limbs in the stall; or by a "feeling" manner of going on first quitting the stable. When legs are really callous, little impression can be made upon them, unless by active measures; but physic, rest, and good grooming, are the best preservatives of these most essential members of the horse's frame; with the friendly auxiliaries of hot-water, flannel bandages, and loose boxes, after severe work, and good shoeing at all times.

The Foot.—Owners of valuable horses may congratulate themselves on the assurance that, by the aid and extended influence of veterinary science, they have no longer to apprehend injury to the feet from the mere application of shoes. On the contrary, they may rest satisfied that, provided no internal disease attack them, from over-excitement by work (and that often is created on ground where shoes would be unnecessary, such as crossing a very deep country), they will be not only as sound and healthy, but *in better form*, from having been properly shod, than if they had not been shod at all. Some hoofs, however, having a greater disposition to secrete horn than others, and thus called strong feet, should never remain more than three weeks without being subject to the drawing knife of the blacksmith (the ruinous butteris is now put aside), and the shoes properly replaced. Neither should stopping with damp tow be omitted; as moisture, *not wet*, is beneficial to the health of the foot. Here then, again, are at once apparent the evils of the out-of-door summering of hunters. The foot of a horse so exposed, is at one time saturated with wet, and at another exposed to a drying wind and a burning sun, the contractile powers of which upon horn are too well known to require comment. Do what we may, however, horses that are required to "go the pace" will always be more or less subject to diseased feet, quite unconnected with shoeing; and against such diseases there are but two precautions on which much reliance can be placed:—First, let hunters be well prepared for their work, and properly treated after it; and, secondly, let them have sufficient obliquity of pastern-joint (in our opinion one of the most important points in the whole structure of the horse), to break the force of concussion; which, together with over-excitement of the vascular system, is the parent of that irremediable disease of the navicular bone, formerly called "founder;" and by the wiseacres of old times, "chest-founder," because the muscles in that part wasted, from the inability of the suffering animal to exert them. The posture of a horse in his stall, when afflicted with this complaint, or fever in the feet, is too characteristic to be mistaken.

We have only one more remark on shoeing. In following hounds across deep countries, hunters are apt to strike a hinder foot against a fore foot, and inflict a severe wound. There have, indeed, been many instances of the total separation of the back sinew by this, often unavoidable act, particularly in leaping brooks. It was formerly very generally believed, that the blow was inflicted with the *toe* of the hinder shoe, to obviate which, shoeing smiths were ordered, by hunting grooms, to let part of the hoof protrude over the front of the shoe, but still the evil continued. It was, however, asserted, in the letters of Nimrod, that it was by the *inside edge, or the rim of the hinder shoe*, and not by the toe, that the act of over-reaching was performed. This was at first doubted, but experience has confirmed the assertion; and we have reason to believe, there has not been an instance of serious mischief by *cutting*, from an over-reach, since the inside edge, or rim, has been rounded off, or bevelled. Indeed, a moment's reflection would dispel all doubts on the subject; for the obtuse form of the toe of a horse-shoe could not inflict the severe wounds we have seen inflicted (often cutting off part of the fore-heel); whereas the inside rim of a worn shoe is nearly as sharp as an ordinary knife. Besides, the act is performed *after* the hinder foot has overstepped the fore foot, and therefore cannot be performed by the toe, but in the act of drawing the hinder foot back, after it has overstridden its bounds. Bruises from over-reaches still occur, which, though sometimes serious, are comparatively, with cutting, harmless, as fomentation and a few days' rest will effect a cure.

The action of the hinder leg reminds us of one useful hint to grooms travelling hunters on the road. If we follow a well-formed horse, with the free use of his limbs, on a road upon which his footsteps are imprinted, we shall find the hinder foot oversteps the fore foot in the *walk*, but falls behind it in the slow *trot*. Exclusive of relief to the muscles by change of action then, it is safer to vary the pace from a walk to a slow trot on a journey, as causing less fatigue to the hock-joint, by which curbs and spavins are frequently thrown out. Add to this, the slow trot is the safest pace a horse goes, because his step is shortest. (C. A.) (W. H. L—Y.)

HORSEMANSHIP.

As to the question, Who was the *first* horseman? it would be in vain to inquire, for even the writers of ancient fables do not agree upon the point. By some it is pretended that Bellerophon first mounted a horse; that Pelethronius first bridled him; that he was harnessed by Erichthonius, and fought upon by the Centaurs of Thessaly. But quitting fiction, we learn from the Sacred Writings, that to Egypt we are indebted for the equestrian art, from which country, by the aid of the colonists who emigrated from it and from Phœnicia, it was introduced into Greece (perhaps by Erichthonius, fourth king of Attica), where it attained to great perfection. Although there was no cavalry employed in the Trojan War, equestrianism must have been much practised and well understood in Homer's time, which is at once proved by a reference to his works. In the fifth book of the *Odyssey*, the shipwrecked Ulysses, tossed by the waves on a plank, is compared to a skilful horseman on an unruly steed; and in the fifteenth *Iliad*, we find one man managing four horses at once, leaping from the back of one to another, at their full speed. Herodotus (in *Thalia*) speaks of hunting on horseback in the time of Darius, even descending to the particulars of an accident in the field to the noble satrap of Persia; and likewise the same writer (in *Melpomene*) mentions the Amazonian women hunting with their husbands on horseback. Xenophon also says that Cyrus did so, when he exercised himself and his horses. Again, with reference to those early times, we should not pass over the introduction of horses and horsemanship into the public games of Greece, and particularly the Olympic Games, which, according to an expression of Pindar, as far transcended all the others as gold is superior to the baser metals.

From the same authority we learn, that the Ethiopians and inhabitants of India, as cavalry, formed part of the expedition of Xerxes against the Greeks. But it appears that the Arabs and the Parthians, who afterwards became so famous for their equestrian accomplishments, were ignorant of the art at the period in question; at least both these nations fought under Xerxes, the former on camels, and the latter on foot. The Persians were more celebrated for their horses than for their riding. According to Athenæus, they were more solicitous of their ease and safety, than anxious for reputation of boldness and dexterity in horsemanship. The Scythians and the Sarmatians were both famous about this period, as well for their breed of horses as for their skill in riding them. In fact, so renowned were the former people, that, according to Gibbon, they were supposed by strangers to perform the ordinary duties of civil life on horseback; "to eat, to drink, and even sleep, without dismounting from their steeds."

The people of Mauritania, Numidia, Massilia, Nasamonia, and other adjacent parts, are also spoken of as having possessed breeds of excellent horses, but were still more distinguished for their singular mode of managing them (on the authority of Livy, and Cæsar) without the aid of a bridle, and even in battle by means of a small switch or wand, turning them to the left by striking on the right side of the head, and *vice versa;* and stopping them by striking the front of the face. These practices are also confirmed by Ausonius, who celebrates the Emperor Gratian as having excelled in them. All we have to remark here is, that we are glad such practices are abolished, not only on our own account, but for the sake of horses, who must have been greatly tortured before they were brought to such a state of obedience as to be ridden *infrœni* (without bridles), as Virgil says of the Numidians, and this in the confusion and excitement of a battle. There is an elegant passage on this subject in Lucan's *Pharsalia,* descriptive of the several tributary nations which Juba took into the field in the cause of Pompey, against Curio's army, which he entirely defeated.

> "Autololes, Numidæque vagi, semperque paratus
> Inculto Gætulus equo," &c.

Thus translated by Rowe:—

> "With him unnumber'd nations march along,
> Th' Autololæ, with wild Numidian throng;
> The rough Gætulian, with his ruder steed;
> The Moor, resembling India's swarthy breed;
> Poor Nasamons, and Garamantines join'd;
> With swift Marmaridans, that match the wind;
> The Marax, bred the trembling dart to throw,
> Sure as the shaft that leaves the Parthian bow;
> With these Massilia's nimble horsemen ride;
> They nor the bit, nor curbing rein provide,
> But with light rods the well-taught coursers guide.
> From lonely cots the Lybian hunters came,
> Who, still unarm'd, invade the salvage game,
> And with spread mantles tawny lions tame."

The Greeks transmitted the art of horsemanship to the Romans, who soon equalled, if they did not excel, their instructors; and nearly one of the first public acts of their first king was to establish the equestrian order, the second order in Rome; the *equites,* or horsemen, being placed far above the commonalty, and next to those of the highest quality and fortune in the state. In short, were proof wanting that horsemanship, as an accomplishment, was held in the greatest esteem in the early ages of the world, it would be found in the fact of the accomplished Cicero (*De Off.* lib. 2, c. 13) telling his son Marcus, with the vanity that now and then breaks forth in the splendid effusions of that great man's pen, that the eyes of the world were upon him, on account of his father's fame; and that he had received the praise of the whole army for his excellence in *riding.* But the exercise and art of horsemanship occupied much of the study and attention of the Roman youth; and we find Horace inviting them to the practice of it, in the eighth ode of the first book.

Descending from the heroic ages, in which the earliest history we possess informs us the art of horsemanship was in full force and vigour, to comparatively modern times, the first notice we find in our own history of the art of riding horses, is in the tilts and tournaments; the earliest mention of which we find in the French historian Nithard, who reports, that, at an interview which took place at Strasburg between Charles the Bald and his brother Lewis of Germany, the followers of both these princes fought on horseback; and, by way of marking the period, it may be observed, that Charles the Bald succeeded to the throne of France A.D. 840. Ducange affirms, that these combats were for some time peculiar to France, and expressly called French combats, *conflictus Gallici.* Scarcely anything distinct, however, is known about them till we find them practised in England, about the year 1140, in the reign of Stephen, after which time they became general all over Europe, particularly in England, where they were displayed on all great occasions. The spots most famous for them in London, were the Tilt-Yard, near St James's Park, and Smithfield; which the neighbourhood of the latter place confirms, by the names of the streets, such as "Giltspur," "Knight-rider," and so on. They are also known to have been practised on the spots now called Cheapside, Barbican, and Bridewell; and to have been exhibited in considerable splendour in various parts of the country besides, which a reference to Sir Walter Scott's romance of *Ivanhoe* will show. These were the days when "to witch the world with noble horsemanship" was one of the chief accomplishments of a gentleman; in which the management of the horse and the lance was amongst the principal requisites of knighthood; when the contest, both in real and in mimic war, was decided by the superiority of such means; the days of chivalry, in fact, which, as a well-known historian says of it, in his portrait of the character of a perfect knight, the accomplished Tancred, "inspired the generous sentiments and social offices of man, far better than the base philosophy, or the baser religion of the times."

Not only is good horsemanship well suited to the pith and nerve of the English character, but it has always been considered as one of the corporeal accomplishments of a gentleman. Thus Clarendon, in his character of the Duke of Newcastle of his day, says of him, that "he was a very fine gentleman, active, and full of courage, and most accomplished in those qualities of *horsemanship,* dancing, and fencing, which accompany a good breeding; in which his delight was." But there are other than mere personal advantages attending good horsemanship. It is the habitual contempt of danger that ennobles the profession of the soldier; and horsemanship, as practised in England at present, and with the *esprit de corps* of the several hunts, tends much to the same end. Those who pursue it in the field, learn to expose themselves to danger with less reluctance, are less anxious to get out of it, or given to lose their presence of mind when in it, than persons whose pursuits have been of a different turn; in fact, it may be said to increase natural courage. It was with this view, that the late Duke of Wellington always gave every facility to officers who wished to hunt or ride steeple-chases. Such persons, again, as merely ride on horseback for exercise, find in it the great preservative of health. Nay, more than this, persons of tender constitutions have surmounted the weakness of their nature entirely, by horse-exercise and hunting; in proof of which, many cases could be quoted. The following, of a patient of the celebrated Dr Sydenham, is perhaps as conclusive as any other:—A gentleman, a relation of the Doctor's, who was brought so low by consumption, that there appeared to be no possibility of a recovery by medicine, was induced by him to try horse-exercise, and a journey to his native country. On leaving London, he was so weak as to be lifted on his horse, and was refused admittance to the first inn he stopped at, being supposed to be in a dying state. Notwithstanding, he persisted in riding, by easy stages, to Exeter, and gained so much strength by the way, that though one day his horse lay down with him, in some water, and he was forced to pass many hours in his wet clothes, he not only sustained no harm by the accident, but arrived at Exeter greatly recovered. Thinking he had gained his point, he left off horse-exercise, and had a relapse; but, on betaking himself again to the saddle, he obtained a perfect recovery. Nimrod, in one of his hunting tours, says,—"My time was almost divided between my saddle and my bed; but I never knew what it was to be fatigued when I lived temperately, and went early to rest. Indeed, such a life bade defiance to disease. A celebrated physician of the last century used to recommend riding on horseback to his patients. 'Live,' said he, 'in a saddle.' That riding is the most wholesome of all exercises, I have little doubt. Despite of all the vile stuff that finds its road down his throat, who ever heard of a bilious post-boy?" To this might be added, the no small advantage a person mounted on horseback derives from breathing a purer air than when on foot, and consequently nearer to the ground. The salutary effect of the motion of a horse, also, on a sluggish or diseased liver, is acknowledged by all medical men.

We shall now take a view of horsemanship in the only forms in which it is at present applied to any useful or pleasurable purposes; namely, military, hunting, racing, and on the road, leaving the art of instructing horses for the circus to those who find it profitable to fit them for it, which we admit they do to very great perfection, though we fear not without the necessary privation and punishment unavoidable, we believe, in such kind of instruction; or, in other words, in making animals perform far more, we conceive, than the Creator of them ever intended they should perform.

The military seat approaches nearer than any other to that of the manège; and, by reason of the horse-soldier having, in general, but one hand to hold his bridle with, is one which gives him great command over his horse, without disturbing his seat. He sits well down in his saddle, on his fork, or twist, with his body erect, and in perfect equilibrium with his horse; his legs well stretched down the sides, with a firm pressure of the calves, as well as of the knees and thighs, and the feet firm in the stirrups. But it is not by any *one* of these aids that he becomes a good horseman. He must be in perfect unison, as it were, with his horse's actions and paces, to maintain a good and graceful seat; and, in proportion to the just balance of his body, will he be able to have a steady hand, a point of vast importance to the dragoon. The importance of this balance, and keeping himself in a proper equilibrium with his horse, is increased by the fact of his not being allowed to rise to the horse's trot, and therefore requiring a still finer use of the bridle hand. "The man who rides with the aid of the proper equilibrium," says Colonel Peters, "will, in case of necessity, know when to apply the strength he has retained with a steady, light hand, and govern every motion according as he finds it necessary for his purpose; play light with his own weight upon the saddle (by a gentle spring in the instep of both feet on the stirrups), with an easy pressure of both thighs, knees, and calves of the legs. When the horse jumps or plunges, then these aids are also requisite to keep the seat; but, in an easy, steady pace *forward*, it is most particularly to be pointed out to a young man, and cannot be too often repeated, that, to become an easy, elegant, or proper horseman, he must learn to ride with comfort and pleasure to his horse as well as to himself; he must learn to seek his balance from his hip upwards, to keep the body with a slight inclination backwards from the perpendicular, and balance himself thus gradually on his horse in all the different paces; which, of course, cannot be expected all at once. A man that rides by the force of his knees alone, shaking his arms and hands, although he rides his distance in the same period of time that the good rider would, yet he cannot be said to ride his horse, or to have any part of his body in the proper equilibrium; but the man who rides his horse with a light, steady hand, and elastic body (which, when disturbed even, has the power of restoring itself to its former seat), in unison with the horse's action, may be truly said to ride in the proper equilibrium."

The act of mounting may be called the first step in practical horsemanship. With horses perfectly quiet, it matters little in what manner we approach them; but in every thing that relates to horses, a certain precaution is necessary. Let the person who is about to mount, then, walk up to his horse, not directly in his face, lest he may alarm him, nor behind him, lest he may strike at him, which he would thus give him an opportunity of doing. Let him rather approach him on the left side, over against his shoulder, inclining something more to his head than to his flank. In the summer time, when the flies are troublesome, this caution is not ill bestowed, because the quietest horses will sometimes strike out, sidewards, after the manner of cows, to rid themselves of their tormentors; and many a man has been injured in the abdomen, or thigh, from this cause. Old writers on horsemanship recommend the horseman, when about to place himself in the saddle, after having put the left foot firmly into the stirrup, to take the reins and the pummel of the saddle in his left hand, and laying his right hand fast upon the hinder part of the saddle, thus to spring into his seat. We should prefer his taking a lock of the mane, together with the reins, into the left hand; because, if he be a man of any considerable weight, his having recourse to the saddle for all the assistance he may require, would be very likely to displace it, especially as no horse in the hands of a good horseman is now tightly girthed.

When he is mounted, the proper adjustment of his reins is the next thing to be attended to. If a single-rein bridle, he has nothing to do but to draw the reins with his right hand through his left, till he finds he has got hold of his horse's mouth equally on both sides of it, when he shuts the left hand, letting the little finger separate the two reins. The same should be done with a double-rein bridle, only observing, as they are drawn through the hand, that the horse's mouth is to be consulted, as to whether that attached to the bridoon or to the bit is the one required to be first acted upon. Many an inexperienced horseman has met with accidents from want of a proper discrimination as to the right use of the reins, when mounted on high-spirited horses, with finely made, that is to say, highly susceptible, mouths, and unused to a rough hand. The bridle reins should be held at a convenient length; for, if short, they will discompose the attitude of the body, by pulling the left shoulder forward; and they should be held with a firm grasp, dividing them, as before mentioned, with the little finger. When a horse pulls at his rider, he should advance his arm a little, but not the shoulder, towards the horse's head, raising his hand towards his breast, and the lower part of the palm rather than the upper; but he should not shorten the rein in his hand if he can command his horse without it, or he may lose the proper *appui*, or bearing of his mouth. Old writers recommend the bridle-hand to be held perpendicular, the thumb being uppermost, and placed on the bridle. Modern practice is in favour of the knuckles being uppermost. The perpendicular hand may do very well in the school, or with the severe bit of the highly-drilled dragoon horse; but no man could ride a free-going race-horse over a course, or a hasty hunter over a country, in that form.

In dismounting a horse, the bridle and mane should be held together in the left hand, in the same manner as in mounting. Unless the horseman be very active, he may put his right hand on the pommel of the saddle to raise himself, previously to throwing his right leg back over the horse; when, by grasping the hinder part of the saddle with the right hand, he lets himself down with ease. The right leg, however, should not be bent at the knee, or the spur may strike the horse's side, in the act of being thrown backward.

The Seat.—It was well observed by Don Quixote, in one of his lectures to Sancho, that the seat on a horse makes some people look like gentlemen, and others like grooms. But a wonderful improvement has taken place within the last half century in the seat on horseback, of all descriptions of persons, and effected chiefly by the simple act of giving the rider a few more inches of stirrup-leather. No gentleman now, and very few servants, are to be seen with short stirrups, and consequently a bent knee, which, independently of its unsightliness, causes uneasiness to the horse as well as to his rider; whose knees being lifted above the skirts of the saddle, deprive him of the assistance of the clip, by his thighs and legs. The short stirrup-leather, however, was adopted with the idea of its giving relief to the horse, although a moment's consideration would have proved the contrary, and for this reason; the point of union between a man and his horse, as well as the centre of action, lies just behind the shoulder-blades, which, as must be apparent to every one, is the strongest part of the horse's body, and where the sack of wheat or flour is placed by the farmer or the miller. With short stirrup-leathers, the seat of the rider is thrown further back on the saddle, instead of being exactly in the centre of it, and consequently his weight thrown upon the part approaching the loins, the weakest part of the body, and very easily injured. From the same mistaken notion was the saddle formerly placed nearly a hand's-breadth from the shoulders, which, of course, added to the mischief; but modern practice has entirely remedied this, as it is now placed as near as possible to the shoulder-bones, so as not to interfere with the action of them.

Next to the advantages of a good seat to the horse, stands the ease and elegance of it in the rider. In the first place, what is natural is easy, and there must be no formal stiffness of the body of a man, or of a woman, who wishes to look well on horseback. When we see a man sitting as upright as if he were impaled, and his body not appearing to yield at all to the motion of his horse, we cannot fancy his having a good hand upon him, because he cannot be in unison with him in his action; neither can he be firm in his seat. But to some persons a good seat is denied by their shape and make. For example, a man with short legs with large calves, and very round thighs, cannot sit so close to his saddle as another whose legs are thinner and longer, and of course yield him a firmer clip; and whose thighs, instead of being round, are hollowed out on the inside, as we see in the form of our most eminent jockeys. The seat of the short-legged, large calved, round thighed man, has been jocularly termed the "wash-ball seat," and not inaptly neither, for, like a wash-ball in a basin, he is seldom at rest in his saddle, from the absence of a proper clip. The thighs, in fact, are a most essential part of the horseman in giving him a good, graceful, and strong seat, as on the form of them depends greatly a good or bad position of the knee, which is a point of the utmost importance, not only to the eye, but to the firmness of his seat. The thighs, in fact, should be applied to the saddle and to the sides of the horse, chiefly by their inner surfaces, or the knees and toes would be too much out; and although the line is by no means required to be perpendicular, yet the shoulder, the hip, the knee, and the foot, should not deviate too far from it, to render a seat perfect. When this is the case, we may be certain the disposition of the thighs and legs is correct, as they will hang down sufficiently straight, and without force or restraint; which can never be the case, unless the body of the rider is placed evenly on the saddle, opening his knees a little, whereby his fork will come lower in the saddle, giving him the appearance, as Shakspeare expresses it, of being "incorpsed and deminatured with the brave beast."

The position of the foot of the horseman is material both to comfort, safety, and elegance. In the old style of riding, the heels were turned outwards, which, of course, threw the toes inwards, and very near to, as well as parallel with, the shoulders of the horse; but this is all wrong. The toes should be turned a little outward and upward, which the slight opening of the knee induces. No animal, human or brute, can look well, or exert its strength well, with toes turned in; and the position is contrary to everything approaching to elegance.

The position of the foot in the stirrup, however, varies with the pursuits of the horseman. The soldier always, the rider for pleasure, or on the road, generally, rests on the ball of the foot, with a gentle play of the instep. But the man who rides after hounds, and the jockey when he rides a race, find it necessary to have the foot more home in the stirrup, with the toes turned a little upward, as well as a little outward. The advantages of all this are twofold. First, it gives them more power over their horses, by furnishing them with a more substantial fulcrum; and, secondly, to the man following hounds, it is a great security against the foot being chucked out of the stirrup, by the seat being disturbed in a leap, or from any of those causes which perpetually occur in crossing a country.

Great as has been the alteration for the better in the seat of Englishmen, in general, by increasing the length of the stirrup-leathers, and thereby placing them more properly in the saddle; yet, in the schools of the military this system has been said to have been carried too far, so as to endanger the safety of the rider. Indeed both Hippocrates and Galen speak of a disease which, in their time, was occasioned by long and frequent riding with the legs hanging down without any support, stirrups then not being in use. How it happened that an advantage so obvious was so long in being made available, is not for us here to inquire; but we consider the support of the stirrup to be the *sine qua non* of the management and services of the saddle horse, for all essential purposes. Nevertheless its most essential use is confined to Great Britain alone, and that is, in enabling the horseman to rise in his saddle to meet the action of the horse in his trot, by which means a pace, otherwise most disagreeable and fatiguing, is rendered nearly the pleasantest of any. So long as the demi-pique saddle was in use, in which the horseman was so deep-seated and trussed up as to make falling almost impossible; and he rode, as Sir Walter Scott made King James to ride, "a horse keeping his haunches under him, and seldom, even on the most animating occasions of the chase, stretching forward beyond the managed pace of the academy;" pressure on the stirrup might have been dispensed with, but with the saddles of the present day, and the more natural action of the horse, we consider it quite indispensable. It is indeed to the disuse of this practice in France, and other parts of the Continent, where rising in the stirrups is never resorted to even on the hardest trotting horses, that is to be attributed the almost rare occurrence of persons riding any distance, or at a quick rate, for pleasure. To this peculiar system in our horsemanship also are we indebted for our rapid style of posting, as without it post-boys could not endure the fatigue the action of a horse creates, especially in hot weather, over a fifteen miles' stage, at the rate of ten or twelve miles an hour, without a moment's intermission;

whereas, by means of it, he performs that task with comparative ease and comfort. The objection to it on the part of foreigners lies in the fancied inelegance, if not indecency, of the motion, which we consider not worthy of an argument; but of this we are certain, that what is called "riding hard," that is, *not* rising in the stirrups in the trot, nor leaning any weight upon them in the gallop or canter, must be extremely distressing to horses, and especially to such as carry high weights.

Previously to our describing the various kinds of seat, it is necessary to observe, that how well soever a man may be placed upon his horse, his performance upon him will mainly depend on the use he makes of his hands. It is on this account that old writers on horsemanship have dwelt upon the difficulty of the art, rendered more so, in their time, when the airs of the manège formed part of it. The fact, however, is notorious, that not more than one man in a hundred of those who have been riding horses all their lives, has what is called "a good hand upon his horse," much less a fine one, which falls to the lot of but few. When, however, we consider, first, that the hand of the rider is to the horse what the helm is to the ship, that it guides his motions and directs his course; and, secondly, that we have recourse to a severe and cutting instrument, acting upon so sensible and totally unprotected a part, as the *natural* mouth of a horse must be,—it is at once apparent, that not only a fine hand, with an easy bit, must be most agreeable, and, at the same time, most serviceable to the horse, in anything he is called on to perform, but that it constitutes the very essence of fine horsemanship. It has been before observed, that a horse's ear has been figuratively said to lie in his mouth, and no doubt he receives the instruction from his rider chiefly through that medium. How material, then, is it that it should be conveyed to him in a manner in which he is not only most likely to understand it, but in one the least disposed to irritate him? How often have we seen a horse fractious and unpleasant both to his rider and himself, when ridden by an indifferent horseman (allowing him even a good seat), but going placidly and pleasantly when mounted by another with a low and fine hand, which appears to sympathize with all his motions, and all his wishes. It is here that Art becomes the handmaid of Nature; and it is the assistance which it is in the power of a jockey with a fine hand to give a horse, which alone exhibits the superiority of one horse over another *in himself* equally good.

Whence this superiority of hand arises, it is very difficult to determine, particularly as it is so frequently apparent in men possessing equally good seats on their horses. From the well-known fact, that it is an accomplishment which in thousands and ten thousands of cases never can be acquired by the practice and experience of a long life, we may almost consider it to be, like the poets, an *ex re natâ* property in the human composition, and thus sought for in vain by those to whom nature has denied it. That it is intimately connected with the nervous influence of the touch is obvious, from its being the result of the action of the hand and arm; and it is in being delicately alive to every motion of the horse, that the excellence of a good hand consists.

Seat on the Road.—Of the various and too often fatal accidents that occur to horsemen, the majority occur on the road. The reason of this is obvious. They are generally, with the exception of cases of inebriation, the result of horses running away with their riders, and either coming in contact with something in their course, which suddenly stops their career, when either one or both are thrown headlong to the ground. Accidents of this description are very frequently attended with the most serious consequences, and show the necessity of persons who get on horseback being capable of commanding their horse. Next come accidents from horses falling, which are often attended with fracture of limbs, if not loss of life, chiefly, perhaps, from the hard nature of the ground on which the horse and his rider are thrown; for, if a twentieth part of the falls sportsmen get in the field, their horses so frequently falling upon them, were to occur upon hard ground, the danger in hunting would put a stop to it. Falls from horses starting only happen to persons who have a loose seat, and such should ride none but horses free from that fault. But the greatest safeguard on the road, next to a firm seat, is derived from the hand of the rider, who should never trust himself entirely to his horse, however safe he may consider him. He may tread on a rolling stone; the ground may give way from under him; he may step into a hole; or, by the effect of sudden alarm, he may lose the centre of gravity, and then, in all or either of these cases, the fall is worse, by reason of his getting no assistance from the rider, which he may have looked for, until past recovery, when he comes to the ground with a crash. We therefore recommend persons who ride the road, always to feel their horses' mouths lightly, by which means not only will the proper equilibrium be sustained, and they will be carried better for it; for, observe, a horse with a weight upon his back, and one without a weight upon his back, are by no means in relative positions, but, should a false step be made, the aid of the rider being *instantly* at hand, is nearly certain to recover him. By which rein the mouth should be felt, supposing the bridle to consist of a bit and a bridoon, must depend on the sensibility of it, although by changing the pressure from one to the other, the mouth is kept fresher and more lively than when one only is used, and especially if that one should be the bit. There is a certain, but not a large, proportion of horses, that are rideable for all purposes on the snaffle only, whose mouths are generally kept fresh by the light pressure they receive. These are perfect mouths; but, nevertheless, horses that have them in this perfection should not be left quite to themselves in any one pace.

Previously to the general use of coaches and railways, road-riding was much more in use than it is at present; and immense distances were travelled over in a day by graziers, horse and cattle dealers, racing jockeys, and others, whose habits of being so much on horseback rendered them superior to fatigue. A hundred miles, from sunrise to sunset, on the same horse, was no uncommon day's work, and this when the roads were in a very different condition from that in which they now are, abounding in ruts and quarters, so that horses were travelling over half their ground, either on a narrow ridge, between two ruts, or over loose unbroken stones; and these were the days in which really good roadsters fetched large prices, as only horses with very good legs and feet could stand fast work long, or be depended upon as to safety. But all modern feats of men on horseback, or indeed the feats of any other period, on the authenticity of which we can rely, retire into the shade before that performed, November 5th, 1831, by George Osbaldeston, Esq. of Hummanby Hall, Yorkshire, over Newmarket Heath, who rode 200 miles in 8 hours and 42 minutes, winning his herculean match with 1 hour and 18 minutes in hand. As may be supposed, he was not restricted to the number of horses, which consisted of twenty-nine, then in training on the heath; but he rode one of them, Mr Gully's Tranby, by Blacklock, 16 miles, at four 4-mile heats. Mr Osbaldeston, also celebrated for his bold and judicious riding to hounds, appeared very little fatigued; and, after the use of the warm bath, and a short repose, joined in the festivities of the evening, and did not retire to rest till an hour after midnight.

An easy seat in the saddle is very important to persons who ride many hours in succession on the road. To accomplish this the following rules should be observed:—To sit well down in the middle of the saddle, with just that length of stirrup leathers that will allow of the fork clearing the pummel of the saddle; for a greater length than this would add to the fatigue of a journey, and lessen the rider's command over the horse. On the other hand, short stirrup leathers create fatigue by contracting the knees, and thereby adding to the exertion of rising to the action of the horse in the trot, which should chiefly proceed from a gentle play of the instep. The body of the rider should incline forwards in the trot, as, by forming a proper counterpoise, the movement of the horse is facilitated; and, above all things, steadiness of seat is required, or the latter will be much incommoded in his action. So distressing, indeed, is a swaggering unsteady seat, that it is a well established, though not a universally known fact, that horses will carry some persons of considerably greater weight than others, long distances on the road, or over a country in hunting, with less fatigue to themselves, solely because they ride them with a firm seat and an easy hand. In a long day's journey on the road, great relief is given to a horse by now and then dismounting from his back, and leading him a few hundred yards; as also by frequent sips of water, particularly if the weather be hot. As to *frequent* baiting of a hackney in a day's journey, the practice is not recommended. In a journey of 60 miles, he should only be stopped once, but then it should be for at least 2 hours, during 1 hour of which time he should be shut up in a plentifully littered stall. It is well known that a horse in good condition would perform this distance without hurting him, if he were not baited at all, but we are far from recommending the practice. Short stops, however, on the road are injurious rather than beneficial, and teach horses to hang towards every public-house they pass by, in their journey.

Most horses should be ridden in double-reined bridles long distances on the road, and all should be ridden with spurs. Should they flag, or become leg-weary towards the end of a day, the use of the curb may be the means of avoiding falls; and, by the gentle application of the spur, a sort of false, that is, more than natural, action is created, which will have the same beneficial effect. As to the rate at which horses should be put on the road, that is a point so much under the control of circumstances, that no line can be drawn respecting it; but our experience assures us, that if a horse has to perform the distance we have already taken as a fair day's work, namely, 60 miles, under not a very heavy man, he would perform it with more ease to himself, and feel less from it the following day, if he travelled at the rate of 7 or 8 miles in the hour, than less. In the first place, this rate of speed is no great exertion to a horse of good action, and also in good condition; and in the next, by performing his day's work in less time than if he travelled slower, he gets sooner to rest, and is, of course, sooner fit to go to work again. Let it, however, be observed, that he should have 2 hours quiet rest in the middle of the journey, which will enable him to perform it without fatigue. But we do not recommend this rate of travelling, when a much greater extent of ground is before us. If a horse is to be ridden 200 or 300 miles or more, he ought not to travel, in the best of weather, more than from 30 to 40 miles per day, and he should rest the entire of the fifth day, or he will become leg-weary, hit his legs, or perhaps fall. We are of course alluding to valuable horses, with which extra expense is not to be put into the scale against the risk of injuring them. The earlier travelling horses, in the summer particularly, start in the morning, the better, that they may get their day's journey over in good time, and be early shut up for the night.

The following good advice to persons riding on the road is very much to the purpose, and may be quoted here:—"When you ride a journey, be not so attentive to your horse's nice carriage of himself, as to your encouragement of him, and keeping him in good humour. Raise his head; but if he flags, you may indulge him with bearing a little more upon the bit than you would suffer in an airing. If a horse is lame, tender-footed, or tired, he naturally hangs on his bridle. On a journey, therefore, his mouth will depend greatly on the goodness of his feet. Be very careful, then, about his feet, and not let a farrier spoil them." To this we add, that, as has been already observed, horses often fall on the road, from the state of their shoes being neglected; in journeys, and on hot and dusty roads especially, the feet as well as the shoes demand care. They should be stopped every night with moist clay, or cow-dung, or what is better, wetted tow, which, whilst it cools and moistens the foot, acts beneficially, by causing pressure to the sensible sole and the frog.

The Hunting Seat.—Next to that of a jockey, on whose skill in the saddle thousands of pounds may be depending, the seat of the fox-hunter is most essential of any connected with amusement. He must not only be firm in his saddle, to secure himself against falls when his horse is in the act of leaping, but he must unite with a firm and steady seat a light and delicate hand, to enable him to make the most of his horse, as well as to preserve himself as much as possible against danger. His position in the saddle should resemble that which we have recommended for the road, with the exception of the length of his stirrup leathers, and the position of his foot in the stirrup irons. The former, the length of stirrup leather, should depend on the form and action of his horse, as well as the nature of the country he has to ride over. With a horse very well up in his forehand, with his haunches well under him, and going perfectly collected and within himself, his stirrup leathers may be long enough to admit of the knee being very nearly straight, and the foot resting on the ball. But, on the other hand, if his horse be somewhat low in his forehand (which many first-rate hunters are), with very powerful action in his hind quarters; if ridden in hilly countries, or if at all disposed to be a puller, he will require to be at least two holes shorter in his stirrups; and his foot will be firmer if placed "home" in them, instead of resting on the balls. Above all things, he must acquire a firm, close, and *well-balanced* seat in his saddle, which is not merely necessary in leaping, but in galloping over every description of ground. A swagging seat in the last-mentioned act is sufficiently bad to make a great difference to a hunter in a severe chase; but when we picture to ourselves a horse alighting on the ground, after having cleared a high fence, and his rider alighting two or three seconds afterwards in his saddle, so far forward, perhaps, as to fall beyond the pillars of support, or backwards behind the centre of action and the part (just behind the shoulders) which ought to form the junction between the rider and his horse, we can readily imagine how distressing it must be to him, and how much a large fence, so taken, must exhaust him over and above what would be the case if he had had the assistance of a firm hand to support him on alighting; but which, however, with such a seat as we have been describing, no man can possess. The first requisite, then, for a person who follows hounds is the combination of a light hand with a firm seat; and fortunate is it for his horse, as well as for himself, if he possess it to the degree required to constitute a fine horseman over a country.

But as the science of war cannot be learned perfectly by anything short of experience in the field, neither can the art of horsemanship, as far as the sportsman is concerned, be learned perfectly in the riding-school or the academy. If our own observation did not confirm this fact, it would appear evident, from the variety of situations in which the man following hounds may be placed, in one individual run; and we will endeavour to enumerate them. First, there is galloping at very nearly full speed, not over turf as smooth as a carpeted floor, and with nothing beyond a daisy's head to come in contact with the horse's feet, but (*cursu undoso*) over every description and every variety of ground; over the high ridge and across the deep furrow; over ground studded with ant-hills, which, unlike the mole-hill, are often as hard as if they had been baked in an oven; over stones and flints, the latter so sharp as frequently to sever the sinews of a horse's leg so completely as to cause his toe to turn upwards, when his throat must be cut on the spot; over grips covered by weeds, and thus, if visible to the horseman, too often invisible to his horse; over deep underdrains, with rotten coverings, which frequently give way, and let in a horse nearly to his shoulders; down steep hills, stony lanes, through deep sloughs and treacherous bogs; and all this very frequently on infirm legs, as those of hunters which have been long in work are very apt to be.

Next come the "fences," as all obstacles to the follower of hounds are now technically termed; and let us just see of what they are composed. There is the new and stiff gate, with always five, and sometimes six bars, and each bar, perhaps, as firm against the force or weight of a horse and his rider as if it were made of wrought iron. Then there is the nobleman or gentleman's park-paling, full six feet high, and too often a turnpike road on the other side to alight on. The stiff four-barred stile, generally to be taken from a narrow and slippery foot-path, and not unfrequently on the declivity of a hill. The double post and rail fence, as it is called, too much to be cleared at one leap, in which case the horse has to leap the second rails from the top of a narrow bank, and sometimes from out of a ditch which is cut between them. Every now and then, in the rich grazing countries, which are far the best for hunting, and in which hounds run faster than in others, there is the ox-fence, which may thus be described: If taken from one side of it, there is, first, a ditch, then a thick and strong black-thorn hedge, and about two yards beyond it, on the landing side, is a very strong rail, placed to prevent feeding bullocks from running into the hedge, to avoid the œstrum or gadfly in the summer. This fence, covering a great space of ground, must be taken at once, or not at all, from either side on which it is approached. In these countries, from the goodness of the land, the black thorn attains great strength; but in places where it happens to become weak, instead of the ox fence, four strong rails are put, which, in addition to the ditch, makes also rather an awful fence; at least, if a horse do not clear it, he must fall, as the rails very rarely will give way. Some of these hedges being impracticable, from their thickness, the sportsman makes his way to one corner of the field, where he finds a flight of very high and strong rails, but without a ditch, and every now and then a sheep-fold. The former is somewhat of a more severe fence than it appears to be, owing to the ground on each side of it being either poached by cattle, or, what is worse, rendered slippery by sheep, which are driven into the corner to be examined by the shepherd, in the case of there not being a sheep-fold in the field. The sheep-fold or sheep-pen, as it is called in Leicestershire, is a still more serious undertaking. To get into it, the horse must leap four strong bars, about the average height of gates, and then, with a very short space to turn himself round in, must do the same thing to get out of it. Next comes the brook, from 12 to 20 feet in width, often bank-full, and sometimes overflowing its banks, which are often hollow, and generally rotten. In most of our best countries, few runs of extent take place without a brook or brooks being to be crossed; and no description of obstacle to which the sportsman is subject in crossing a country is the cause of so many disasters.

In what are termed the Provincial Hunting Countries, in contradistinction to Leicestershire, and the other chiefly grazing countries, timber, with the exception of stiles, is not so frequent, nor is the ox-fence to be seen at all; but there is comparatively more fencing, though chiefly hedges and ditches. In many of these, Dorsetshire in particular, the fences are generally what is termed double; that is, there is a ditch on each side of the hedge, which it requires a horse to be prepared for, by receiving, if not his education, a good deal of instruction in the country. In other parts of England—Cheshire and Lancashire, for example—we find fences that require an apprenticeship; they consist of a hedge and ditch, not of large dimensions, but in consequence of the former being planted on a cop or bank, a horse must land himself on the cop before he can get his footing to clear the fence, provided the hedge be on the rising side. Were he to spring at it from the level of the field, and clear the bank, together with the hedge and ditch, the exertion would be so great as soon to exhaust his powers. Those fences require horses very active and ready with their hinder legs, and also riders with good hands. In all strong plough-countries, as our fine loams and clays are termed by sportsmen, hedges with ditches (for the most part only one ditch) prevail. For height and width they are not equal, by much, to those of the grazing districts, but circumstances render them equally difficult and trying to the skill of a horseman and the judgment of his horse, and oftentimes still more so. In the former, although the fence is large (brooks excepted), the ground on the rising side is almost always sound and firm; whereas in deep-plough countries it is generally soft, and often, what is worse, it is sticky. Neither is this all. It very often happens that the headland of a field is ploughed to within a foot or two of the ditch, when a small ridge, or "balk," as it is termed in some districts, is left to prevent the soil of the field washing into the ditch. This ridge is often very perplexing to the horseman. He must either put his horse at the fence so as to clear all at once, or he must let him take his footing from off this narrow ridge, which, if his head be not in a very good place, and his rider's hand an indifferent one, makes even a small fence dangerous. The objection to a ploughed country also holds good as regards the other, the landing side of the fence. In the grass countries a horse alights on turf sufficiently elastic to break the concussion from the weight of himself and his rider, but seldom soft enough to sink him below his hoofs. On the other hand, in the ploughed districts, he is perpetually alighting in fallowed ground, or in that sown with wheat or other corn, which, particularly after a severe frost, is so far from being firm enough to bear his weight, that it sinks him nearly to the knees. This is very distressing, especially to a horse which carries a heavy man; and here the skill of the rider is shown in his preventing his jumping at fences of this description higher or farther than is absolutely necessary to clear them. To a man who follows hounds, indeed, this art of handing his horse easily over fences is one of the very highest value; and to the possession of it to perfection is to be attributed the extraordinary performance of hunters under some of our heaviest sportsmen (such as Mr Edge and his brother, Mr Richard Gurney, Sir Bellingham Graham, Mr Maxse, Lord Alvanley, and others), in fast runs of an hour or more, over strongly inclosed countries. Taking England throughout, there are fewer fences than there used to be; but more land is, year by year, being laid down in plough.

Walls are, we believe, the only fence met with in Great Britain which we have as yet left unnoticed. They are of two descriptions, namely, fast, by means of mortar, and loose, being built without mortar. The first do not often come in the way of the sportsman; and it is well that they do not, for, in the event of a horse striking them, they do not yield to his weight. The last, the loose walls, particularly those met with in Gloucestershire and Oxfordshire, are the least dangerous fences he can ride at; for, unless his horse be blown, or he is himself a very powerless horseman, they seldom resist him sufficiently to throw him down.

Their height varies from 3 to 5 feet; but as there never is a ditch on either side of them, and the ground is generally firm in the parts of those counties which are inclosed with walls; those even of the last-mentioned height may be taken with safety by a good horseman, on a horse that is accustomed to them, and is not distressed at the time by the pace; for, as "*it is the pace that kills*," so is it the pace that causes falls.

The following directions may be serviceable to a young beginner in the hunting field:—When hounds find and go away, place yourself well down in your saddle, on your fork, or twist, and dont be standing up in your stirrups (as formerly was the fashion, and the cause of many a dislocated neck), sticking out your rump as if it did not belong to you. Let your knee be not very far from straight, with your foot well out in front of it, and feeling in the stirrup as if it formed a sufficient fulcrum for your bodily strength to act upon in the assistance your horse may require from you. Be assured that the military seat, with the very long stirrup leathers, will not do here, however graceful it may appear on a parade. There must be a kind of *obstando* power in the rider to act against the preponderance of his horse, particularly at what are called drop-leaps, in very deep ground; or, in case of his making a blunder, or getting into false ground, in his gallop. Having got well away with the pack, keep your head up, with your reins in the left hand, and your whip in your right, held perpendicularly upwards, with the thong falling loosely through your hand, when it will be ready for all purposes. Cast your eye forward, to take a view of the country, and then on the body of the hounds, to satisfy yourself that they are well settled to the chase. And now comes the young fox-hunter's trial. *You must neither take liberties with the hounds nor with your horse.* Ride wide of, that is, on the left, or on the right of, the former, turning as you see them turn, and never find yourself exactly behind them, on their line; and no matter how perfect may be the latter, never trust him to himself, nor upset him by going too fast for him, or, in other words, over-marking him for pace. However good his mouth, never ride him in chase with quite a slack rein, for, independently of your own safety, it is not giving him a fair chance. He requires your support, and he should have it.

In riding to hounds, there is much to be gained by what is termed picking out your country. Avoid going straight across land highly ridged, and consequently deeply furrowed, if possible to avoid it, but rather take your line diagonally. If the furrows are very deep and holding, make for the side, or the headland, where, of course, it is comparatively level ground. Even if it takes you a little out of your line, you will find your advantage in this, for you may increase your rate of going, and that with ease to your horse, more than equal to the extra distance you have to go. If your horse appear somewhat distressed, it is on a headland, or still more on a long sideland, that you have a good opportunity of recovering him; and here you may have recourse to the old-fashioned style of riding a hunter. You may stand up in your stirrups, catching fast hold of your horse's head, and pulling him well together, when you will find that, without slackening his pace, he has recovered his wind, and can go on. Avoid deep ground as much as possible; but when in it keep a good pull on your horse, and by no means attempt to go so fast over it as you have been going over that which was sound. After Christmas, turnip fields should be skirted, if possible; for, by reason of the many ploughings they receive at seed-time, the land sown with turnips becomes so loose and porous after severe frost, that it cannot carry a horse. Also avoid *crossing* fallows, or land sown with wheat. If obliged to go athwart them, get on the headland; or, if you ride straight down them, choose the wettest furrow you can see. It is sure to have the firmest bottom, which is proved by the water standing in it.

As no man can say where a fox-chase will end, have an eye to your horse, and endeavour to give him all the advantages in his favour that the country and the pace will admit of. Next to a judicious choice of your ground, is quickness in turning with hounds, as the difference between riding inside and outside of them, in their turns (be it remembered hounds very seldom run straight) is very considerable indeed; and to a certain degree corresponds with what is called "the whip-hand" in a race. Again, if you wish to stand well with the master of the pack, and to obtain the character of a sportsman, observe the following rules:—Never press upon hounds, even in chase. When they have lost the chase (in other words, when they are at fault), pull up your horse and keep wide of them; and, in the words of a celebrated old sportsman, "*always anticipate a check.*"

Never, for the sake of displaying your horsemanship or your horse, take an unnecessary leap when hounds are running, nor a large one when a smaller is in your view, unless the latter take you too much out of your line, or for a reason which we shall presently give. If your horse is a good timber leaper and not blown, prefer a moderate timber fence to a rough and blind hedge-and-ditch fence, as less likely to give you a fall, neither will it take so much out of your horse. But when your horse becomes distressed avoid timber, for if he do not clear it he will give you a worse fall in that state than if he were quite fresh. A blown horse falls nearly as heavy as a dead one. There is, however, another precaution to be observed with horses a good deal beaten by the pace. Have an eye, then, rather to the nature of the ground on which it is placed, than to the size of the fence; that is, prefer a good-sized fence, where you see firm ground for your horse to spring from, to a small one where it is soft and sticky. Moreover, a distressed horse will often rise at a fence of some height and appearance, whereas he will run into, or, at all events, endeavour to scramble through, a small one. If you decide upon the smaller place, let him go gently at it, as he will be less likely to give you a fall; at all events, he may not give you so bad a one as if you went fast up to it. Some horses get out of scrapes better than others; but it is as well not to give them an opportunity of showing their prowess in such matters, and one of the worst faults they can possibly have is not to care for falling.

A chief requisite to a good rider across a country is courage, one of the most common qualities of human nature; and another is coolness. No man, when flurried, can do any one thing well; but when we consider the variety of objects that the sportsman following hounds has to attract his notice, and the many obstacles he may have to encounter, it is evident that, according to the old adage, "he must have all his wits about him." The perfection of fine horsemanship in the hunting-field, then, is in a man riding well up to hounds, when going their best pace over a stiff country, and yet appearing to be quite at his ease, and his horse, as it were, sympathizing with him in his calmness. Such a man (and there are some such in every hunt, but not many) is capable of taking every advantage that can be taken of country, hounds, and all obstacles which appear to oppose him in his career. Another signal advantage to the sportsman also arises from his coolness in these moments of no small mental as well as bodily excitement and exertion. He is able to observe the beautiful working of the hounds, which is displayed to advantage with a burning scent; and he enjoys it the more in consequence of the superiority of his horsemanship having placed him in a situation where he is not molested by the crowd.

Although speed in the hunter is now absolutely necessary, from the much increased rate of hounds, yet it is equally necessary, in most of our hunting countries, that he should be a perfect fencer as well, and that his rider should be an accurate judge of the extent of his fencing powers. Thus it often happens that horses, not equal in speed to others, get quicker over a stiffly-inclosed country than they do, because, by the means of their superior fencing, they are able to cut off angles and go straighter. In fact, there are frequent instances of one individual sportsman beating every other in the field, and being alone throughout a run, merely by clearing a great fence in the direct line of the hounds at starting; in avoiding which, so much ground had been lost by the rest of the field, that it could not be recovered by them until the chase was ended.

It is a common saying among steeple-chasers, that five times as many horses rick their backs at a grip or small blind fence, which they hardly care to rise at, than at a rasper; and from the effect of the exertion of leaping, in horses, which is pretty accurately ascertained by the observation and experience of sportsmen, some rather curious facts are drawn. A very large fence, as has been before observed, exhausts a horse, or, in the language of the field, "takes a good deal out of him;" nevertheless, a hunter becomes sooner distressed over quite an open country, when the pace is very severe, than he does over an inclosed one, provided the fences are not very large indeed. This is accounted for in two ways: First, fences check the speed of hounds, and consequently the speed of horses. Secondly, the mere act of pulling or gathering a horse together, to shorten his stride previously to his taking his leap, is a very great relief to his wind, as we know from the effect a good pull at his bridle, towards the end of his course, has on that of the race-horse. At several kinds of fences, likewise, it is necessary that he should be pulled up nearly, if not quite, into a walk, to enable him to take them with safety, such as fences by the sides of trees, hedges with ditches on each side of them, particularly if they are what is termed "blind:' in short, all places known in the hunting vocabulary as cramped places, as well as now and then a timber fence, which must be taken nearly at a stand. And it was the old system of taking all upright fences, such as gates, rails, stiles, and hedges without ditches, at a stand, that enabled the low-bred hunter of the early part and middle of the last century to live with hounds as well as he did live with them. The very short time that it takes for a horse to recover his wind, to a certain extent, might be proved by a reference to stage-coach work. Previously to the perfect manner in which it was latterly performed, and the superior condition of the cattle, from their owners having at length found out how to feed them, it was not unusual for a coachman to have a high blower, as a thick or bad-winded horse is called on the road, in his team, which might scarcely be able to keep time. If he found him distressed, he would pull up his coach on the top of a hill, and draw back the distressed horse from his collar. But how long would he keep him in this position? Why, not many seconds, before he would be sufficiently relieved to proceed. Thus the country of all others which puts the physical powers of horses to the greatest test in following hounds, is one which is hilly, and totally without fences, of which the Sussex South Downs, in the neighbourhood of Brighton, may be taken as a sample. Nothing but a thorough-bred horse, and a good one too, can live quite alongside hounds, going their very best pace, more than half an hour over such a country as this, and very few can do even so much, if they carry more than average weight. The open ploughed countries, such as great part of Wiltshire and Hampshire, are for the same reason very distressing to horses, and require them to have a great share of blood; but hounds do not, neither can they, run so fast over ploughed ground, as over old, or maiden turf, which the Sussex Downs are clothed with. In the first place, the scent is seldom so good; secondly, the ground is not only not elastic, which the other is, but it impedes the progress of hounds from two other causes; its surface is less even, and the soil of all ploughed land sticks more or less to the feet of hounds; or, in the language of the huntsman, it "carries" invariably after a slight frost on the previous night.

We now resume our advice to the young fox-hunting horseman: It is the practice of all first-rate horsemen over a country—and no man was a greater advocate for it than Sir Harry Goodricke—to ride slowly at the majority of fences. For example, if the ditch be on the rising side, you may cause your horse to put his feet into it before he rises at the hedge, if you hurry him at it. Should the ditch be on the landing side, the case is somewhat altered, as the pace you ride at must be regulated by its width. If you have reason to believe it is of moderate width, do not go fast at the fence, because it will cause your horse to leap further than he needs to leap, and of course help to exhaust him. But if, when within a few yards of the hedge, going slowly at it, you perceive the ditch is a broad one, "put in some powder," as the modern sporting term is; that is, urge your horse by the hand and spur, and he will be aware of what you wish him to do, namely, to extend himself so as to clear a wide space of ground. If the ground on the landing side be lower than that on the rising side, causing what is called "a drop leap," or even if the ground be not lower, but soft or boggy, your horse will look for assistance from you on alighting, which you should give him by throwing your body back, having at the same time a resisting power from your stirrups. But another precaution is necessary when the ditch is on the rising side, or indeed with all fences except those (as will be hereafter named) which require to be ridden quickly at. This is, to fore-shorten the horse's stroke so as to enable him to gather himself together for the spring, or he may misjudge his distance, and get too near to his fence to rise at it. In fact, to judge accurately of the distance from the fence at which the spring should be taken, is a great accomplishment in a man and a horse. In the former, it is the result of experience and a quick eye; with the latter, it is in great measure dependent on temper; and consequently violent horses—"rushing fencers," as they are termed—never perfectly acquire it. It is a serious fault in a horse to take his spring sooner than he need take it; and perfect fencers go close up to their fences before they rise at them, particularly to hedges when the ditches are on the landing side. Horses, however, of hasty tempers, particularly well-bred ones, with great jumping powers, cannot always be made to do so. Neither will they save themselves by walking into, or pushing through, places which do not require to be jumped; on the contrary, many otherwise excellent hunters will scarcely suffer a brier to touch their legs. A good bridle-hand here comes into play, more especially with horses who are rather difficult to handle, either from too fine a mouth, or a loose, ill-formed neck. It is difficult, however, to offer instruction here, as there ought to be an absolute interchange of feeling between the instructor and the instructed, to render them intelligible to each other; but we will endeavour to make ourselves understood:—When you approach a fence with a horse of this description, you should leave him as much to himself as you find it prudent to do, particularly when within a few yards of it. If you are obliged to check his speed, do so with as light a hand as possible; and if he shows a dislike to be much checked, by throwing up his head, or otherwise, drop your hand to him, and let him go. He has by this time most probably measured the fence by his eye, and it may not be safe to interfere with him.

Double fences, particularly with a horse not quite perfect in his mouth, and the setting on of his head, try the hand of the horseman. The first part of the fence, usually a ditch, may be cleared without any difficulty, and so may the second, if visible; but it often happens that neither horse nor rider is prepared for the second. Here it is that, in our opinion, lifting a horse is to be recommended, and in very few cases besides. Our objection to it arises from the horse being led to expect it; and if he do not get it at the critical moment, it may mislead him. In fact, it requires a hand nicer than common to make a practice of lifting a horse at his fences. Nevertheless, in the instance we have alluded to, the unforeseen ditch, it is useful; as also towards the end of a run, when a horse, from distress, is given to be slovenly at his fences, if not disposed to run into them. In leaping timber fences, we consider the attempt to lift a hunter dangerous; for a horse becomes a good timber-leaper from confidence; and if he finds he is to wait, as it were, for your pleasure for him to rise at a gate or a stile, he will be very apt to make mistakes.

We have already observed that timber fences are the most dangerous of any, by reason of their general strength; if a horse strikes them with his fore legs, or gets across them, as it were, by not being able to bring his hinder quarters clear of them, they are nearly certain to cause him to fall. And he falls from timber in a form more dangerous to his rider than when he merely stumbles and eventually falls, by putting his feet into a ditch. In the latter case, his fore quarters come to the ground first; and by breaking the force of the fall, the rider has time to roll away from him before he himself rolls over, should the violence of the fall cause him to do so. In the former, if the timber be strong enough firmly to resist the weight and force of a horse that strikes it with his fore legs, especially if above the knees, the first part of his body which comes to the ground is either his back or his rump. Should the rider then not be thrown clear of him, he must be made of hard materials if no bones are broken, or some serious injury sustained. All this, then, enforces the advice we have already given, of avoiding strong timber with horses not perfect at leaping it, as much as may be compatible with keeping your place with hounds; and still more so with horses, how perfect soever they may be at it, that are blown, or very much distressed. It likewise induces us to point out the best and safest method of riding at this description of fence.

Never ride a horse fast at a timber fence, unless it be a low one, with something wide to be cleared on the landing side. If a man or boy is seen exercising himself in jumping heighth, you do not see him run quickly at it, nor does he run over any considerable space of ground before he springs. On the contrary, he only takes a few steps, and those at a moderate rate. Never, then, ride your hunter fast at gates, stiles, &c., unless in the one case alluded to. Mr Thomas Assheton Smith, who was for many years at the head of the Quorndon (Leicestershire) Hunt, and whose riding of Jack o' Lantern in particular was justly regarded as the very essence of horsemanship, never rode fast at any fences, brooks excepted, and then only under circumstances which will be explained when we treat on that part of our subject. When riding at timber, however, take a firm hold of your horse's head, chiefly by the aid of the bridoon, if his mouth is good enough for it; and let him understand, by assuming an air of resolution on your part, that you not only mean him to leap it, and that you will not suffer him to turn his tail to it, but that it is something at which his best energies will be required of him. But above all things do not interfere with his stroke or stride, unless absolutely called upon by some peculiarity of the ground, such as a grip on the headland, or a small ditch on the rising side. A horse making up his mind to leap a timber fence, will of his own accord regulate that matter, and gradually gather himself together on his haunches, previous to being required to take his spring. He will also, if you let him, often make choice of his pace at which he goes up to a gate, &c. It is true the deer can clear a greater height in its trot than in any other pace; but a horse prefers the very slow gallop, or canter, when thus called upon to exert himself; for if he do trot to any upright fence, we generally see him break into a canter in the last few yards. As the fulcrum for the spring comes from behind, the canter is the most natural pace, the haunches being at this time more under him.

The same instructions to the horseman hold good with regard to stone walls as to timber fences, at least to those met with in England, which are loose, and without ditches. But in several parts of Scotland the case is different, as the sportsman very frequently has to encounter walls with ditches on one side or the other of them. In consequence of their being placed at some distance from the wall, to prevent the water which runs down them undermining the foundation of it, there is frequently room, when the ditch is on the rising side, for a horse to leap the ditch, and take a second spring from the intermediate space, and so clear the wall. But when he has to leap the wall, with the ditch on the landing side, it becomes a very difficult fence, and must be ridden at with judgment. If the ditch be not too far from the wall to come within the stretch of a hunter, he should be ridden quickly at it, and well roused by the rider, to make him extend himself sufficiently; but if it be too far, he should be put very slowly at the wall, so as to enable him to drop, with his hinder legs at least, on the intermediate space, and from thence spring over the ditch. This fence is very trying to horses not accustomed to it; and with those which are, one fact becomes apparent, namely, that the mere holding the reins of a bridle does not constitute what is called "a hand" on a horse. A workman with a "finger" is wanted here.

In riding at every description of timber your seat as well as your hand requires attention. You have already been told on what part of your horse you ought to sit, namely, in the middle of your saddle, which should be placed close to the shoulder bones, when your seat will be most secure, from its being just in the centre of motion when your horse springs at his fence; as, in the rising and falling of a board placed *in equilibrio*, the centre will be most at rest. Your true seat, indeed, will be found nearly in that part of your saddle into which your body would naturally slide if you mounted without stirrups. But other security than this is required to insure safety over very high fences. It is not the horse's rising that tries the rider's seat; the lash of his hinder legs is what ought to be chiefly guarded against, and is best done by the body's being greatly inclined backward. Grasp the saddle lightly with the hollow or inner part of your thighs, but let there be no stiffness in any part of the person at this time, particularly in the loins, which should be as pliant as those of a coachman on his box, when travelling over a rough road. A stiff seat cannot be a secure one, because it offers resistance to the violent motions of the horse, which is clearly illustrated by the cricket-player. Were he to hold his hand firm and fixed when he catches a ball struck with great force, his hand or arm would be broken by the resistance; but by yielding his hand gradually, and for a certain distance, to the motion of the ball, by a due mixture of opposition and obedience, he catches it without sustaining injury. Thus it is in the saddle. A good horseman recovers his poise, by giving some way to the motion, whereas a bad one is flung from his seat, by endeavouring to be fixed in it. In old times, when hunters were trained to leap all upright fences standing, these precautions were still more necessary, because the effect of the lash of the hinder quarters was more sudden and violent, in consequence of the horse being so close to his fence, that he rose perpendicularly at it, and not with the lengthened sweep of a flying leap.

Although Virgil, in his third *Georgic*, speaks of not suffering the brood mare to leap fences (*non saltu superare viam*), we find nothing on this subject in the classics to induce us to believe that the ancients, although they hunted, were given to ride over fences. Here they sustained a loss; for we know few more delightful sensations than that experienced in the act of riding a fine flying leaper over a high and broad fence. Nothing within the power of man approaches so nearly to the act of flying; and it is astonishing what a great space of ground has been covered at one leap by horses with first-rate horsemen on their backs. In the grand Leicestershire Steeple-Chase of 1829, a gray horse, called "The King of the Valley," the property of Mr Maxse, and ridden by the celebrated "Dick Christian" of Melton-Mowbray, cleared the previously unheard-of space of 33 feet; and in the "Grand National" at Liverpool, Mr Elmore's Lottery cleared 33 feet over the wall erected in front of the stand; Mr Tilbury's Culverthorpe jumped 37 feet over hurdles at Newport-Pagnell; and at Leamington Captain Little's Chandler cleared 39 feet over the brook, in which three or four horses and their riders were scrambling at the time. Yet, after all, the most extraordinary fact relating to the act of leaping in horses, is the power they have of extending themselves by a second spring, as it were, when they perceive something on the further side of a fence, for which they were not prepared. That they occasionally do this under good horsemen, all good horsemen of experience can vouch for; but whence the fulcrum is derived it would be difficult to determine. All horses which have been in Leicestershire, and other counties where the fences are large and wide, become more or less accomplished in the act of throwing themselves forward, as well as springing upward, causing a very pleasant sensation in the rider, as well as an assurance that he is not likely to drop short into the ditch or brook. The most accomplished hunters generally touch their fences, and many of the Irish horses carry this habit of thrusting themselves with their hind legs off a bank to such an extent, that the rider feels as if he were never coming to the ground again.

We have already said that brooks stop a field more than any other description of fence, and for the following reasons:—Very few men, and still fewer horses, like jumping brooks. In the first place, as concerns the rider, they are very apt to injure his horse by a strain, or a bad over-reach; secondly, water is deceiving as to the extent of it; thirdly, a wide brook takes much out of a horse; and, lastly, the banks often give way, after the horse supposes he has landed himself; and although it is easy for him to get into a brook, it is often very difficult for him to get out of one. Few horses become very good water-jumpers, unless they have been hunted a good deal in countries where brooks abound, and also have been fortunate in not getting into one of them in their noviciate; and Lottery, the most thorough steeple-chaser under all weights that was ever crossed, invariably bungled at them. For this reason, it is a hazardous experiment to give a large price for a hunter, how high soever may be his character, that has been only hunted in counties like Hampshire or parts of Wiltshire, where there are no brooks but such as, from the soundness of their bottoms, horses may walk through. We have already stated the most likely way to make a young horse a good brook-jumper, a very superior accomplishment in a hunter, and chiefly to be attained by his acquiring confidence.

There is one other untoward circumstance attending leaping brooks with hounds. They are, for the most part, met with in the middle of a field, and it often happens that, until the horseman arrives on the very brink of them, he cannot form a correct estimate of their nature or extent. They also vary much in both these respects, we mean in the soundness or unsoundness of their banks, and in their width, in the space of a few yards; so that it is in some measure a matter of chance whether you have to leap a wide brook or a narrow one. But, then, it may be said, you can always satisfy yourself on these points. True; you may do so; but what would too often be the consequence? Why, if you show your horse a brook before you ride him at it, it would too frequently happen that he would not have it at all; add to which, whilst you were doing this, on a good scenting day, the hounds would get a long way a-head of you. Besides, the *vis vivida*, or momentum of the horse's gallop, so necessary to get him well over wide brooks with rotten banks, is wanted, but in this case would to a certain extent be lost; and if he is once pulled up, and turned round, it is not so readily acquired again, as he is always more or less alarmed, after having got a sight of what he is going to encounter. Wide brooks, then, with uncertain banks, are the only fences which should be ridden very fast at; for, exclusive of the advantage the horse gets from the impetus derived from the speed should he fall on the other side from false ground, he will generally save himself from dropping backwards into the brook, an object of no small importance to him, as also to his rider. There are, however, exceptions to the rule of riding *fast* at brooks. When they are not wide, and the banks are sound, it takes less out of a horse to put him at a moderate rate at them. Neither should he be ridden quickly at them when they overflow their banks, as it will then require all his circumspection and care to know when, or where to spring from, to cover them. In fact, overflown brooks are rather formidable obstacles; but (a fine trial of hand) numerous instances do occur in the course of a season, where they are leaped when in that state by some of the field, but not by many.

Although, when the sportsman rides over a very wide brook, or any other fence which requires much ground to be covered, he has a certain hold by his bridle: yet, as may be supposed, it is very unequal to the weight of his own body, increased by the resistance of the air. How happens it, then, that his horse does not leap from under him? or, at least, how is it that, when the horse alights, the rider alights in the very same spot in the saddle on which he sat when his horse rose at it? The fact is, his body so far partakes of the speed of his horse, and increases in common with it, that, with very little assistance from his bridle-reins, he keeps himself in his proper place. If it were not so, what would become of the rider in the circus, who leaps directly upward, through a hoop perhaps, or over his whip, whilst his horse is going at considerable speed? He would, of course, alight upon the ground, perpendicularly, under the point at which he sprung from his saddle. It is evident, however, that on leaving the saddle the body of the rider has equal velocity with that of the horse; and the spring, which he takes perpendicularly upward, in no degree diminishes the velocity; so that, while he is ascending from the saddle, he is still advancing with the same speed as his horse, and continues so advancing until his return to the saddle. In this case the body of the rider describes the diagonal of a parallelogram; one side of which is in the direction of the horse's motion, and the other perpendicularly upward, in the direction in which he makes the leap. From these facts, these striking instances of the composition of motion, then, may the advantages of good, and the disadvantages of bad, horsemanship be appreciated; and as it appears that the motions of the rider and his horse are so intimately connected and in unison with each other (for were the circus rider to project his body forward, in his leap through the hoop, as he would do if it were on the ground, he would alight on his horse's head or neck, or perhaps before his head, for he would then advance forward more rapidly than his horse), the importance of a steady seat and a good hand is apparent, and accounts for some men crossing a country on middling horses, quicker and better than others do upon really good ones.

Having spoken of overflown brooks, and being aware of the many fatal disasters that have occurred to sportsmen in water, and the narrow escapes of others from drowning by crossing flooded rivers, within the last twenty years, we are surprised that the exercise of swimming horses in the summer months is not more generally resorted to. It was practised by the ancients; for we find Alexander swimming the Granicus with thirteen troops of horse. But the horses should be practised in swimming as well as their riders, or it would not avail the sportsman so much, as we know some horses are very much alarmed when they lose their legs in water, and often turn themselves over. That the act of swimming on horses is a most simple and safe one to those who practise it, may be proved at any of our watering places in the summer, where boys swim them out to sea, two at a time, changing their seats from one to another with the greatest ease. We observe they generally lean their body forwards, so that the water gets under it, and partly floats it, interfering as little as possible with the horse's mouth; at all events, never touching the curb rein. When the sportsman or the traveller has occasion, or is accidentally called upon, to swim his horse through deep water, and the banks will admit of it, he should enter it as gradually as possible, as not only will his horse be less alarmed at the loss of his footing, but less liable to turn himself over in it. Thus in fording a brook too wide to leap, and with a soft bottom, a horse should be ridden *very slowly* into it, which will enable him to get his hinder legs well under his body before he makes his spring to ascend the opposite bank; which he cannot do if he enter the brook quickly.

As the young sportsman may be induced to "make his own horses," as the term is for qualifying them for the appellation of hunters, it may not be amiss to offer him a few words of advice. Be careful, the first season, how you ride them at very cramped places, especially where there is timber, for they cannot be expected to be *au fait* at such things; and many of the worst falls that some of our hard-riding sportsmen have experienced, have been from expecting young horses to do what old, or at least experienced ones, only can do. Avoid also taking the lead with hounds, especially if they run hard, with a young horse, for it may cause him to refuse a big fence which he might have followed another horse over, and thus become a refuser ever afterwards. Although horses do not understand languages, they understand the arbitrary signs of their masters or riders; and if a young hunter makes a slovenly mistake with you at a fence, he should be corrected with either spur or whip, and also *by the voice.* The merely calling out to him, or exclaiming, "For shame! what are you about, eh?" accompanied by a slight stroke of the whip, has often a very good effect, and will be visible at the next fence, when he will be more careful where he puts his feet, and take a greater spring. A horse knows his errors; also, when he is corrected, and when cherished, each of which he should be subject to in their turns; but as, according to the old adage, a coward and a madman are equally unfit to be horsemen, the correction of a young hunter should not be severe. Nothing would be more likely to make him what is called a "rushing," and consequently an unsafe fencer for the rest of his life, than beating him *severely*, for any trifling faults he may commit in the field. Martingals on hunters and racers are now generally condemned; but, in our opinion, more generally than they deserve to be, particularly during the first season of a young horse, as a long martingal serves to steady his head, if he is a little impetuous, and saves him many falls, which, putting his rider out of the question, are injurious to him, as all horses become safe fencers, in a great measure, by having confidence in themselves, which falls must necessarily shake. All horses, indeed, whose necks are weak and loose, may be ridden with advantage by the aid of a martingal on the bridoon rein, *the rings coming quite up to their jaws*, when it cannot interfere with their galloping or their leaping.

The perfect command of a horse in the hunting field is in nothing more essential than in passing through half-opened gates, and many have been the bad accidents that have arisen from the want of it, horses being often stuck fast between the gate and the post, to the no small injury to their rider's legs or knees. Indeed the being handy in opening a gate, is no trifling accomplishment in a hunter; and here a few lessons in the school may be of advantage to him. He would there be taught to obey the leg as well as the hand; and, by a slight touch of the spur, would throw his haunches round to the left, on his rider unfastening the latch with his right hand, and thus enable him to throw the gate behind him, and pass through it. This has reference to gates that open *towards* the horseman; such as open *from* him require not the horse's aid. But it often happens when a horse is blown, or beat, that unless he have a very good mouth, he will hang upon a gate, and nearly prevent his rider from opening it at all. One precaution, however, should always be taken with gates; the rider should never trust to catching the topmost bar, or what is called the head of the gate, but should pass his hand inside of it, when he will be certain to come in contact with some part of it.

Falls.—There is a proverb, and a true one, which says, "He that will venture nothing, must not get on horseback." All men, however, who ride a-hunting are subject to falls, but those who ride near the hounds, or "hard," as the term is, seldom escape without having several in the course of a season. It is well, then, that the young sportsman should know that there is an art in falling, as well as in preventing falls. This consists in getting clear of the horse as soon as possible, which a man in the habit of falling has a better chance to do than one who runs less risk of it, having greater self-possession at the moment. Next to a horse coming neck and croup over a high timber fence, a fall in galloping at full speed is most dangerous, and apt to dislocate the neck, by the head coming first to the ground; and from the velocity of the fall, the rider has no time for precautions. However, even in this case he should endeavour to put out one hand, if not both, to break the force of the fall, as well as to act in resistance to his head coming first to the ground, and receiving the whole force of the concussion. By so doing, it is true, the collar-bone stands a great chance of being fractured; but that is an accident merely of temporary inconvenience, and unattended with danger, whereas a dislocated neck is very rarely reduced. But it is a curious fact, that there are fewer instances of broken necks in the field in the present age than there were nearly a century ago, notwithstanding that for one man who rode a-hunting then, there are fifty now; and the pace of hounds, as well as style of riding, much altered as to speed. This has been accounted for in two ways; first, the modern sportsman sits, for the most part, down on his saddle, whereas the sportsman of olden times stood up in his stirrups, and, when his horse fell with him in his gallop, was nearly certain to fall on his head. Secondly, he did not ride the well-bred, clever-actioned horse that the modern sportsman rides, which would account for his falling oftener in his gallop, and particularly as the surface of the country, in his day, was very uneven and uncultivated compared to what it now is. Neither was the hunting cap of much service to him in accidents of this description. On the contrary, from its being so low in the crown, as it was then made, coming in immediate contact with the top of the head, the concussion was greater if he were thrown upon his head, than if it had been cased in a hat which, from the depth of it, would break the fall.

In all falls, the horseman should roll away from his horse as soon as he possibly can, lest in his struggle to rise again he strike him with his legs or head. Coolness in this hour of peril, likewise serves the sportsman in another way. Instead of losing hold of his reins, and abandoning his horse to his own will, as the man who is flurried at this time invariably does, he keeps them in his hand, if not always, perhaps in nine falls out of ten, and thus secures his horse. It was the remark of a gentleman to whom we have before alluded, and who (*singulus in arte*) was, from his desperate system of riding, and despite of his fine horsemanship, known to have more falls than any other man during the time he hunted Leicestershire, that nothing had so low an appearance as that of a man running on foot over a field, calling out "Stop my horse!"

Before quitting this part of our subject, it may be well to observe, that in cases of bad falls, particularly those affecting the head, where the lancet cannot be *immediately* had recourse to, a large wine glassful of equal parts of *strong* vinegar and water, drunk by the sufferer, is found to be very efficacious, from the revulsive powers of the vinegar acting on the general circulation of the system. In countries where there is much timber to be leaped—stiles particularly—calkins to the shoes of the hinder feet of a hunter should never be omitted, as should those feet slip under his body, the fulcrum to spring from is lost, and a fall nearly certain.

We have only a few words more to offer to the young sportsman. Nature is invariably the standard of excellence, and unless she have endowed you with a cool head, a vigorous body, and a stout heart, you will not long distinguish yourself in the hunting field as what is now termed "*a first-flight horseman.*" You may sing with Hector,

> "———*The foremost place* I claim,
> The first in danger, as the first in fame;"

but you will not obtain it unless you possess the above-named requisites. But having them, do not consider the following admonitions unworthy of your notice: "Never ride at impenetrable or impracticable places; you may get over or through them with a fall, but your horse will surely be the worse for the attempt, and will the sooner sink under you in a good run. Never abandon your horse to himself over any ground, but be sure to hold him fast by his head, either up or down hill, and in soft ground. If you doubt the effect of a tight hand at these times, ask the first Newmarket jockey you meet, and he will fully satisfy your doubts. In the daring movements of that "*lawless moment,*" which the first start after hounds, in some countries, may now be termed, from the desperate attempts hard-riding men make to get the lead, do not fail to have your eyes about you, and also keep a good command over your horse. In plain English, *do not ride over any man.* Some of the worst accidents to sportsmen have arisen from this cause. In the first place, one man will often ride so close to another who is going to leap a fence, that if the first horse falls, the second is almost certain to leap either on or over him and his rider, as he can rarely be pulled up, or even turned, in so short a space. But even should the second man see the first man's horse in the act of leaping the fence, he should allow him some time to get away from it, for in the event of his clearing it, it is still possible he may fall, by stumbling over something after landing; stepping into a grip or rut, or into false ground, all of which he is subject to, but more especially towards the end of a chase, when, of course, his strength and action are reduced. It is better, if you can, to take a line of your own than to follow any one at this time, as your horse is now fresh; and, by not having cause to pull him up to let others go before you, you have a better chance to get a good start, which gives you a great advantage. When once alongside the pack, quit them not until they have finished their work, or at least as long as your horse can go without trespassing too hard on his powers. If, however, you get the lead and can keep it for forty minutes *best pace over the grass,* with rasping fences and two wide brooks in your way, the laurels Cæsar won would be weeds, and withered ones too, compared with those which would, for that one day, be yours.

There have been, and are now, some splendid specimens of horsemanship, and the management of horses in other ways, amongst servants, and it appears there always were such. Amongst the celebrated ones of antiquity we find the following, moving in this humble sphere:—Automedon, servant to Achilles; Idæus to Priam; Metiocus to Turnus, king of Rutuli; Myrtilus to Œnomous, a son of Mars; Ceberes to Darius; and Anniceris, servant to Cyraneus. And why should not the servant, by practice, become as fine a horseman as his master? The question appears to be easily answered, namely, that the chances are equal, with equal instruction and experience. But such has not been found to be the case; and although amongst the various huntsmen, whippers-in, and what are known by the appellation of second-horse-men (namely, those grooms who ride horses with hounds to supply the place of those their masters ride when they become fatigued, a most humane as well as economical plan with all who have a stud of hunters), some super-excellent horsemen may be found, the generality of servants are deficient in that first essential to good horsemanship, a fine or sensitive hand. Nor is this a matter of surprise. The nervous influence proceeding from the organs of touch may be said chiefly to constitute what is termed the "hand" of the horseman; and that influence may easily be supposed to be greater in a person whose situation in life has not subjected him to rough and laborious employments which must necessarily tend to deaden it. Until of late years the seat of servants was unfavourable to a good hand on their horse, as they, with very few exceptions, rode with too short stirrups, and, consequently, by being not well placed in their seats, were perpetually interfering with their horses' mouths from their unsteadiness. So fully aware of these objections was the late Mr Childe of Kinlett Hall, Shropshire, that he had only one servant that he suffered to mount the horses he himself rode, and that was William Barrow, afterwards more than twenty years huntsman to the late Mr Corbet in Warwickshire, and who was remarkable for his fine bridle-hand. Mr Osbaldeston also seldom intrusted his best horses to any one but Jack Stevens. Notwithstanding this, it may fairly be maintained, that, from the fact of the comparatively small number of good horsemen who have obtained instruction from the schools, there is more of nature than of art in the acquisition of skill and talent on the saddle.

Saddles and bridles form no unimportant feature in the equestrian art, as well as in the establishment of a sportsman. Nothing sets off the appearance of a horse and his rider more than a good saddle and bridle; nor does anything contribute more to the comfort and safety of the latter than a well-made, roomy saddle, with spring bars for the stirrup-leathers—stirrups rather heavy than otherwise, and sufficiently large for the feet. Some persons, not contented with the spring bars, require spring stirrups as well; but, in our opinion, no man can hang in a common stirrup, provided he do not wear thick boots nor use small stirrup-irons. Of the various sorts of bridles, the snaffle is most in use on the turf, and the curb for military horses, hunters, roadsters, and coach horses. Not one hunter in twenty has a mouth good enough for a snaffle only, although there are a few horses in every hunt that will not face the curb. Some, however, go very well on the snaffle up to a certain period of a run, when all at once they require the assistance of the curb. Such horses should be ridden with a double bridle, so that the rider may have recourse to the curb-bit when wanting.

There is often great nicety required in fitting a horse with a bridle, if irritable in his temper, or a very hard puller. If the former, he must have a bit of just sufficient severity to control him, and not anything more. The one called the "Pelham" is well adapted to horses of this description, as it partakes of the double properties of snaffle and curb. With very hard pulling horses, the curb to a severe bit must be used; but the evil of this is, that, after a certain time, the mouth thus acted upon becomes "dead," as the term is, and the horse is unpleasant to ride and difficult to turn. To remedy this, three players should be attached to the port of the bit, which, by hanging loosely over the tongue, keep the mouth alive. A bridle of this description, very long in the cheek, is known in the hunting world as the "Clipper bit," being the one in which that celebrated horseman Mr Lindow rode a horse called the Clipper several years over Leicestershire, in which far-famed county he was supposed to be the best hunter going. If a horse rushes at his fences, a moderately tight nose-band is useful, as also to prevent his opening his mouth, and snatching at his rider's hand. The less a horse opens his mouth in his work the better, as it tends to make it dry; whereas, it cannot be too moist for his own good. Bits very high in the port are of course the most severe, owing to the increased purchase; but with every description of bits care should be taken that they are sufficiently wide for the mouth, so as not to press against the horse's cheeks, and that the headstall is sufficiently long to let the bit drop well into the mouth.

As we read in the 22d chapter of Genesis, 3d verse, that "Abraham rose up early in the morning, and *saddled* his ass." saddles of some sort must have been used in very early days; but few things appear more extraordinary to those persons who look into ancient history than the fact of saddles *with stirrups* being a comparatively modern invention. Although a French translator[1] of Xenophon by an oversight makes a governor of Armenia hold the stirrup of the Persian king when he mounted his horse ("Il lui tenoit *l'etrier* lorsq'il montoit à cheval"), it is well known that the ancients had no stirrups, but that men of rank among them were accompanied by a person whose office it was to lift them into the saddle, whom the Greeks called ἀναβολευς, and the Romans *strator*. There is no mention of stirrups in any Greek or Latin authors, no figure to be seen in any statue or monument, nor any word expressive of them to be met with in classical antiquity. In the celebrated equestrian statues of Trajan and Antoninus the legs of the rider hang down without any support; whereas, had stirrups been used at that time, the artist would not have omitted them. Neither are they spoken of by Xenophon in his two books upon horsemanship, in which he gives directions for mounting; nor by Julius Pollux, in his *Lexicon*, where all the other articles belonging to horse-furniture are spoken of. The Roman youth, indeed, were taught to vault into their saddles (*Æneid*, xii., 287),—

> ———"Corpora saltu
> Subjiciunt in equos;"

and in their public ways stones were erected, as in Greece also, for such as were incapable of doing so. As another substitute for stirrups, horses in some countries were taught to bend the knee, after the manner of beasts of burden of the East;[2] and in others portable stools were used to assist persons in mounting. This gave birth to the barbarous practice of making captured princes and generals stoop down, that the conqueror might mount his horse from their backs; and in this ignominious manner was the Roman Emperor Valerian treated by the Persian king, Sapor, who outraged humanity by his cruelty. The earliest indisputable mention of stirrups is by Eustathius (the commentator of Homer), about 600 years back, who uses the word *stabia*.

Although the history of the saddle has not exercised the learned world so much as the antiquity of the stirrup, a good deal has been written and said about it. Like all other inventions, it appears to have been suggested by the necessity of making the rider sit easily upon his horse, and some kind of covering, consisting of cloth or leather (skins or hides, perhaps), was placed on the animal's back. These coverings, however, became afterwards extremely costly;[3] they were made to hang down on each side of the horse, and were distinguished among the Greeks and Romans by various names. After they became common, however, it was esteemed more manly to ride without them; and thus we find Varro boasting of having ridden bare-backed when young. Xenophon also reproaches the Persians with having placed as much clothes under their seats on their horses' backs as they had on their beds. It is certain that no coverings to the horses' backs were for a long time used in war; and, according to Cæsar, the old German soldiers despised the cavalry of his country for having recourse to such luxuries. In the time of Alexander Severus the Roman soldiers rode upon very costly coverings, excepting at reviews, when they were dispensed with to show the condition of their horses. But we should imagine we must look to later times for the costly trappings of the horse. In his description of the city of Constantinople, the author of the *Letters of the Turkish Spy* says,—"The next thing worthy of observation is the Serayan, or house of equipages, where are all sorts of trappings for horses, especially saddles of immense cost and admirable workmanship. There cannot be a more agreeable sight, to such as take pleasure in horses and riding, than to see 4000 men here daily at work in their shops, each striving to excel the rest in the curiosity of his artifice. You shall see one busy in spangling a saddle with great oriental pearls and unions intermixed, for some Arabian horse, belonging, perhaps, to the Vizier Azem; another fitting a curb or bit of the purest gold to a bridle of the most precious Russian leather. Some adorn their trappings with choice Phrygian work; others with diamonds, rubies, and the most costly jewels of the East."

But to return to the history of the saddle, its invention, and general use, the latter a point very difficult to be ascertained. The word *ephippium*, by which the ancient Romans expressed it, being merely derived from the Greek words ἐπὶ, *upon*, ἵππος, *a horse*, leads us to conclude that, by degrees, the covering spoken of was converted into a saddle. The Greek word ἕδρα, used by ancient authors, is believed to have been used to express a saddle, and is more than once used by Xenophon, in his *De Re Equestri;* and Vegetius, who wrote on the veterinary art nearly 400 years B.C., speaks of the saddle-tree. Perhaps the clearest proof of the use of anything approaching to the form of the modern saddle, is the order of Theodosius (see his Code), in the year 385, by which such persons as rode post-horses in their journeys were forbidden to use those which weighed more than sixty pounds; if heavier, they were ordered to be cut to pieces. What would the people of those times have thought if they could have seen one of our Newmarket racing saddles, weighing two and a half pounds, but giving the rider a very comfortable seat. The order here alluded to, doubtless applied to something resembling a saddle, although of rude workmanship, as its weight bespeaks. Every traveller, we may conclude, was provided with his own saddle; and about this time the Latin word *sella* more frequently occurs. In the fifth century, again, we find articles bearing something of this stamp, and made so extravagantly magnificent as to call forth a prohibition by the Emperor Leo I. against any one ornamenting them with pearls or precious stones. The saddle-tree is also mentioned by Sidonius Apollinaris, a Christian writer, who was born A.D. 430; and in the sixth century, the saddles of the cavalry, according to Mauritius, who wrote on the military art, had large coverings of fur; and about this period, the Greek word σελλα (*sella*) is used. It is considered probable, however, that the merit of the invention of saddles may be due to Persia, not merely from the circumstance of Xenophon's mentioning the people of that country as being the first to render the seat on the horse more convenient and easy, by placing more covering on their backs than was common in other parts, but also because the horses of Persia were made choice of for saddle-horses in preference to any others. That the word saddle is derived from the Latin word *sedeo*, to sit, may fairly be presumed. That the proper saddle itself, however, was unknown in England until the reign of Henry VII., we have good reason to believe; and in Ireland, from the absence of any representation of it on their coins, it may be conjectured, not till many years subsequent to that period. The woman's saddle, called by us the side-saddle, first appeared in Richard II.'s time, when his queen rode upon one; but from the pictures of men and women's saddles used in England's early days, we find they were miserable apologies for our modern saddles. Indeed at the present time, Great Britain is the only country in which proper saddles are made. Hunting saddles should have their pannels well beaten and brushed to prevent sore backs; and no sportsman, even if light, should use a short saddle, under sixteen inches from pommel to cantle.

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[1] D'Ablancourt.

[2] See Silius Ital., lib. x., 465.—

> "Inde inclinatus collum, submissus et armos
> De more, inflexis præbebat scandere terga
> Cruribus."

[3] See Virgil, *Æneid* vii., 276; viii., 552; Ovid. *Metam.* lib. viii., 33; also *Livy*, lib. xxxi., cap. 7, who speaks of a man who dressed his horse more elegantly than his wife.

The antiquity of the spur does not appear to have much excited curiosity: but the use of this instrument was known in the very earliest age of which we have any satisfactory history. At least we may presume that it was so, from the Hebrew word signifying horseman (*Pavash*), appearing to be derived from a Hebrew root signifying to *prick* or *spur*. So at least says Buxtorff; and he adds, that the horseman, or spurrer, was so called on this account: *Eques quod equum calcaribus pungat;* and he quotes Aben Ezra in confirmation of his opinion:—*A calcaribus quæ sunt in pedibus ejus.* Spurs occur but seldom on seals, or other antiques, in the eleventh century, but in the thirteenth they are more frequent. As it is necessary that a horse should obey the leg as well as the head, all military and parade horses are ridden in spurs; and, as we have already said, they are very useful to the sportsman in riding across a country, particularly in the act of opening gates; also all race-horses that will bear them are ridden with them, because, should punishment be wanting in a race, it is more easily inflicted by the heel than by the hand; add to which, these horses not only require the jockey's two hands at the same time, but are apt to swerve, or shut up, if struck severely by the whip.

Race-Riding, or Jockeyship.—Race-riding and riding over a country cannot be called sister arts. Indeed the former bears little relation to any other system of horsemanship, because, from the rapidity with which the race-horse gets over the ground, there is neither time nor necessity for a display of the various aids which it is in the horseman's power to afford to his horse in most other cases. Nevertheless, the very refinement of the art, the nice and delicate hand, together with a firm and strong seat, is absolutely essential to a good jockey. Neither is this all. He must possess a stout heart and a clear head.

Something like jockeyship was practised in very early times, the Greeks having introduced it at their celebrated games. In the 33d Olympiad they had their race of full-aged horses. In the 71st Olympiad they instituted that for mares called the Calpe, bearing a resemblance to our Oaks Stakes at Epsom; and an interesting anecdote is handed down to us, relating to this race. A mare, called Aura, the property of one Phidolas, a Corinthian, threw her jockey, but continued her course as if he had kept his seat, increasing her pace at the sound of the trumpet, and, finally, as the story goes, presenting herself before the judges, as if conscious of having won. The Eleans, however, declared her to be the winner, and allowed Phidolas to dedicate a statue to her. In the 131st Olympiad, the race of the πωλος κέλης, or under-aged horses, was established; but with respect to all these races, we are left in obscurity as to the weight the horses carried, as also the distance they ran; and whether or not such matters were regulated by their age, and not at all by their size. It is the general opinion that they were left to the discretion of the judges (the Hellanodicæ, as they were called), who regulated all matters at Olympia, as the members of our Jockey Club do at Newmarket; but, as may be expected from the character of the times, exercising a power over their brother sportsmen, which would not be relished at the present day, although, in some respects, well worthy of imitation. For example, they not only excluded from the games and imposed fines upon such as were convicted of fraudulent or corrupt practices, but inflicted bodily correction upon them besides. But some very interesting facts are the result of the rigid scrutiny of this Elean Jockey Club. Alexander the Great was ambitious of obtaining the Olympic crown, but was objected to as being a Macedonian, the prize he wished to contend for being confined to Grecians. Alexander cleared himself by showing, that although he was a prince of Macedon, he was descended from a family that came originally from Argos; and the Hellanodics allowed him to start, but he did not win. Themistocles objected to Hiero, King of Syracuse, as a tyrant, and proposed that the magnificent pavilion which contained his race-horses should be pulled down. The objection, however, was overruled, and he became a winner; but we do not wonder that in a Grecian assembly the name of tyrant should have been abhorred.

The seat of the jockey is one of peculiar elegance, heightened by the almost universal symmetry of his form or figure, for very few ill-proportioned men are seen in the racing saddle. The good appearance of the jockey is also increased by the neat fit of his clothes; his costume appropriate to his calling; the extreme cleanliness of his person, produced by his necessary attention to it during his preparatory course of exercise; and, though last, not least, his almost affinity with the noble animal we see him mounted upon. But for this he is indebted to Nature—to the relation that the bodies of animals hold to natures altogether external to their own; and it is most happily exemplified in that of a man to his horse, which appear to have been especially formed for each other. But, as a celebrated moral philosopher has observed, "There is throughout the universe a wonderful *proportioning* of one thing to another. The size of animals, of the human animal especially, when considered with respect to other animals, or to the plants which grow around him, is such, as a regard to his conveniency would have pointed out. A giant or a pigmy could not have milked goats, reaped corn, or mowed grass; *could not have rode a horse*, trained a vine, or shorn a sheep, with the same bodily ease as we do, if at all."

Previously to describing the proper seat of the jockey, we will now endeavour to exhibit him in the most likely form to acquire that seat. In height he should be about 5 feet 5 inches. We are aware there are several excellent jockeys under this standard; but they do not look so well on their horses, neither can they be so firm in their seat from want of a better clip, which the firm grasp of a longer thigh gives them. He should be rather long in the fork for his height, and powerful, long arms, and a very quick eye. He should be of a naturally spare habit, to save the expense to his constitution by wasting; but he should have as much muscle in his arms and thighs, as his diminutive form will admit of; in short, to ride some horses at such very light weights, he should be a "pocket Hercules." But there must be nothing like rigidity in his frame. On the contrary, there should be a great degree of pliability about his arms, shoulders, and back-bone, to enable him to be in perfect unison with his horse. He should have very free use of his hands, so as to change his reins from one to the other in a race, and to whip with the left, as well as with the right, when occasion requires it; he should possess much command of temper; and, lastly, he should have the abstinence of a Brahmin, and be able by medicine and hard walking in the sweaters to get off the two stone he gains during the winter, without fever, in about three weeks or a month.

The seat of the jockey may be described in a few words. He should sit well down in his saddle when he walks his horse to the post, with his stirrups of moderate length, so as to enable him to clear his pommel, and have a good resisting power over his horse. No man can make the most of a race-horse with long stirrup leathers, because, when he is going at the top of his speed, he sinks down in his fore quarters, in his stride, to the extent of several inches. It was calculated that Eclipse, naturally a low fore-quartered horse, sank nearly 8 inches. The circumstance, then, of the use of the stirrup, in ancient racing, being unknown, fully accounts for racing on horseback as we now race, being, comparatively with chariot-racing, but little resorted to; and the excellency of a jockey in the Olympic Hippodrome, consisting more in a sort of harlequin feat of jumping from one horse, and vaulting upon another, in a race, than in riding and finishing it, as it is now finished, in a severe trial of speed, bottom, and jockeyship. Indeed, some racers go with their heads so low as to bear up their rider from the saddle whether he will or not, and they would pull him over their heads, if he had not the power of resistance from his stirrups. Much was written by Samuel Chiffney, in a pedantic pamphlet called *Genius Genuine*, on riding the race-horse *with a slack rein*, which system has never been adopted by any jockey but his son on a few occasions. Exclusive of the necessity of restraining a free horse, who would run himself to a stand-still if suffered to do so, or of making "a waiting race," all race-horses feel relieved by a strong pull at their heads, and many will "shut up" at once if their heads are loosed. In our opinion, the hand of a jockey should always be firm, though at times delicate to an extreme; and he should never unsettle his horse by any sudden transition from a slack to a tight, or from a tight to a slack rein. In fact, everything in horsemanship is best done by degrees, but at the same time with a firmness and resolution which a horse well understands; and the hand which, by giving and taking, gains its point with the least force, is the best and most serviceable, as well as most agreeable to a horse. Chiffney always insisted that a horse should be "invited to ease himself an inch at a time," and he certainly proved the truth of his curious slack-rein theory by winning on Knowsely (whom no other jockey could hold in the severest curb) in a plain snaffle at Guildford; and on Eagle at Newmarket.

We will now bring our jockey to the starting post, where the first thing he does is to strip. Having inspected the saddling of his horse, and found everything about him secure, he cocks up his left leg, and is chucked into his saddle by the trainer, who generally wishes him "*luck*" as he performs this office for him. After he has seated himself firmly down in it, and tried the length of his stirrup-leathers, he takes a preliminary canter of about a quarter of a mile; and then walks his horse quietly to the starting post. But his method of starting his horse depends entirely on circumstances. If for a half-mile-race—in which a good start is a great advantage—he catches fast hold of his horse's head, and, if he will not start quickly without, sticks both spurs into his sides as soon as the signal is given, taking his chance of getting his head down into its place when and how he can. If for a two-mile race, or over that distance, he need not be in such a hurry at starting, provided he do not lose too much ground; but all this must in great measure be regulated by his orders, whether to make running or to lie by, and wait. We will, however, put him in all these different situations.

The Half-mile Race, generally straight. Orders, "*To make running*." Having turned his horse round *beyond*, or we should rather say *behind*, the post, he brings him as quietly as he can back to it. On the word being given, he gets him on his legs as soon as he possibly can, dropping his hand to him to enable him to feel his mouth, and endeavours to "steady him." He lets him go perhaps half the distance he has to run with only his head hard held, before he gives him his *first* pull; but this event (the half-mile race) being soon over, there is no time for much speculation, and the pull must be but a short one. He then runs up to his horses again; lives with them to the end and wins, if he can, without a second pull; but if he finds other horses too near to be pleasant, or, in other words, appearing to be as good as his own, he takes a second pull within the last 100 or 200 yards, when he "comes" again and wins. The same directions hold good in a mile race, with the exception that the jockey need not be quite so much on the *qui vive* at starting, and his pulls may be longer, and the last nearer home.

The Half-mile Race. Orders, "*To wait*." In this case the jockey gets well away with his horses, but never more than a length or two behind any of them, as more than that distance is difficult to make up in so short a race. Within 150, or perhaps only 30 yards, from home, he makes his effort, or it may be that he never gets up till the last stride, and wins, as the saying is, a head on the post.

The Mile Race. Orders, "*To wait*." The jockey may start last of all if he like, but he must not lose much ground. However good judge a jockey may be of *pace*, it is a fault to lie far out of his ground. Let him then also lie well with his horses all the way, creeping up to them inch by inch, and not quit them to win till he feels certain he has the race in his hand; that is, till he sees that the other horses have run themselves out. His orders to wait have been given him from the supposition or knowledge that speed, not stoutness, was the best of his horse, and, consequently, that if he had made the running or "play," he would not have run home.

The Two-mile Race. Orders, "*To make running*." Nothing, next to the struggle of the last 150 yards between two horses very nearly equal, called on the turf "the set-to," is so difficult in racing horsemanship, as making running or "play" by a jockey, solely for the benefit of the horse he himself is riding. In other words, it is a great accomplishment in a jockey to be a superior judge of *pace*, that is, of not merely the pace he himself is going, but how that pace affects the other horses in the race. And this task is difficult with idle or lurching horses, which, when leading, require urging by the hand or leg every yard they go. In this case the jockey works hard to keep his horse going. He has to use his hands, arms, legs, and feet, and occasionally to turn his head round, with all his limbs in action, and yet not disturb his horse's action. The upshot is, if his horse answers the opinion entertained of him, by cutting up his competitors by severe "play," he wins his race, and has the character of being a stout, honest horse. One of the greatest triumphs of a jockey is to get in front and ride what is styled a waiting race in front, when he dreads the effect of a severe pace from end to end on his horse.

The Two-mile Race. Orders, "*To wait*." In this case the jockey goes off at a steady pace, with a good hold of his horse's head, as near to the other horses as he likes, but not attempting to go in front. Thus he continues in his place to within a certain distance from home, probably specified in his orders, when he brings out his horse, challenges the leaders one after another, and wins, if his horse be good enough. This style of race requires immense judgment, as, if a jockey lays too much out of his ground at starting, he would never be able to catch his opponents in time to get a pull at his own horse.

The duty of a jockey is to win his race if possible, and not to do more than win it; and a very clever one, if he is opposed to another of less science in a finish, will "gammon" he is beat; and then if his opponent eases his horse or becomes at all careless, he catches him with a tremendous rush on the post. The "Chiffney rush" has passed into a proverb; and Job Marson's victorious one on "Nutwith," for the St Leger of 1843 has also been greatly famed. Perhaps one of the finest specimens of jockey science was displayed by those celebrated Newmarket riders, Robinson and Chiffney, on "Camarine" and "Rowton" in the Ascot cup of 1832. Buckle was also very great in the saddle, especially when he had an idle horse to "set-to" on; but, although these *artistes* have quitted the scene, and Frank Butler was taken from it in his very zenith, we have still some first-rate talent left. Amongst the elder ones may be specially reckoned Flatman (better known as "Nat") Rogers, J. Marson, Templeman, Marlow, Bartholomew, and Alfred Day; whilst Wells, Aldcroft, Charlton, Ashmall, J. Mann, J. Osborne, G. Oates, Quinton, and Fordham, are at the very head of the younger generation, who have splendid chances of early distinction in these handicap days.

All good jockeys avoid the use of the whip as much as possible. When a race-horse is in the fullest exercise of his powers and doing his best, it is unnecessary, for it cannot make him do more, and it often has the effect of making him shut up at once. One of the gamest horses that has run during the last twenty years flinched at the finish of a severe race at Doncaster in consequence of a chance blow from his jockey's whip on the tail. The spur, properly used, is a much better instrument for increasing the speed of a horse, although there are times when the application of the whip, or the mere act of flourishing it in the hand, is eminently serviceable to the jockey; we mean when his horse hangs to one side of the course or the other, or towards other horses in the race, or exhibits symptoms of running out of the course, or bolting. A jockey ought to be able to use his whip with vigour when necessary, and (though this do not often happen) with his left hand as well as with his right, in case of his losing what is called the whip-hand, when he cannot use his right. The nature and form of the race-course also will call for accurate knowledge of the peculiar action of his horse.

Our remarks on the art of race-riding may be concluded by stating the manner in which horses of various tempers, dispositions, and capabilities, are to be ridden, with the best chance of being made the most of. Nine racers in ten are free-going ones, if not hard pullers. On one of this description the great art of the jockey is to economize his powers according to the length he has to go, as also the weight he is carrying, so as not to let him over-pace himself, and have little or nothing left in him at the finish. If other horses make running, this can only be done by his sitting perfectly still in his seat, dropping his hands, and having fast hold of his horse's head. The less he interferes with his mouth the better; and if he likes to be well up with the other horses, he is better there, supposing him not to be a regular jade, than pulled at, to be kept back. Temper is a great thing in this case—we mean in the jockey; for a hasty horse and a hasty rider are sure to disgrace themselves. Every unnecessary movement in the one is instantly responded to by the other, who becomes flurried, and pulls more determinedly than he did before.

The lazy, sluggish, or "craving" horse, as trainers call him, requires riding from end to end of his race. By this we mean, that although the body of his jockey should not move, he is often obliged to raise his hands off his horse's withers, to shake him now and then; as well as to use his feet to urge him to a better pace, or even to keep him at the one he is going. Indeed, he will sometimes require a blow with the whip, or at least to be very much roused, to make him extend his stride towards the finish of his race. This is the sort of horse that used to distinguish himself in four-mile races at Newmarket, and was, of course, not thought the worse of by his owner for taking so much riding to make him do his best.

But the most ticklish and difficult horse, next to the determined restive one, or bolter, is what is known by the appellation of the "Flighty Horse," one which is as difficult to train as he is to ride, being delicate in constitution, of extremely irritable temper, and very easily alarmed. The jockey that has to ride a horse of this description, should have a temper the very reverse of his, and a hand as delicate as a woman's. He must also indulge him in every way save one, which is, in not allowing him to overpace himself. But here, also, he must be careful; for this horse will neither bear to be pulled nor hustled, but must be let to go nearly in his own way, with the exception of being kept well together by a steady hold of his head. If challenged in the race, he must accept the challenge, and come out of the conflict as well as he can.

Jockeys, of whom there are about 180 in the United Kingdom, riding all weights from 8 st. 7 lb. to 4 st. 7 lb., delight in finding themselves on a fine-tempered racer; such as Zinganee was in the year 1829, and of which year he was considered the best horse. In a plain snaffle bridle, without even a martingal, as he was ridden, and with an obedient mouth, it is a pleasing instead of an irksome task. A horse of this description is easily held, is kind at his turns, in fact, will nearly make them of his own accord; will either wait or make play, as his rider's orders may be; and when called upon to challenge, is ready to do his best. More than this, he is always going within himself, because he is obedient to his jockey's hand; and his temper is at least equal to 4 lb. weight in his favour.

We now conclude our remarks on jockeyship with a short description of the last 400 yards of a race; the leading horses lying close together, and all well up. The set-to is about to begin. But before the jockey does this, he alters his position in his saddle. He has been previously standing up in his stirrups, with his body leaning forward over the horse's withers, and his hands down, somewhat below them. He now seats himself firmly down in his saddle, and, raising his hands off his withers, first gives his horse an easy pull, and then the set-to begins. He now moves his hands, as if describing a circle, by way of rousing his horse; and although he does not quite slacken his reins, he allows him to reach with his head, as a distressed horse will always do, and which is technically termed "throwing him in." Then comes the last resource. If he finds, when within a few yards of home, that he cannot win by these means, and that his horse appears to sink in the rally, he pricks him a few times with his spurs; gets his whip up in his right hand, giving a good pull with his left, and uses it as occasion may require.

Steeple-Chase Racing.—A new system of racing jockeyship has come into fashion in Great Britain and Ireland within the last forty years, which, however daring, we know not how to commend. We think it an unreasonable demand on the horse, to require him to go at a racing pace over rough and soft ground, with the addition of having too often a country selected for him to run across, which, if it is not deemed difficult, is dotted with artificial fences and brooks. Several human lives have already been sacrificed, and, we are sorry to say, several horses have died from broken backs in steeple-chases. The four miles and a quarter of the Liverpool course is often covered in little more than ten minutes, by horses, who have no claim to rank with Grimaldi, Vyvian, Lottery, and Discount, the whilom heroes of this amusement; which is at a low ebb now to what it was when Captain Ross and "The Squire" met on Clinker and Clasher for their great matches in Leicestershire.

Qualifications for a Steeple-Chase Rider.—These are exactly what are wanting in a very fast run over a stiffly inclosed country with fox-hounds; namely, a fine bridle-hand, a steady seat, a cool head, undaunted courage, and above all things, great quickness, and very prompt decision. But the steeple-chase jockey has one evil to guard against, which the racing jockey is, comparatively, but little subject to, and this is a fall. The best preventive of it is keeping a horse well together, and making him go in a collected form at his fences, as well as over rough ground. But, at the same time, he must not overpace his horse, or he will not be able to rise at his fences when he gets to them. And here lies the great difficulty after all, as far as the horse is concerned. He must go, at least he is called upon to go, at a much quicker rate than he can reasonably be expected to maintain, for any considerable length of time, without becoming distressed, because his competitors in the race are also doing so, and he will be left behind, to a certainty, if his rider do not endeavour to make him keep with them. That horse, then, has the best chance to win which, barring a fall, is the stoutest runner and surest fencer, and whose rider is good enough, and strong enough, to give him all the assistance he requires, at least as much as a rider can give him, to enable him to struggle through his difficulties to the end. But there is one quality in a horse, especially calculated for steeple-chase racing, and that is *quickness.* After fencing some are on their legs again, and get away instantly, as soon as they alight on the ground, be the fence ever so large, whilst others dwell for some time after landing, previously to their recovering their equilibrium, and so lose time. It is evident, then, that a quick horse, with a quick man on his back, is best adapted to a steeple-chase; and would beat another, supposing leaping and other qualifications, this excepted, to be equal, which could give him half a stone weight over the Beacon Course, and beat him.

It is no great compliment to this species of horsemanship to show its origin, which is thus given in a work called *The Gentleman's Recreation*, written nearly 200 years back: "But before I enter upon the subject proposed" (training of horses), says the author, "I think it convenient to tell you the way our ancestors had of making their matches, and our modern way of deciding wagers; first, then, the old way of trial was, by running so many train scents after hounds, this being found not so uncertain and more durable than hare-hunting, and the advantage consisted in having the trains laid on earth most suitable to the nature of the horses. Now others choose to hunt the hare till such an hour prefixed, and then to run the *wild-goose chase*, which, because it is not known to all huntsmen, I shall explain the use and manner of it. The wild-goose chase received its name from the manner of the flight which is made by wild-geese, which is generally one after another, so that two horses, after the running of twelve score yards, had liberty, which horse (qr. rider?) soever could get the leading, to ride what ground he pleased, the hindmost horse being bound to follow him within a certain distance, agreed on by articles, or else to be whipt up by the tryers or judges which rode by, and whichever horse could distance the other, won the match. But this chase was found by experience so inhumane, and so destructive to horses, especially when two *good* horses were matched; for neither being able to distance the other, till ready both to sink under their riders through weakness, oftentimes the match was fair to be drawn, and left undecided, *though both horses were quite spoiled.* This brought them to run train scents, which was afterwards changed to three heats, and a straight course." Our readers will acknowledge the resemblance between the modern steeple and the ancient wild-goose chase; and we trust that ere long, the example of our ancestors will be followed, and the man who is capable of exhibiting his horsemanship in a modern steeple-chase, will reserve his prowess for a better if not a nobler cause.

(C. A.) (W. H. L—Y.)

HORSE-POWER, a unit of force introduced by Watt to enable him to determine what size of engine to send to his customers to supersede the number of horses which the new power was to replace. Watt ascertained at one of the London breweries that the average force exerted by the strongest horse was sufficient to raise 33,000 lbs. one foot high in a minute; thus, an engine of 200 horse-power would be a force equal to that of 200 horses, each lifting 33,000 lbs. one foot high per minute.

Watt had two methods of estimating and comparing his engines—viz., by the *power* and by the *duty*. By the power is meant the quantity of work which an engine can effect in a given time; by the duty is meant the quantity of work which it can effect by a given expenditure of fuel. Now, it is evident that without any change in the size of an engine, but simply by increasing the pressure of the steam, the power of an engine may be greatly increased—that is, the load remaining constant, the speed of the piston may be increased, the number of strokes may be increased, and, consequently, the work done per minute will be increased also. Hence it is difficult to apply a limit to the power obtainable from the smallest cylinder, provided the boiler be large enough to evaporate the increased quantity of water, and strong enough to resist the increased bursting pressure. In fact, no size of cylinder can be reckoned as having a particular power, since the power depends not on size but on strength. Nevertheless, in modern engineering the term *horse-power* refers rather to the size of the cylinder than to the power exerted, and the value of the unit has undergone many changes; so that in a modern engine, a horse-power may imply 52,000 lbs., or 60,000 lbs., or 66,000 lbs., raised one foot high per minute. The plan now adopted for ascertaining the performances of different engines is by an instrument called an *indicator*. This consists of a small cylinder fitted with a piston, which is pressed down by a spring. By the height to which this piston rises against the spring the steam pressure within the cylinder of the engine is indicated; and the number of lbs. pressure on the square inch multiplied into the number of square inches in the area of the cylinder, and by the number of feet travelled through by the piston per minute, gives the impelling power: deduct in large engines about $\frac{1}{10}$th for friction, and the remainder is the efficient moving power, which, divided by 33,000, gives the actual horse-power. See STEAM. (C. T.)

HORSHAM, a parliamentary borough and market-town of Sussex, on a branch of the Arun, 37 miles S.S.W. of London. It is a borough by prescription, and returned two members to parliament previous to the Reform Act, by which it was deprived of one of its representatives. The borough is governed by a steward and two bailiffs. Horsham consists of two streets, crossing each other at right angles, one of them being adorned with rows of trees. The town-hall is a handsome Gothic building. St Mary's church is a spacious and elegant edifice in the early English style, with a tower surmounted by a lofty spire. The grammar school, founded in 1532, is now in a very flourishing state; the present rental of its endowment is upwards of L.400 per annum. There are no manufactures of importance; but a considerable trade is carried on with the surrounding country. Market-days, Monday and Saturday. Pop. (1851) 5947.

HORSLEY, Samuel, a very learned prelate of the Church of England, the son of the Rev. John Horsley, for many years clerk in orders at St Martin's in the Fields, and afterwards rector of Thorley in Hertfordshire, was born at his father's residence in St Martin's Churchyard in October 1733. He received his early education from his father, and was entered at Trinity-hall, Cambridge, where he applied himself to the study of mathematics, and the writings of the ancient and modern divines and logicians. Why he took no degree in arts cannot now be ascertained. We find, however, that in 1758 he took that of bachelor of laws, and became his father's curate at Newington, which living he succeeded to the following year, and held until his elevation to the episcopal bench in 1793, as Bishop of Rochester.

In April 1767 he was elected a fellow of the Royal Society, of which he continued for many years an active member; and about the same time he published a pamphlet on the *Power of God*, "deduced from the computable instantaneous productions of it in the solar system." This he allows to be a "very singular and whimsical speculation." In 1768 he went to Christ-Church, Oxford, as private tutor to Heneage Earl of Aylesbury, then Lord Guernsey. In 1770, his first mathematical publication, *Apollonii Pergæi Inclinationum libri duo*, was elegantly printed at the Clarendon press. This work, though severely criticized at the time, and in reality not distinguished by any peculiar felicity of restoration, does not appear to have injured his rising reputation; for in November 1773 he was appointed secretary to the Royal Society, and in 1774 he had the degree of doctor of civil law conferred on him at Oxford, and was presented by the Earl of Aylesbury to the rectory of Aldbury, in Surrey, along with which he obtained a dispensation to hold that of Newington. The same year he published *Remarks on the Observations made in the Voyage towards the North Pole, for determining the acceleration of the Pendulum in Lat.* 79. 51.

Dr Horsley having long meditated a complete edition of the works of Sir Isaac Newton, issued in 1776 proposals for printing it by subscription, in five volumes 4to; but the commencement of the undertaking was delayed by severe domestic affliction, nor was it completed until 1785. In the meanwhile his diligence and proficiency in science attracted the notice of Dr Lowth, who, on his promotion to the see of London in 1777, appointed Dr Horsley his domestic chaplain, collated him to a prebend in St Paul's Cathedral, and procured for him the situation, which had been held by his father. of clerk in orders at St Martin's in the Fields. In 1778, during the controversy between Dr Priestley, Dr Price, and others, on the subject of materialism and philosophical necessity, Dr Horsley published a sermon on *Providence and Free Agency*, in which he attempted to draw a distinction between the philosophical necessity of the moderns and the predestination of their ancestors. This discourse was evidently directed against the writings of Dr Priestley, but the latter did not take any immediate notice of the attack. In 1779 Dr Horsley resigned Aldbury, and in 1780 was presented to the living of Thorley, which he held by dispensation along with that of Newington. In 1783 he became deeply involved in a dispute with some members of the Royal Society, which ended in his withdrawing himself from that learned body.

Dr Horsley was now about to engage in that celebrated controversy with Dr Priestley, which was conducted on both sides in the fiercest spirit of polemical contention, but on that of Horsley with superior learning and ability. In 1782 Dr Priestley published a work in two volumes 8vo, entitled *A History of the Corruptions of Christianity;* at the head of which he placed both the Catholic doctrine of Christ's divinity, and the Arian doctrine of his pre-existence, in a nature far superior to the human, at the same time representing the Socinian doctrine of his mere humanity as the unanimous faith of the first Christians. Dr Horsley, conceiving that the best antidote to the poison contained in this work would be to destroy the credit of the writer and the authority of his name, made its imperfections, moral as well as literary, the subject of review in a charge delivered to the clergy of the archdeaconry of St Albans, at a deputation held on the 22d of May 1783. The specimens produced as evidence of the imperfections of the work and the incompetency of the author, may be reduced to six classes. First, instances of reasoning in a circle; second, instances of quotations misapplied through ignorance of the subject; third, instances of testimonies perverted through artful and forced constructions; fourth, instances of passages in the Greek fathers, misinterpreted through ignorance of the Greek language; fifth, instances of passages misinterpreted through ignorance of the Platonic philosophy; and, sixth, instances of ignorance of the phraseology of the earliest ecclesiastical writers. Dr Horsley concludes his charge by observing, "I feel no satisfaction in detecting the weakness of this learned writer's argument, but what arises from the consciousness that it is the discharge of some part of the duty which I owe to the Church of God." This vigorous and systematic attack staggered the admirers of Dr Priestley; but he himself felt none of the apprehension with which they were seized. His reply was entitled, *Letters to Dr Horsley, in answer to his Animadversions on the History of the Corruptions of Christianity, with additional evidence that the primitive Christian Church was Unitarian*, 1783, in 8vo. To this production, in which there are more errors of haste and infirmities of argument than could have been expected from one who had so much at stake, Dr Horsley replied in the same epistolary form, by *Letters from the Archdeacon of St Alban's, in reply to Dr Priestley.* Dr Priestley, in his *Letters*, had attempted to draw his adversary into a controversy respecting the divinity of Jesus Christ; but the latter, knowing that question to have been long since exhausted, defended his own argument, and confined himself to the collection of proofs from Dr Priestley's publications of his inability to throw any light upon the subject.

Dr Priestley, finding that his *Letters* had failed to produce the expected impression, now lost all temper; and in a second set of letters to the Archdeacon of St Alban's, which appeared in the autumn of 1784, threw aside all profession of personal regard, or even of ordinary civility. The charge of incompetency and ignorance was warmly retorted, and "the incorrigible dignitary" was charged with manifest misrepresentation of his adversary's argument; with injustice to the character of Origen, whose veracity he had called in question; and with the grossest perversion of ancient history. In a word, he was stigmatized as a "falsifier of history, and a defamer of the character of the dead." Regardless of this reproach, Dr Horsley remained silent for eighteen months. A sermon on the Incarnation, preached upon the feast of the Nativity in 1785, formed the prelude to the renewal of the contest on his part, and was, early in the ensuing spring, followed by *Remarks on Dr Priestley's Second Letters to the Archdeacon of St Alban's, with Proofs of certain Facts asserted by the Archdeacon.* This tract consists of two parts; one containing new specimens of Dr Priestley's temerity in assertion; and the other defending the attack upon Origen, and proving the existence of a body of Christians at Ælia after the time of Hadrian, which was the fact upon which the Archdeacon's historical fidelity had been so loudly arraigned by Dr Priestley. With this publication Dr Horsley had intended that the controversy on his part should close; but having been induced to collect and republish what he had written (in one vol. 8vo, 1789), this led to a second perusal of Dr Priestley's *Letters*, which produced not only many important notes, but some disquisitions of considerable length; and as the *Remarks on Dr Priestley's Second Letters* had elicited a third set, in which he endeavoured to support the veracity of Origen, and to maintain his position respecting the orthodox Hebrews of the church at Ælia, these are replied to partly in the notes, and partly also in two of the disquisitions.

The reputation which Dr Horsley had now acquired, recommended him to the patronage of Lord Chancellor Thurlow, who presented him to a prebendal stall in the cathedral of Gloucester; and, by the interest of the same eminent person, he was, in 1788, promoted to the see of St David's. As a bishop, his conduct was exemplary and praiseworthy; in this character he fully answered the high expectations of eminent usefulness, which his elevation to the mitre had so generally raised. In his diocese, he carried through a general system of reform, regulated the condition of the clergy, introduced greater strictness with respect to candidates for admission into holy orders, preached frequently in the parish churches, and acted with Christian liberality towards the poor. Bishop Horsley's first charge to the clergy of St David's was delivered in 1790, and deservedly admired, as was also his animated speech in the House of Lords 31st May 1791, on the subject of the Catholic Bill. These effective displays are understood to have occasioned his subsequent promotion to the bishopric of Rochester and the deanery of Westminster, upon which he resigned the living of Newington.

During the agitating period between 1793 and the close of the century, Bishop Horsley ranged himself on the side of the government, and with great zeal and warmth opposed the enemies of the constitution, and the professors of democratic principles, under which categories were then included all those who sought for reform in the representation of the people as a guarantee for the removal of abuses, and the progressive improvement of our institutions, ecclesiastical as well as civil. As a senator, his talents and activity necessarily gave him weight; and there were few discussions of importance in which he did not take part. He was not, however, an every-day speaker, nor desirous of protracting the debate, unless he had something original or important to communicate. In 1802, he was translated to the bishopric of St Asaph, and resigned the deanery of Westminster. Until 1806, his vigour of body and mind remained unimpared. In the month of July of that year he went to his diocese, and after a residence of two months intended to visit his patron Lord Thurlow at Brighton, where he arrived on the 20th of September, after learning on the road that his noble friend was no more. On the 30th, he became affected with a complaint in the bowels, which, slight at first, soon terminated in mortification, and on the 4th of October proved fatal. He died in the seventy-third year of his age.

Bishop Horsley was a hard student all his life. His active mind was ever directed to some pursuit. He was an acute and original thinker, with a powerful intellect. He was proficient in languages and Scripture criticism, and thus well fitted for controversy. He was naturally warm and uncompromising, and considering the agitated period in which he lived, whether as to church or state, it is no more wonderful that he exhibited at times the heats and asperities of controversy, than it is that his opponents did the same. Though a high churchman, he possessed more true liberality, and understood better the broad principles of practical toleration, than many of his clamorous opponents. His sermons display vigour, depth, precision, originality, and judgment. His patient research and extensive erudition often enable him to render easy a difficult subject.

Besides the works already mentioned, Bishop Horsley was the author of the following, viz.,—1. On the Properties of the Greek and Latin Languages, 1796, in 8vo; 2. On the Achronical Rising of the Pleiades, appended to Dr Vincent's *Voyage of Nearchus*, 1797; 3. A Circular Letter to the Diocese of Rochester, on the Scarcity of Corn, 1796; 4. Another Circular Letter to that Diocese on the Defence of the Kingdom, 1798; 5. Critical Disquisitions on the 18th Chapter of Isaiah, 1799, in 4to; 6. Hosea translated from the Hebrew, with Notes explanatory and critical, 1801, in 4to; 7. Elementary Treatises on the fundamental principles of Practical Mathematics, for the use of Students, 1801, in 8vo. Since his death have appeared,—1. Sermons, 1810 and 1812, in three vols. 8vo; 2. Tracts in controversy with Dr Priestley, upon the historical question of the belief of the first ages in the Divinity of Jesus Christ, revised and augmented by the author, with an Appendix by his Son, 1812, in 8vo; 3. The Speeches in Parliament of Samuel Horsley, 1813; and, 4. The Charges delivered at his several visitations of the dioceses of St David's, Rochester, and St Asaph, 1813, in 8vo.—(Chalmer's *Biog. Dict.*, art. HORSLEY; *Edinburgh Review*, vol. xvii. p. 465, 468.) (J. B—E.)

HORTENSIUS, QUINTUS, one of the greatest orators of Rome, was born of an equestrian family, B.C. 114. At the early age of nineteen he appeared in the forum, and distinguished himself so as to attract the notice of the consuls Scævola and Crassus, the former the greatest jurist, and the latter the greatest orator of that day. Attaching himself to the Sullane faction, he found ample scope for his professional services in defending the numerous adherents of that party who were tried for misgovernment or extortion in their provinces. His success in these trials was so great that till the appearance of Cicero he was called the "rex judiciorum;" but Hortensius was never very scrupulous as to the means he took to secure a verdict in favour of his clients. Extant evidence proves that he was only too well acquainted with all the arts of bribery, and that he often practised them in flagrant defiance of justice. Though both at the bar, as well as in politics, Hortensius was always opposed to Cicero, yet in private life the rivals seem to have been on terms of intimacy, if not of friendship, with each other. On Cicero's side, however, the friendship seems never to have been wholly cordial. Perhaps friendship was impossible to a man of so suspicious and irritable a temper as he. At all events, when Cicero was obliged to leave Rome after failing in his impeachment of Clodius, he suspected that Hortensius had a share in procuring his exile, and censured this supposed duplicity in no measured terms. All the efforts of Atticus to undeceive him failed, and it was only after his return that he acknowledged the groundlessness of his suspicions. For ten years before his death Hortensius had retired from political life, and confined himself to his practice as an advocate. He had gone through the usual career of public office; and had distinguished himself by the almost unparalleled splendour of the games which he celebrated when quæstor, ædile, and prætor. His luxurious tastes and habits remained with him to the last; and as his professional gains were enormous, he had ample means of gratifying them. He lived in a style not inferior to Lucullus; and his villas at Bauli, Tusculum, and Laurentum were proverbially magnificent. He died B.C. 50, two years before the final overthrow of the Republic. Cicero remarked it as of a piece with Hortensius' usual good luck that he had been spared the pain of seeing this catastrophe completed. He is mentioned by Cicero and Quinctilian as the author of *Orations* and *Annals*, which have all perished. He also wrote love songs, some of them not very decent. Nearly all that is known of Hortensius is gathered from the works of his friend and rival Cicero. An analysis of his genius as an orator is given by Cicero in his *Brutus*, and in the opening chapters of the *De Claris Oratoribus*.

HORTICULTURE.

Introduction.

Horticulture is that branch of rural economy which consists in the formation and culture of Gardens. It is the science of the cultivation of culinary vegetables, fruits, and flowers. On one side it is allied to Agriculture, from which, however, it is distinguished by the nature of its products, and by the smaller extent and greater complexity of its operations; on the other side, in its processes of embellishment, it approaches the arts of the Landscape Gardener and the Forester. For these latter departments of rural art, considered as distinct from Horticulture, see Landscape Gardening.

Like other arts, Horticulture borrows its principles from the general sciences. To Botany it is indebted for the facts and theories of vegetable physiology; to Chemistry for assistance in reference to soils, manures, and artificial heat; and to Meteorology for a knowledge of many circumstances which very materially affect the labours of the gardener. On these subjects, with which the philosophical horticulturist will not fail to make himself familiar, we refer to the various scientific articles in this Encyclopædia. It is very desirable that such information should be extensively diffused among *practical* men; as it is only from this quarter that much improvement, in our present state of knowledge, can be expected. Gardening has, until lately, too generally been practised, and treated as an empirical art. Those who were minutely conversant with its numerous manipulations were generally deficient in that intellectual training necessary to enable them to wield general principles with effect. This useful art is based on the imitation of Nature; for although the processes of nature may be in some measure originated—as when a seed is inserted in the ground, or modified—as in the artificial training of fruit-trees, they can neither be entirely controlled nor counteracted. The principle of vegetable life will not suffer interference beyond a certain point, and our theoretical views should be so directed as to interfere with this principle as little as possible. Accordingly the rapid advancement of Horticulture in recent times may be traced to the strictly scientific basis on which it has been placed, and the close adherence to the laws of vegetable physiology which has supplanted the prejudices of former days. The writings of De Candolle, Dutrochet, Bonnet, Papin, Sennebier, Duhamel, Mariotte, Liebig, Saussure; and those of our own countrymen, Keith, Knight, Priestley, Lindley, and Balfour, have greatly contributed to this result.

Gardening was undoubtedly among the first of the arts to which the attention of man was directed. If we would ascend into remote antiquity, we can have recourse only to conjecture, for although, in the Sacred Writings, and in the earliest profane authors, allusions to gardens occur, little is told us either of their productions or their culture. At the close of the Roman commonwealth, the catalogue of fruits had become considerable, the principles of grafting and pruning were understood and practised, and shortly afterwards, even artificial heat seems to have been partially employed. With the decline of the empire, horticulture also declined or became stationary; but at the revival of learning, it arose from the slumber of the dark ages, encumbered, it is true, by the dreams of the alchymists, the restrictions of unlucky days, and the imaginary effects of lunar influence. From these fetters it was ere long emancipated by the diffusion of knowledge, and it has hitherto kept pace with the general improvement of society. Modified by climate and other circumstances in different countries, its advancement has been various; but nowhere has it made greater progress than amongst ourselves. Introduced into England at an early period, gardening made great progress in the reign of Henry VIII. and his immediate successors, and met with considerable attention during the reigns of the Stuarts. In the first half of the eighteenth century, Miller, Switzer, and others, laboured with success in improving the operations, and unfolding the principles, of the art; and these were succeeded by Abercrombie, Speechly, and a host of writers, who added greatly to our stores of knowledge. In 1805 was established the Horticultural Society of London, which was soon followed by the institution of the Caledonian Horticultural Society at Edinburgh; and in their train have sprung up a multitude of provincial gardening societies, all of which have given an impulse to the public mind, and stimulated the exertions of individuals. Experimental gardens have been formed, in which, amongst other things, the important work of distinguishing and classifying the numerous varieties of our hardy fruits has been zealously prosecuted. The mass of information now collected is immense, and the labour expended in its diffusion unwearied. Judging from the literature of the day, we shall scarcely find any art, however nationally important, which receives more attention, or on which the liberality of the wealthy is more abundantly bestowed. The public nursery-gardens, too, both at London and elsewhere, establishments intimately connected with our subject, and which, in a manufacturing nation, are not the least wonderful amongst the applications of skill and capital, prove the extent and perfection to which gardening has advanced.

We shall, in what follows, confine our attention almost exclusively to the horticulture of Great Britain, and endeavour to give such an exhibition of its practice as may suit the middle districts of the island. It would be unprofitable to describe all the methods of culture in practice; and we shall therefore notice such only as are deemed the best.

The subject naturally divides itself into the Fruit, the Kitchen, and the Flower Garden; but as the first two generally occupy the same locality, or are intermingled with each other, we shall, to some extent, take them together. Then will follow the Flower Garden; Conservatory and Plant-houses; and by way of conclusion to the whole, a short Calendar.

Before proceeding to these departments, it may prevent unnecessary repetitions, to offer a few brief remarks on the general principles of vegetable origin and existence.

The first principles of vegetation are those which regulate Propagation and Growth. All plants are propagated by Seed, Cuttings, Layering, Budding, or Grafting. Imported seeds should be sown as soon as they are received, unless in the case of those that vegetate speedily, which should be sown neither late in autumn, nor early in winter, as in the event of their vegetating during the dark months the young plants would likely perish. Hard seeds, and such as do not vegetate rapidly, may be committed to the soil at those periods when it is calculated their growth will commence.

Propagation by Seed.—Germination, or the sprouting of the seed, depends on the presence of moisture and a due amount of heat and air. No seed will germinate at 32° Fahr., nor if enclosed in hermetically sealed vessels, nor even if too deeply covered with soil. A full account of the requisites for germination, and of the chemical changes which occur, is given under the article BOTANY, Part I. § iv. 2.

Propagation by Cuttings of the Wood, the mode next in importance and general use, consists in originating new individuals by means of portions of the parent plant. Sometimes pieces of the roots are employed, but more generally portions either of the young wood of the current season of growth, as in the case of Heaths; or portions of the ripened wood of the previous season, as in Currants and Gooseberries; or occasionally single eyes or buds, as in the Vine; or truncheons of the stem and older branches, as in the Willow and Mulberry; or the leaf, as in Gloxinia; or any part of the plant, as in the majority of Succulents.

The immediate cause of the formation of roots is as yet unknown, but the remote cause is conjectured by Lindley to be the elaboration of organisable matter by the leaves, for, as he observes, "there can be no doubt that the development of roots is much assisted by the descending sap. When a ring of bark is removed from a branch, if the wound is wrapped in damp moss, roots will invariably push from the upper lip of the wound, while the lower will produce none, a fact so well known, that it has been one of the causes of an opinion, that roots are bundles of wood liberated from the continual perpendicular system, and that the wood itself is nothing but a mass of roots formed by the leaves and buds." Roots, for the most part, are formed in the dark, and hence the seed, the cutting, and the layer, are buried more or less under ground.

Heat has a very considerable effect on the formation of roots in cuttings, and hence the most successful mode is to place the cuttings in a mild bottom heat. Many hardy plants which strike roots when their cuttings are planted in the open soil, would do so much sooner if placed in heat. Some hard-wooded trees, as the common White Thorn, refuse to root when their cuttings are planted in the natural soil, yet they will do so readily if placed in a bottom heat. We must first obtain roots to our cuttings before leaves need be looked for, and to obtain this the temperature of the soil in which the cuttings are placed, must be several degrees higher than that of the atmosphere. It is an invariable rule throughout plant culture that the root action shall be in advance of that of the leaves. Deciduous trees and shrubs succeed best when the cuttings are planted early in autumn, while the soil retains the solar heat absorbed during summer. Evergreens propagate by these means best, when the cuttings are planted during April or May, August or September. Greenhouse and stove plants are propagated in this way during the spring and summer months. The great object to be attained is to get them established with active roots before the approach of winter.

The following, from "Lindley's Theory of Horticulture," contains the main essentials required in this process of propagation. "What is demanded when cuttings or plants are to be struck, is a due adjustment of heat, light, and moisture. The first stimulates the vital processes, the second causes the formation of matter, out of which roots and leaves are to be organised; the third is at once a vehicle for the food required by the cutting, and a part of it. The great difficulty is to know how to adjust these agents.

"If the heat is too high, organs are formed faster than they can be solidified, if too low, decay comes on before the reproductive forces can be put in action. When light is too powerful, the fluid contents of the cutting are lost faster than they can be supplied; when too feeble there is not a sufficiently quick formation of organisable matter with which to construct the new roots and leaves. If water is deficient, the cutting is starved; if over-abundant, it rots. It is, then, the adjustment of these forces to the peculiar nature of the cutting to be acted upon that constitutes the art of propagation. It is this which theory cannot supply, but which depends upon skill and experience. If any part of the operations of cultivation can be called empirical, it is this. And yet the operator is not without rules to guide him in this adjustment; the misfortune is that they are too general. The softer the cutting, the quicker must be the excitement and the application of the formative process. The more hard and woody the cutting is, the slower will be the operation."

Light and moisture have also a considerable effect on the constitution of the cutting. When intense light is allowed to strike on a cutting before its roots are formed, and especially if the cutting be a soft-wooded one, undue transpiration is excited; this transpiration therefore must be modified by partial shading, and the loss of sap made up for by keeping the atmosphere and soil moist. These precautions must be continued until the roots are formed, when they will imbibe fluid from the soil as fast as the sun dries it off from the leaves. An artificial atmosphere, so to speak, is formed around the cutting when it is covered with a bell-glass. "Ignorant people," Dr. Lindley remarks, "believe that the use of the bell-glass is to keep out air, which is impracticable and useless. Bell-glasses act by keeping in moisture. From the surface of warm damp soil, water is perpetually escaping in the form of invisible vapour; if the soil is freely exposed that vapour is dispersed as fast as it is formed; but when it is confined beneath a bell-glass the air is unchanged, and the vapour remains in a state of suspension, bathing and invigorating the whole surface of the cuttings. When this is well managed, the whole of the injurious effects of sunlight are prevented, and all the advantages of it secured." Great care, however, must be taken to keep the temperature of the air which surrounds the bell-glass as warm as that which is enclosed, to prevent condensation within, which would induce rottenness, or what is practically termed damping off. Cutting off the leaves of cuttings, or even reducing them in size—a very common error—should be avoided. Many cuttings will strike root if their end be placed in water, and those plants do so most successfully which are termed hard-wooded, because the dense texture of the wood prevents their absorbing too much of the water, as is the case with soft-wooded plants.

This absorption in such cuttings is one if not the principal cause of their so often damping off. Mr. Low, with a view to prevent this, has proposed to dip their ends in Collodion, an adhesive substance, impenetrable by water. Its general application is not, however, recognized. There is a singular phenomenon, somewhat analogous to irritability in animals, known to exist in vegetables, the cause of which has not been discovered by physiologists. They have, however, applied the term Vegetable Excitability to it. Its effect is the well-known fact that the young cuttings taken from trees growing in the open air will not produce roots, whereas, if the same trees were taken up and placed in a forcing-house, cuttings from them would certainly succeed.

Cuttings taken from plants growing in a cool greenhouse will, in a like manner, not succeed if placed in a propagating pit at a high temperature, but if the same plants are set in a warm house for a few days, the cuttings from them are sure to succeed.[1]

Propagation by Layering is practised in the case of roses and other shrubs which do not so readily strike by cuttings. It is somewhat analogous to Inarching, that is, forming an individual plant from the branch of another still adhering to it.

Propagation by Suckers is seldom adopted, except in the case of some hardy shrubs, and the Pine Apple. Plants originated by this process amongst the former are in general considered inferior. In the latter case it is otherwise. In good culture a sufficient stock is easily kept up for private supply by choosing the strongest suckers that are produced on the stem, which are more or less numerous according to the amount of check the plant may sustain by the formation of the fruit. Rare sorts may be wonderfully increased by retaining the stump, instead of throwing it away as is usually done after the fruit is ripened, and placing it in a damp pit, with a bottom temperature of 90°. Every latent eye would then spring, and a large amount of young plants be produced.

Propagation by Single Leaves.—The leaves of some plants produce adventitious buds upon their edges and upper surfaces, and some leaves like those of the Echeverias strike root soon after they fall on the soil. Some genera like Gloxinia, Clianthus, Gesnera, &c., require to have only the footstalk of their leaves planted in sandy soil in a proper temperature, to produce young plants. These leaf cuttings first form a callosity at their base, then roots, and lastly, a bud, from which last the future plant is organised. Some plants form this bud more freely than others, while a few seem unwilling to form it at all.

Propagation by Cuttings of the Root.—Some plants produce on their roots what are called adventitious buds, which are used for the purpose of propagation. It is a singular and beautiful arrangement in the vegetable economy that such plants as do not propagate freely by cuttings in the ordinary way, do so freely by substituting portions of the root for that of the branch. The Japan Quince, the *Cydonia japonica*, so common in our gardens, is a good example of this. It can scarcely be propagated in the usual manner, but the roots from $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, if cut into pieces about 2 inches in length, and planted even in the open border, will take root freely, The *Acacia pubescens*, which is rarely if ever struck by cuttings of the wood, propagates freely by this method. But the most extraordinary instance within our knowledge is that of coniferous trees being so multiplied. This discovery is due to M. Neuman of the Jardin des Plantes of Paris, who, in his interesting work on propagation, states this fact in regard to the *Araucaria Cunninghamii*, and he believes that all conifers may be propagated in the same manner. His process is briefly this:—In spring the cuttings are made, being portions of the roots $\frac{3}{4}$ of an inch in diameter, and from 2 to 3 inches in length; they are planted in pots in March, and placed in a moderate temperature; in April they are transferred to a warm tan bed, and in a month afterwards vegetation becomes excited.

Propagation by Single Eyes.—This is now almost universally practised in the case of the vine, the plants so produced being remarkable for the shortness of their joints, that is the multiplicity of their buds. It is believed, theoretically, that all plants may be so increased. In some cases the eyes disengage themselves spontaneously from the mother plant, fall down, and strike root; in others the propagator cuts out the eye, with a small portion of the wood. In some plants the eyes are more excitable than in others, and hence this mode of propagation is not of universal application in practice. The rationale of this is given by Mr. Knight, in the 2d vol. of the Hort. Trans. p. 115.

Analogous with this mode of propagation is that of originating plants from knots or excrescences, which are cut out of the bark, and called by the Italians *novoli*, in English, knaurs. These embryo buds or concretions are spoken of by Dr. Lindley, as being found "in the bark of many, and probably of all trees, and are supposed to have been adventitious buds developed in the bark, and, by the pressure of the surrounding parts, forced into those spheroidal woody masses, in the shape of which we find them." These are found sometimes singly, as in the Beech, but often in groups or clusters, as in the Elm. They often remain dormant for years, at other times lengthen out into small branches. They have been seldom used for the purpose of propagation in this country, but have been so in Italy in the propagation of the Olive. The process is explained by Signor Manetti in the 7th vol. of the Gardener's Magazine.

Propagation by Budding and Grafting.—This operation is in some respects analogous to that of propagation by single eyes, buds, or cuttings. In the cases we have already treated of, the eye, bud, or scion, is transferred from the tree to the earth at once, whereas, in the present case, the bud or scion of one tree is transferred to another tree, or in other words planted into it. Grafting is so nearly akin to budding, that the French, who are great operators, do not distinguish them by separate words, but use the general term *greffe* for both. The theory has been very fully explained by De Candolle, in his "Physiologie Vegetable;" by D'Albret, Knight, and others. Mons. Thouin, in his "Monographie des Greffes," and also in "Nouveau Cours complet d'Agriculture," has described above 40 methods, while M. Louis Noisette published a description, with figures of 137 forms. The most valuable information on the subject, however, is to be found in Dr. Lindley's "Theory of Horticulture," *new edition*, 1855. Glancing only at the more important parts of our subject, we find that strong and healthy stocks increase the vigour of scions of weakly plants; hence delicate sorts of vines should be wrought upon plants of robust varieties. Delicate and shy-flowering roses, when wrought on strong growing sorts, produce and develope their flowers, which they would not do in our climate if upon their own roots; and, singular to say, the most delicate variegations are retained when budded, which would not happen if not so treated. Blossom buds of one tree may be transferred to the barren branches of another, and fruit thus produced. Buds of a variegated-leaved plant inserted into a branch of a plant of the same genus, having only green leaves, will, even should the inserted bud not push into growth, produce variegation in the leaves of the green-leaved plant. In this way, the curious *Cytisus Adami*, produced apparently by grafting *Cytisus purpureus* in *Cytisus Laburnum*, exhibits both purple and yellow flowers. The stock has also a considerable influence over the scion, and therefore great care should be taken in its selection.

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[1] That portion of the wood, whether old or young, intended for a cutting, must be furnished with buds upon its surface. Hence those parts denominated internodes, that is, the smooth parts between two joints, as exemplified in the *Nat. Order Gramineæ*, need not be tried, but the same plants, cut transversely, close under a node or joint, root freely. In other plants, as in the Pelargonium, for example, internodes also intervene between leaf and leaf, hence cuttings of them must be made just under a leaf, because a bud is certain to exist in the axil of the leaf. Flower stalks seldom contain buds, and hence they are useless for the purpose of making cuttings.

Introduction.

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If mere multiplication of individuals were all that was to be expected of budding or grafting, then the stocks most easily procured, if sufficiently akin to the scion or bud, would be the best. But the operation is of far greater importance than this; it ennobles the tree by changing its character from a worse to an improved condition, as to its production either of flowers or fruits. To a certain extent it increases the hardiness of a tender sort, when wrought on a stock capable of better resisting cold, or one which is more suited to the low soil temperature of northern latitudes than that natural to the tree from which the bud or scion is taken. Mr Knight denied this fact, but Dr. Lindley supports it, and says, in his "Theory of Horticulture"—"Probably in Persia, the native country of the Peach, that species, or its wild type, the Almond, is the best stock for the former fruit; because the temperature of the earth is that in which it was created to grow. But in a climate like that of England, the summer temperature of whose soil is so much lower than that of Persia, the Plum, on which the Peach takes freely, is a hardy native, and suited to such soil, and its roots are aroused from their winter sleep by an amount of warmth insufficient for the Peach. Experience, in this case, completely confirms what theory teaches; for although there may be a few healthy trees in this country growing upon the Almond stock, it is certain that the greater part of those which have been planted have failed; while in the warm soil of France and Italy it is the stock upon which the old trees have in almost all cases been budded."

Stocks must also be chosen to suit the soil. From a careful series of experiments made in the Horticultural Society's Garden at Chiswick, we find that in loamy soils the Apple succeeds best on the Doucin stock, in chalky soils on the Crab, and in light soils, slightly enriched with decayed vegetable matter, on the Doucin. The Pear in loamy soil, or in light soils enriched with decayed vegetable matter, succeeds best on the Quince, while on chalky soils the wild Pear is preferable. The Plum succeeds best in loamy soils, when wrought on the Plum stock, while on chalky and light soils it does better on the Almond. The Cherry succeeds best in loamy, or in light rich soils, when wrought on the wild Cherry, and on chalk when on the Mahaleb stock.

The stock also has considerable influence on the fruit, as well as on the strength of the scion. This we find to be the case in regard to the Stanwick Nectarine, so apt to crack and not to ripen when wrought in the ordinary way. It is said to be cured by being first budded on a very strong growing Magnum Bonum Plum, wrought on a Brussels stock, and inserting the buds close to the ground, then the buds of the Nectarine on the Magnum Bonum Plum, about a foot from the ground. The quality of the fruit is in general also improved by the process. "This may be conceived," says Dr. Lindley, "to happen in two ways—either by the ascending sap carrying up with it into the scion a part of the secretions of the stock, or by the difference induced in the general health of a scion by the manner in which the flow of ascending and descending sap is promoted or retarded by the stock. In the Pear the fruit becomes higher coloured and smaller on the Quince stock than on the wild Pear; still more so on the Medlar. On the Mountain Ash the Pear becomes earlier; and in these instances the ascent and descent of sap is obstructed by the Quince more than by the wild Pear, and by the Medlar more than by the Quince. Similar effects are produced in the Apple by the Paradise and Siberian bitter and sweet stocks."

From these facts we learn that the quality of fruit must become deteriorated when wrought on stocks, the fruit of which is worthless. For example, Peaches would be so when wrought upon the Almond or Wild Plum; the Apple, when wrought on the Crab; and the Pear, when wrought on the White Thorn or Mountain Ash. Analogy would lead us to expect that using as stocks those trees whose fruits are of known excellence, still greater excellence would follow. This is asserted to be the case. In the same way double working or ennobling is said to improve the quality of fruits, an idea we have long entertained.

Planting.—Transplanting naturally follows propagation. We will now briefly glance at the leading features of this important part of our subject. Every plant when removed from one place to another sustains, to a greater or less degree, a check. It is for us to consider how this check can be obviated, or reduced. The season of the year, the state of the atmosphere, the condition of the plant, the soil, its age, size, and the disposition of its roots, are all matters to be duly considered.

As to season, as regards deciduous trees and shrubs, it is now admitted by those most competent to judge, that the earlier in autumn the operation is performed the better; although some extend it from the period when the leaves fall to the earliest part of spring, before the sap begins to move, and the cold dry winds to prevail. Were it possible, we would say, let the operation be completed by the end of November, because up to that period the soil has not parted with the solar heat absorbed during summer; heat being, as already shewn, so necessary for stimulating growth in the roots. We are aware that in large operations this cannot in all cases be effected, but in regard to rare and delicate plants it should not be lost sight of. Early autumn planting enables the wounded parts of the roots to be healed over, and to form spongioles, which will be ready in spring to collect food for the plant, at the time it most requires it. Late winter and spring planting should, as far as possible, be avoided, for at that time the buds begin to become excited, and the draught upon the roots becomes great. Some believe that as the surface of the young leaves is small, the transpiration is feeble; but they should take into consideration that the newly formed tissue is unable to resist the drying action of the atmosphere, which is exceedingly great in spring, unless it is abundantly supplied with sap from the roots.

Not only is evaporation great in our climate at the period the buds begin to burst, but our temperature is also low, which prevents the free circulation of the sap. Indeed, as regards deciduous trees and shrubs, we are confident that the proper season for transplanting is during September, October, and November. Experience has taught us during forty years' practice, and in this we are fully borne out by our greatest physiological authority, who says, in his *Theory of Horticulture*, "As soon as a plant has shed its leaves it is as much at rest for the season as it will be at any subsequent period, unless it is frozen; its torpor is indeed greater at that time, because its excitability is completely exhausted by the season of growth, and it has had no time to recover it. If at that time a root is wounded, a process of granulation or cicatrization will commence, just as it does in cuttings; and from that granulation, which is a mere development of the cellular system, roots will eventually proceed. Now, as it is obvious, that since roots must be wounded in the process of removal, the sooner the wound is made the better, because it has the longer time in which to heal; and therefore, the earlier in the autumn transplanting is effected, the less injury will be sustained by the plant submitted to the process. Deciduous trees usually begin to assume their autumnal hue in September, and as soon as that has happened they may be transplanted with safety." The humidity of the atmosphere also, as is well known, is much greater in our climate during the autumn and winter months than in spring, and hence this season is more favourable for the perspiration of plants which, although they are enfeebled by the loss of their leaves, is not entirely suspended. Besides, the functions of absorption and perspiration are going on through their bark, and therefore a saturated atmosphere is extremely favourable to this important action.

We only refer to one other circumstance in favour of autumnal planting, and that is the production of roots during the absence of leaves. Some physiologists support a theory, that roots are formed by the action of the leaves, and therefore that trees make no roots during winter. This theory is, however, unsupported by facts, for it is proved that roots do grow during that period.

Closely connected with the proper season is the best means of performing the operation of transplantation. This depends greatly on the size of the trees, the soil in which they grow, and the mechanical appliances made use of in lifting and transporting them. The smaller the tree, the more successfully can it be removed. The more argillaceous and the less silicious the soil, the more readily can balls of earth be retained about the roots. Most planters prefer balls, some, however, care less for this, so long as the roots are preserved to their greatest possible extent. Others lay great stress on the preservation of the spongioles, while all admit them to be indispensable as absorbing points, destined to collect food for the plant, which derives nourishment from them by means of the roots. The point principally disputed is the necessity of preserving them during the process, or the practicability of allowing them to be cut off and replaced again. Their careful preservation has been strongly advocated by De Candolle, Dutrochet, Bonnet, Papin, Sennebier, Keith, and Lindley; while Link, Ohlert, Rogers, and others, deny this to be a matter of consequence. Trees and shrubs removed from thick plantations, or from sheltered warm places, are ill fitted to be planted in bleak and cold places. During their removal it is important that the roots be in some way covered, if only to prevent their suffering from being dried up by the action of the air, so that they may retain nearly the same degree of humidity which they had when growing in the soil. Damp days are therefore the best for the operation, hence March, April, and May being our dryest months, are the most unfavourable. Of mechanical appliances, there is no doubt that M'Glashen's tree-lifter, where the soil is free of stones and of sufficient depth, is the best at present in use, and that the common timber carriage or janker is comparatively a barbarous invention.

The best time for removing evergreens is during August and September, or during April and May. The month of September, however, should have the preference. But they may even be safely planted, if judiciously gone about, at any time from April till the end of October. Evergreens differ from deciduous trees, inasmuch as they have no season of repose, that is to say, they are in a perpetual state of growth, their circulation, assimilation, transpiration, and process of root-making, being continually in operation. Much of the success in transplanting depends on the humidity of the atmosphere at the time the operation takes place; but the principal point of importance is warmth in the soil. Humidity can be supplied artificially, but heat cannot. It is upon this temperature of the soil that Mr Glendinning appears to found his arguments in favour of September planting, as described by him in an excellent paper in the "Journal of the Horticultural Society," and his opinion is one in which theory and practice completely coincide.

Pruning.—Lindley says "that if well directed, pruning is one of the most useful, and if ill directed, it is amongst the most mischievous operations that can take place upon a plant." The object of pruning is to regulate the number and bulk of the various parts of a plant, to modify the form of trees, to promote the growth of timber in forest trees, and the formation of blossom buds in fruit trees, to cure disease, proportion the head to the roots, or increase the size of the fruit. In fruit-bearing trees, it is performed on the roots to induce fruitfulness.

The season for pruning varies according to the nature of the tree, but in general it is performed at mid-winter or mid-summer, practically called winter and summer pruning. The latter should, properly, extend during the greater part of the growing season of the tree, beginning with disbudding or finger pruning, and ending by a reduction of points of the shoots where not specially required, to admit light and air to the ripening crop and young wood. Early autumn pruning has the effect of strengthening the shoots of the succeeding season, and by some is said to hasten the ripening of the crop, a fact we are unable to certify. The former is thus accounted for by Dr. Lindley, "During the season of rest (winter) a plant continues to absorb food solely from the earth by its roots; and if its branches are unpruned, the sap there and then introduced into the system will be distributed equally all through it. If late pruning is had recourse to, and the branches are removed, of course a large portion of the sap that has been accumulating during the winter will be thrown away. When, however, early or autumnal pruning is employed, and the branches removed before the sap has accumulated in them, then all the sap which the roots are capable of collecting during the period of repose will be deposited in the branches left, and they will necessarily push with increased vigour. As, however, pruning is by no means intended at all times to increase the vigour of a plant, late or spring pruning, if not deferred till the sap is in rapid motion, may be more judicious." Hardy trees and shrubs, with few exceptions, may be pruned during autumn and winter, the most tender should be left till spring, lest they suffer from frost while their wounds are unhealed. Besides many of them lose portions of their branches, and the extent of this loss cannot be determined till spring.

Pruning is an art which requires experience, and a knowledge of the character of the plant to be operated upon. Two important lessons require to be learned, namely, how to cut, and where to cut. The cut should be clean, and always in a sloping direction upwards, at about an angle of 45°, and this can only be performed with a very sharp and thin knife. The cut should commence at the back of the bud, and not on the opposite side of the shoot, as by this means the bark soon covers over the wound. When the cut is too low, leaving the bud exposed, it is faulty, because the bud is exposed to the drying air, and is liable to be broken off. Cutting too far above a bud is equally bad, as it leaves a dead portion of the branch which can never be covered with bark, and must either be cut away afterwards, or left, as it often is, a staring evidence of want of care or skill in the operator.

The question of pruning, or cutting back trees at planting, is a disputed point amongst horticulturists. The matter has been explained in "The Theory of Horticulture," of which the following is the substance:—In pruning plants, when transplanted, there can be no doubt that it is more frequently injurious than beneficial. The roots of a transplanted tree not being fully in action in consequence of the injuries sustained during its removal, they are capable of exercising but little influence on the branches, as compared with an established tree, and therefore heading back the branches will not cause the buds to break with more force than if the pruning had not been performed. The great point to be attained, in the first instance, is the renovation of the roots, and that will happen only in proportion to the healthy action of the leaves and buds; if, therefore, the branches are removed, a great obstacle is opposed to this renovation; but if they remain, new roots will be formed in proportion to the healthy action of the leaves. The danger to be feared is that the transpiration of the leaves may be so great as to exhaust the system of its fluid contents faster than the roots can restore them; and in such cases it is certainly requisite that some part of the branches should be pruned away. The shortening of the roots at the time of planting, although pretty universally practised in nurseries, can only be useful in cases where they have sustained injury in course of their removal. In all cases, therefore, where roots have been broken or bruised, it is proper to cut off the injured parts smoothly, in order to prevent decay and to promote the formation of granular matter along the edges of the wounds, from which new fibres or spongioles are certain to be produced. This operation, however, should take place in autumn, when the roots are comparatively devoid of fluid, and not in spring, when they are fully charged.

Summer pruning consists merely of a removal of all young wood not required for the extension of the tree or formation of fruit-buds. One species of summer pruning should be here adverted to, namely, a partial removal of the leaves. This is a dangerous operation in unskilful hands, as by means of the leaves the important functions of digestion and respiration are carried on. Strip a tree of its leaves during its growing season, and it dies; reduce their number, and a reduction of its energies is the consequence. Hence it is only with the greatest care that a few leaves may be removed towards the ripening season to admit light and air to assist in the ripening of the fruit and the maturation of the young wood.

Training.—The sap in all trees has a natural tendency to flow upwards, and hence the buds at the extreme points of the branches will be the strongest and most disposed to produce leaves and wood. Upright training is consequently the best when these results are desired, but the worst when fruit is desired; and hence a contrary direction, or some modification from the perpendicular, should be given to the branches. Again, weak growing trees should have their branches trained perpendicularly, or nearly so, while strong growing ones should be placed in a horizontal or even pendant position. We find trees trained between these extremes, and all that practice has exemplified in the various modifications is borne out by the soundest theory. It would be quite out of place here even to give an enumeration of the various forms. We will, however, give a few illustrations of the most popular forms in their respective places.

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Although fruits and culinary vegetables are for the most part cultivated within the same enclosure, and even in many works on the subject of their management we find them treated as inseparable, yet it will be found best in practice, particularly where high culture is attempted, to keep the culinary garden and that dedicated to fruit-trees distinct. This systematic arrangement, however, applies more especially to large establishments, where order and system are considered leading features. Grave objections may be also raised against placing hot-houses, plant-houses, and often a large amount of flowers, in juxtaposition with cabbages and potatoes, and even with one another. In places of limited extent, this medley system can scarcely be avoided. The *beau ideal*, however, of a perfect garden establishment would be to have each department a perfect whole in itself; and these may be so arranged as to adjoin each other, or be separated, according to local circumstances. Long cherished associations (prejudices, may we call them?) will require much softening down, ere the promiscuous style be entirely abandoned. Unfortunately we have only few examples to adduce in favour of the systematic style; yet, when it has been adopted, an ample amount of satisfaction has been the result.

The first thing to be considered is the *plan* of the garden. This should be prepared before commencing operations, and in it should be laid down the most minute arrangement even of all the details. It does not, however, follow that the proprietor is to carry into effect the entire plan at once, or possibly, in many cases, at any future period. He can adopt such parts of it as suit his taste or circumstances at once, and when afterwards disposed, proceed from time to time with the remainder. The want of such an arrangement at the outset accounts for the confusion and want of unity displayed in many gardens of high standing. Indeed we have few instances to point to, in which the grossest incongruities are not to be found.

Size.—The size of a walled garden ought evidently to bear some proportion to the splendour of the mansion-house of which it is an appendage, and to the extent of the park. In style also, in its principal erections, it should harmonise with that of the proprietor's residence; and although the architectural details are not required to be carried out in all their minutiæ, still so much of them is required as to show a connection between the one and the other. Such a garden should comprehend from four to six acres. In many places this extent will not afford an adequate supply of culinary vegetables, and therefore, as at Chatsworth, Petworth, Belvoir, Dalkeith, &c., the extent varies from twelve to twenty acres, and that of Her Majesty at Frogmore exceeds thirty acres. From an acre and a half to three acres may, however, be regarded as forming a good size for a garden, it being always better, in the first formation of a garden, to enclose too large a space than too small a one. Some, from mistaken notions of economy, attempt to procure a supply of the hardier vegetables from the farm; but, with the exception of the winter supply of potatoes, nothing can be so well or economically produced as in the garden.

Situation.—The position of the garden in relation to the mansion-house properly belongs to the province of Landscape-Gardening, as it obviously should be in keeping with the general features of the park scenery. As a place of interest to every well-informed proprietor, it should be so near as to be conveniently accessible on foot, probably within little more than a quarter of a mile; while it should be so distant as to avoid the possibility of offence arising from gardening operations and the resort of workmen. A position on either side of the house is to be preferred, unless a much better can be found behind it. Wherever it be placed, it should be so masked by evergreen shrubs and trees, as not to be visible from the principal lawns, nor from the walks in the shrubbery and flower-garden. If the surface of the domain be undulating, the garden is almost unavoidably seen from some point or other, and the *coup d'œil* of the enclosure walls, presenting the idea of a large box, is apt to produce an unpleasant impression, which should by all means be avoided or lessened by plantations judiciously placed. Where the irregular form of exterior enclosure is adopted, this great defect is obviated; and gardens in this form present many advantages over those of stiff and formal shapes; while, at the same time, space is secured in the surrounding slips for furnishing an abundant supply without the expense of high walls. Also much of the formality of regular figures is taken off when south walls are either dispensed with, as exemplified in the new gardens recently laid out by Mr. M'Intosh at Braco Castle and Maulsden; or where they are transformed into sunk terrace walls, as in the new gardens at Panmure House and elsewhere.

Ground possessing a gentle inclination toward the south is desirable for a garden. On such a slope effectual draining is easily accomplished, and the greatest possible benefit is derived from the sun's rays. The lower part of a gentle declivity is perhaps to be preferred; but a very low situation should never be chosen, as the subsoil is apt to be damp, fogs often brood over such spots, and frosts are more injurious there than on higher ground. It is beneficial to have an open exposure towards the south, the east, and west, so that the garden may enjoy the full benefit of the morning and evening sun.

Shelter is absolutely necessary; and that afforded by natural objects, such as rising grounds, is the best. Where this is wanting, its place should be supplied by masses of forest-trees, disposed at such a distance, however, as not to shade the wall-trees, perhaps not nearer than 150 feet. The purpose of such screens is to break the force of the winds; and as every situation is, in this respect, liable to some peculiarities occasioned by the general structure of the country, as for instance to aërial currents from adjacent eminences, these peculiarities should be carefully observed and obviated. The idea that crowded plantations increase the warmth of a place is fallacious; and, in the opinion of many, they do more harm than good, by producing an unhealthy atmosphere.

The trees employed may be various, but lime-tree, horse-chestnut, beech, sycamore, weeping birch, and the smooth-leaved wych elm, should prevail. There may also be a proportion of evergreen trees, such as hollies, Portugal and common laurels, and evergreen oaks. When these masses of wood are planted at the time the garden is formed, poplars, and other fast-growing trees, should be thickly intermixed to act as temporary trees and nurses, which are afterwards to be weeded out, as the permanent trees more slowly advance to maturity.

"Experience," says Towers, who has written most judiciously on this subject, "has proved the correctness of Forsyth's opinion on the prevalence of blights in situations surrounded by woods." "I believe," he says, "that prevalence to be dependent on the phenomena of conduction, effected by the proximity of innumerable vegetable points, by which the chemical constitution of the atmosphere is somewhat changed, so that the juices of the plants partake of the change, and acquire a saccharine quality. Insects are thereby enticed, but not produced; and in every case of blight, it appears much more probable that the altered or diseased juices invite the insect than that it is imported by this or that current of air, whether it blow from the east, or from any other point."

The points from which shelter from winds is most required, varies very much according to the geographical position of the place. Thus we find by the calculations of the Royal Society of London that the prevailing winds in England are as follows:—S. W. 112 days, N. E. 58, N. W. 50, N. 16, S. 18, W. 53, E. 26, S. E. 32. And according to Dr. Meek, from observations taken during 7 years, the prevailing winds of Scotland are—S. W. 174 days, N. E. 104, S. E. 47, and N. W. 40 days. And it may be stated that the prevailing winds in Scotland are the same throughout Europe, namely S. W. and N. E.

Those prevailing in Ireland, from its geographical position, are W. and S. W.

Water is one of the most important elements in vegetable life. It is, as Switzer remarks, "the life and soul of a garden."

Yet we do not find one garden in twenty, where even ordinary precautions have been taken to secure a competent supply. Rain water is the best, next to that, river or pond water, and last of all, that from springs. A chemical analysis, however, should be made of its properties, before the expense of bringing it in is thought of. Many waters containing mineral ingredients are exceedingly injurious to vegetation. Iron pipes are the best conductors, and they should lead to a capacious open reservoir placed *without* the garden, and at the highest convenient point of level, to secure sufficient pressure, so that not only the whole surface of the ground, but the wall trees also may be conveniently watered. Short flexible tubes should be made to fit on branches of the main pipes, so as to traverse the whole garden, and these of a calibre capable of conducting a supply even to the extent of irrigation in certain cases. They should also be placed under the walks for safety, as well as for being easily reached when repairs are required. Pipes should also be laid having a connection with an underground cistern and a communication with every hot-house, as well as with the various offices.

Notwithstanding the vast importance of water, it is far from expedient to admit of large basins or ponds, and far less of a running stream through a garden, unless they can be completely turned off during winter. Where water is introduced, whether by bringing it from a distance in pipes, or by raising it to the surface by means of artesian wells, the expenditure, be it what it may, will, in the long run, be far less than what attends the very imperfect means employed in most gardens.

There are many contrivances by which water can be procured in abundance in almost all situations. We may merely refer to Lucas's self-acting force and lift-pump, the hydraulic ram, and other mechanical appliances.

Connected with the situation is the *approach* to the garden from without, a matter requiring some taste and contrivance. If possible, it should be from the south, when the range of glazed houses will be seen at once, and produce a pleasing effect. Sometimes a lateral entrance is very suitable, leading, it may be supposed, from the flower-garden through an intermediate shrubbery, and coming upon the hot-houses in flank. Such would be the case in passing from one garden to another, as we have previously suggested, and much more so, if the department in which the principal hot-houses are placed, be entered, so as to get the first *coup d'œil* of them from a point nearly in a parallel line with their front. The worst of all entrances is from the back or north.

Form.—The form of a garden, it is obvious, must chiefly be determined by the nature of the situation and the taste of the proprietor. In general, gardens are either squares or oblongs, chiefly, it is presumed, because walls of this configuration contain the greatest space within the least perimeter, a result of very questionable value. They may be of any form, with this limitation, that attention should be paid to facilitating the transport of manures and garden products, for when the grounds are straggling, or complicated in structure, the labour of cultivation is much increased. Straight lines of walls and geometrical forms are perfectly admissible when near a mansion of a high architectural character, but not when the mansion which may be considered as the datum point is so subordinate as to fall under the denomination of a cottage or picturesque structure. In this case a garden of an irregular form will be in much better keeping. Prejudice is strong against gardens of irregular form, but when well adapted to the conditions of the locality they are far from being objectionable, as they associate better with surrounding objects and forms.

Exterior Fence.—All gardens should be encircled by an outer boundary, formed by a sunk wall or ha-ha, surrounded by an invisible wire fence to exclude hares, or by a hedge and low wire fence on its inner side. Occasionally this sunk wall is placed on the exterior of

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the screen plantations, and walks leading out among the trees, to give favourable views of the adjacent country. Although the interior garden receives its form from the walls, the ring fence and plantations may be adapted to the shape and surface of the ground. The spaces between the outer fence and the walls are called *Slips*, and, where circumstances render it eligible, a considerable extent of ground is sometimes included, and appropriated to the culture of small fruits and vegetables. If possible, the gardener's house should be situate here, as being convenient for him, and as tending to scare depredators.

Walls.—For the production of the finer fruits, such as peaches, apricots, hardy grapes, and most of the delicate French and Flemish pears, the aid of walls is indispensable in our climate. Indeed in the northern and higher parts of the country, where there is no walled garden, the dessert can seldom consist of more than small fruits, and ill-ripened apples and pears. The north wall having, in the interior, a south aspect, is of course appropriated to the more tender kinds of fruit-trees; here, it is generally estimated, they enjoy an increased temperature equal to 7° of south latitude; that is to say, the mean temperature within a few inches of their surface is equal to the mean temperature of the open plain 7° farther south. The east and west walls are set apart for fruits of a somewhat hardier character.

The north wall is generally placed nearly perpendicular to the meridian, that is, so as to have the sun directly in front at 12 o'clock. Minute directions have indeed been given to make it face towards 11 or 11½ A.M., on the ground that thus it would sooner meet the rays of the morning sun; but it does not appear that this arrangement has been the subject of direct experiment, and certainly the arguments, by which the superiority of this aspect is supported, are far from being satisfactory. The east and west walls are commonly placed at right angles to that already mentioned, but they may follow the shape of the ground, and if this slope to the south, they descend with the declivity. This descent, however, should not be carried in a direct line parallel with the surface of the ground, but should be stepped or ramped, so that the cope may be level between each of the breaks. South walls are the most valuable in cold climates, and against them the hot-houses have generally been placed. This appropriation of them along the northern side of the garden, has led to the erection of a corresponding wall on the southern side also, and not unfrequently, when the garden is large, a cross wall is carried through the centre. To such walls there are objections, inasmuch as they shade the ground behind them, and render it cold by the exclusion of solar heat. The only advantage gained by them is that of their southern side, the opposite being next to useless, as no fruit-trees trained against it derive any advantage above being planted as open standards. Such walls also give the garden a confined appearance, and practically render it cold and deficient in ventilation. It is better, therefore, to extend the length of the principal wall beyond the space covered with glass, or to place the hot-houses in the centre of the garden, or, still better, in a compartment by themselves, constructing them of glass on all sides to within two feet of the ground, in the span-roofed, ridge and furrow, or curvilinear fashions. Thus little or no shade would be occasioned by them, and the front or south side of the garden would be open to the sun and air. The fence surrounding the slips will afford sufficient protection, or if no such exterior fence exist, the ends of the east and west walls may be connected by a rabbit-proof wire fence. However, as walls with a southern exposure are of so much importance for the ripening of our superior fruits, these ends may be better secured by running sunk or terrace walls across the ground than by the lofty walls at present in use. Where the inclination of the ground is considerable, such walls may not only be readily constructed, but they give a character of design as well as of utility at the same time. Their top should in no case rise more than three feet above the level of the ground behind, and a gravel walk should run parallel to them. As dryness is favourable to an increase of heat, it is necessary that such walls be either built hollow, or that they be packed behind to the thickness of three or four feet with rubble stones, flints, brickbats, or similar material, thoroughly drained at bottom, and forming the foundation of the walk referred to. Where the inclination of the ground is not great, then sunk walls may be employed, and the ground in front of them sloped back, so that the rays of light and heat may not be intercepted. Walls so situated will be warmer and much more sheltered than such as are built entirely above the surface.

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Regarding the height of walls, it is better to extend the surface by elongation than by carrying them to a great height. Twelve feet is in general taken as the average height, but this depends greatly on the extent enclosed. The largest garden should have its northern or principal wall 14 feet, and its side walls 12 feet in height. Spaces of an acre or so should have their principal walls 12 feet and side walls 10 feet in height. It is important to extend projecting wings to the extent of 12 feet, or the breadth of the exterior border at the four corners of the garden, as they break the force of the wind considerably. It is better, however, that these projections extend in a diagonal direction rather than in a straight line with the wall.

Material.—Bricks have almost universally been employed in England for this purpose, because brick is the material of the country. For a similar reason stone has, until within late years, been greatly used in Scotland. The manufacture of bricks has now reached as great perfection in the latter country as in the former, and the means of procuring them in all parts has led to their more general adoption. The principal advantage of brick walls is that they can be more readily built hollow than stone walls, which is of itself important. The cavity (about 9 inches) between the sides of the wall renders them dryer than any solid wall, as the capillary attraction of damp is arrested; and the more so as the cavity is charged with air admitted through small openings placed near the surface of the ground. Such walls also readily admit of having hot water pipes placed in them. A considerable economy in material is effected, and an equally strong wall is the result. Bricks cannot be too well burnt for garden walls; the harder they are the less moisture will they absorb. Their colour becomes softened down during the process from the harshness of brick colour to that of a dark stone colour, which is more in harmony with all surrounding objects. A prejudice, indeed, was long felt in favour of bricks, on account of the facility they afforded for training trees. That prejudice, however, is now set aside by the use of eyed cast-iron studs (*vide* fig. 1), which are placed in the wall during its erection, and pushed into the joints before the mortar becomes set. They are placed in straight lines, both vertically and horizontally, and are permanent. For Peaches, &c., they are 9 inches apart, and for Pears, &c., 15 inches. The trees are fastened to them by passing a piece of soft twine through the eye and round the branch.

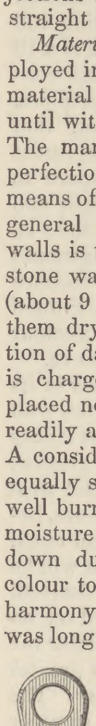

Fig. 1.

Many excellent walls are, however, built of stone.

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The best is dark-coloured whinstone (*the greenstone and basalt of mineralogists*), because it absorbs a very small amount of humidity. The best, however, in Scotland would be Caithness pavement, 4 inches thick, which absorbs even less moisture than the celebrated Bangor slate. Walls of that material could be built in regular courses, and cut (in the quarries) to any required length.

Common rubble walls are the worst of all, and where necessity compels their erection, they should be covered with Portland cement, and drawn off in imitation of ashlar.

Coping is an important element in garden walls, both for their preservation, and for throwing the rain-water off their surfaces; for, whatever produces dryness, tends to increase heat. The extent to which the coping should project must be regulated by local circumstances. On the west coast of Britain, where a much greater amount of rain falls than in the midland, and more especially on the east coast, the projection should, for a 12 feet wall, be 5 inches. In the very dryest districts 1½ inch, or merely as much as will throw the drip clear of the wall, but not of the trees, will be sufficient. A broader projection would deprive the trees of their natural supply of moisture by rain or dews. Of all material none is better than Caithness pavement.

As regards colour, no doubt black absorbs more and reflects less heat than any other colour; yet, although this is scientifically true, in practice little benefit is found to be derived from it.

Hot Walls.—Heating walls by means of smoke flues, as formerly practised, is worse than useless; and we may add, the application of the flues was just the reverse of what it ought to have been. The effect of a furnace on a smoke-flued wall is only to the extent of heating 400 superficial feet, or, in other words, 40 feet in length of a 10 feet wall; whereas the same furnace and the same consumption of fuel applied to a boiler and hot water pipes, will heat more efficiently 3000 superficial feet, that is, 300 feet in length of a 10 feet wall. In arrangement the boiler should be placed in the centre of the space to be heated, and the circulation made to flow right and left, on either side. The disadvantage of smoke flues is, that with them it is impossible to guard against extremes of heat at certain parts; that part nearest the furnace being too hot for the trees, while even towards its limited extremity little heat is perceptible. Also they discolour the wall by soot-stains which it is difficult to remove.

The advantage of heating by hot water consists in its greater economy and uniformity of operation, the wall deriving as much heat at 150 feet from the boiler as it does close to it. The first expense is doubtless somewhat greater, but it requires no expense afterwards. East and west walls are better adapted for heating than south ones, because in them the trees on both surfaces derive an equal heat, whereas, in the other case, much of the heat will be absorbed by the side from which no good is to be derived. The application of artificial heat to walls should on no account be practised in early spring, because the later the trees become excited and the blossom formed, the greater chance have they of escaping our spring frosts. The whole use of heated walls is to increase our summer temperature, and prolong it as late in autumn as will secure not only the ripening of our finest fruits, but also the ripening of the wood and maturation of the buds for the following season.

Espalier-Rails.—Subsidiary to walls as a means of training fruit-trees, espalier-rails were formerly much employed, and they still prevail in many parts of the country. In their simplest form, they are merely a row of slender stakes of larch, driven into the ground, and connected by a slight rod or fillet at top. Espalier-rails of wood, formed into pannels, fixed between upright standards, set on (not in) stones, are also employed. Their expense has, however, in most cases, been found nearly as great as that of walls of the same dimensions, while the advantage to the trees has been comparatively little. Cast and malleable iron rails have also to some extent been erected, but the well known property in all metallic substances to act as powerful conductors of both heat and cold in equal extremes, has led to their almost entire disuse. Modern improvements in pomology have shown that dwarf standard trees produce as fine fruit, and at a vastly less expense than espaliers, whether set in a vertical or horizontal position.

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Soils.—It is of great importance that the ground selected for a garden should be naturally of a good quality. A hazel-coloured loam, of a light or sandy texture, is well adapted for most crops, whether of fruits or culinary vegetables. As it is more easy to render a light soil sufficiently retentive, than to make a tenacious clay sufficiently porous, a light soil is preferable to one which is excessively stiff and heavy. It is advantageous to possess a variety of soils; and if the garden be on a slope, it will often be practicable to render the upper part light and dry, while the lower remains of a heavier and damper nature. The soil should be good to the depth of three feet, and any necessary additional deepening by manures or otherwise, should not be neglected. The nature of the subsoil demands particular attention. If it be strongly impregnated with metallic substances, or composed of cold till, it will prove pernicious to the roots of fruit-trees, and will scarcely admit of a remedy. A decomposing rock, or a bed of sand, is preferable. Perhaps the best of all is a dry bed of clay, overlying sandstone, which crops out within the enclosure. If the inferior strata be retentive, and if water lodge in any part of the garden, draining should be carefully executed, so as to carry off the superfluous moisture.

Irrespective of the removal of water, drainage is of vast importance, by admitting air, and with it solar heat, to the roots of plants. Vegetable physiology teaches us that plants depend greatly on a supply of air to their roots, and if it be denied them they ultimately perish. (See *Wall Borders.*)

The thorough drainage, and even vaulting of fruit-tree borders cannot be too much insisted upon, nor should gardeners overlook the important fact that drained land is in summer from 10° to 20° warmer than water-logged land lying contiguous to it. Professor Schabler, long ago, came to the conclusion, that the loss of heat, caused by evaporation in undrained lands, amounted from 11¼° to 13½° Fahr. Mr Park has also shewn, in his "Essay on the Philosophy of Drainage," that the thermometer in drained moss land rose in June, 1837, to 66° at 7 inches below the surface, while in the neighbouring water-logged land it would never rise above 47°. In the garden of the Hort. Soc., the mean temperature of the thoroughly drained soil at 1 foot below the surface, in the month of July, is 63° 49′, so that, if we take that of water-logged land to be the same as spring water, or 47°, there is a gain of 16½°. The reason why drained land gains heat, consists in the well known fact that heat cannot be transmitted *downwards* through water. The experiments made on vaulted borders at Yester bear out these facts in a remarkable manner.

Preparatory to the distribution of the several parts of a garden, it is proper that the ground be trenched to the depth of three feet at least; but the deeper the better. In this operation all stones larger than a man's fist are taken out, and all roots of trees, and of perennial weeds, are carefully extracted and cleared away. When the soil is not tolerably good to the depth of three feet, it will often be proper to remove a portion of the subsoil; and its place should be made up by a proportional quantity of turf or fresh loam from the fields. If the subsoil be gravel, and the upper layer sandy, the additional earth should be clayey loam; but if the original body of soil be of a compact texture, the materials introduced

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should be mixed with sand, marl, and other light opening substances. When the whole ground has been thus treated, a moderate lining will, in general, be useful. After this, supposing the work to have occupied most of the summer, the whole may be laid up in ridges, to expose as great a surface as possible to the action of the winter's frost. The draining, trenching, and other operations here recommended, will unavoidably be attended with considerable expense, which will not immediately be followed by any perceptible beneficial result. The lapse of a few years, however, will develope the vast advantages of such a mode of procedure, which, if neglected at first, cannot be adopted at a subsequent period but with indifferent success, and a great increase of care and labour.

Manures.—In enumerating the general appendages of gardens, it may be proper to say something of manures. Where there are extensive melon grounds, an abundance of stable and other litter is required; and this substance, in its partially decomposed state, as afforded by exhausted hotbeds, supplies a manure well adapted to aid the processes of vegetation. Decayed leaves, which are plentiful where there are extensive pleasure-grounds, also form an excellent manure for many purposes. Some practical men prefer composts, or such substances as have undergone fermentation, to simple dungs. For fruit-trees, turf from rich pastures, mixed with vegetable earth, is the best stimulant which can be applied. No trees are permanently benefited by the application of crude manures to their roots; and it is certain that many have been irremediably injured by this practice. But whatever caution may be necessary in their use in the fruit-garden, the prudent horticulturist will find it expedient to pay particular attention to the collection of manures. He cannot go on long without them in the kitchen-garden; for ground which is exhausted by continual cropping, requires to be continually repaired.

Internal Arrangement of Gardens.—A considerable portion of the north wall is usually covered in front with glazed structures, called hothouses, or forcing houses. To this practice there are exceptions. (See *Forcing Garden.*) To these the houses for ornamental plants are sometimes attached; but the last are more appropriately situate in the flower garden, when that forms a separate department. It is well, however, that every thing else connected with the forcing, whether of fruits or flowers, should be concentrated in one place. The melonry and pine-pits should occupy some well-sheltered spot in the slips, or on one side of the garden. Adjoining to this may be found a suitable site for the compost ground, in which various kinds of soils may be kept in store, and composts prepared. To this department free access should be had, so that carts may be admitted, a precaution seldom thought of, until the inconvenience is discovered by the increased expense and labour of wheeling in and out material.

Extensive gardens, in exposed situations, are often divided into compartments by hedges so disposed as to break the force of winds. Where these are required to be lofty yet narrow, holly, yew, or beech is preferred; but if space be no object, common laurel-bay is one of the most beautiful plants that can be employed for this purpose. Smaller hedges may be formed of evergreen privet, or of tree-box. These subordinate divisions, though often neglected, are worthy of attention; for, in addition to shelter, they furnish shade, which, at certain seasons, is peculiarly valuable. Gardens upon a large scale, and especially those laid out in the irregular manner, may have narrow belts of shrubbery running through them, producing picturesque beauty, and affording, at the same time, shelter and shade. These should be planted on elevated borders several feet above the general surface, combining all the beauties of the shrubbery and the utility of the kitchen-garden. And this is the more necessary if these shrubberies be so broad as to admit of walks passing through them, with occasional openings or outlets to the culinary departments.

Fruit and Kitchen Garden.

The distribution of the area of the garden in walks, borders, and compartments, may be regulated very much by the shape of the ground and the taste of the owner. In general, a gravel walk, six or eight feet broad, is led quite round the garden, both within and without the walls. A walk of similar dimensions is often constructed in the centre of the garden in the direction of the glazed houses, and this is sometimes crossed by another at right angles. Some times these walks are led diagonally from the corners. The space between the wall and the walk that skirts it, is called the wall-border, and is commonly from fifteen to twenty feet broad. On the interior of the walk there is usually another border five or six feet broad, which is generally occupied by fruit-trees trained to espalier-rails, or by dwarf standard trees. The middle part of the garden is divided into rectangular compartments for raising the various culinary crops. It is advantageous to have several small beds, in which to cultivate the less bulky articles, such as basil, sage, tarragon, &c., which, in large spaces, are apt to be overlooked or neglected.

Wall-Borders.—The preparation of borders for fruit-trees is a matter of the utmost importance, and no pains should be spared upon them. Where borders are not in good condition, the care and toil of the most experienced gardener will avail but little to the production of fruit. The most perfect wall-tree borders must be admitted to be those that are vaulted below, and have the soil for the roots placed upon a pavement flooring, which is supported by stone or brick piers, so constructed as to leave a cavity below of eighteen inches or two feet, into which air is admitted by small vertical eyes, placed along the edges of the walk and covered with open iron gratings. The next are those having earthenware tubular drains laid across the border, at distances of from eight to ten feet, with openings both at the side of the walk and also along the bottom of the wall, so as to introduce a circulation of air. Over these drains rubble stones, flints, brickbats, or similar material, are loosely laid, and these are again covered by a coating of coarse gravel, upon which the soil is to be placed. It is important, even beyond these precautions, that drains be placed so as to render the bottom perfectly dry. Formerly concrete and impervious bottoms were recommended, with a view of preventing the roots penetrating into the subsoil or descending too deep, and being beyond the reach of solar heat and air. Such bottoms were found defective, inasmuch as they retained water, and consequently excluded air. Good soil to the depth of two feet and a half is quite sufficient for any fruit-tree, it being better to extend the range of the roots horizontally than vertically, hence such borders should not be less than twelve feet in breadth. It is also well to give them a fall of six or eight inches from the wall. Three-fourths rich loam, and one-fourth light sandy earth, form a mixture congenial to the generality of fruit-trees.

Fruit-tree borders should never be cropped with culinary vegetables, the process of digging destroys the roots of the trees, which should, by every possible means, be induced to keep near the surface. In selecting the soil, regard may be had to the particular trees which are to cover different portions of the wall. Thus, a heavy soil may be allotted to pears and plums; loam of a medium character, inclining to be strong, to peaches, nectarines, and apricots; and a lighter earth to cherries and figs. Above all, care should be taken to render the borders sufficiently rich and substantial at their formation.

Standard Fruit-Trees should not be planted, if it can be avoided, in the borders of the kitchen-garden. Their roots are either mangled by digging about them, or their growth becomes too luxuriant, in consequence of the soil becoming too rich. They shade and injure other crops, and destroy that unity of expression which ought to exist in every highly kept kitchen-garden. They should be planted in the outer slips, where they may be allowed to attain a large size or be kept in a dwarfish state. Each sort of fruit should be planted by itself, to give an appearance of order and system, as well as to facilitate their protection by being covered with nets.

THE FRUIT GARDEN.

We shall first direct our attention to the culture of hardy fruits, or of such as, in our climate, do not require the assistance of much artificial heat. But before proceeding to a minute detail of the management of the different varieties, it may be proper to attend to some of the operations which are common to all.

The Preliminary Operations may be classed under the heads, Propagation, Planting, Training, and Protection of Blossom.

Propagation.

Propagation of Fruit-Trees by Seed.—Although fruit-trees are furnished with all the natural means of reproduction, it is not in general expedient to attempt to propagate them by the sowing of seed. This method is found to be equally tedious and precarious, requiring the labour of many years; and after all, existing varieties of fruits can be propagated by seed, so as to resemble the parent tree upon which they grew, only to a very limited extent; and the chance of an improved variety being produced by their means is exceedingly rare. This is so far owing to the great change which took place in the individual at the period of its origin, when by some cause to us unknown it appeared possessed of properties superior in size, colour, and flavour, to its parent. In other words, a seed is capable of growing into a new individual of the *same species*, but not, in the case of our cultivated fruits, into the *identical variety* of that species. In the great majority of cases, while the new individual retains its *specific characters*, it will be very different from *the variety*, in general very inferior to it; for, following a natural law, it will recede towards its original type, *e. g.* the wild crab in the case of the apple, and the almond in the case of the peach. "But while it will with certainty become the same species as that in which it originated, it does not possess the power of reproducing any of the peculiarities which may have existed in its parent. For instance, the seed of a Green Gage Plum will grow into a new individual of the Plum species, but it will not produce the peculiar variety called the Green Gage. This latter property is confined to leaf-buds, and seems to be owing to the seed not being specially organized after the exact plan of the branch on which it grew, but merely possessing the first elements of such an organization, together with an invariable tendency towards a peculiar kind of development."—(Lindley's *Theory of Hort.*) All our present admired fruits are regarded as seminal varieties obtained from the wild inhabitants of the forests, which have been trained into an artificial condition; and when sown seem to have a tendency to resume their original constitution. In the peach-orchards of America, for instance, which are planted with the kernels of choice sorts, there are seldom more than a few trees affording fruit fit for the table; the produce of the majority being so worthless, that it is usually employed for feeding hogs. Notwithstanding this inconvenience, there are some considerations which render this mode of propagation at once interesting and important to horticulturists. It is the only way by which we can procure new kinds of superior qualities. The late Thos. And. Knight promulgated the theory that by rearing fruit-trees from seed he could produce a re-invigoration of our older varieties, which he believed to be hastening to decay, if not total extinction; and further, that new generations of fruits reared from seed would become hardier and better adapted to our climate, by what he denominated acclimation. Modern vegetable physiologists deny the truth of both these theories, and assert that no deterioration has taken place in even our oldest fruits, some of which have been in cultivation since, if not prior to, the days of Pliny.

The well known Pomme d'Apis or Lady Apple is historically asserted to have been brought to Rome from Peloponnesus by Appius Claudius. Dalechamps and Harduin are of opinion that it is the Petisia of Pliny, who describes it—"Odor est his Cotonearum, magnitudo quæ Claudianis, color rubens." This variety does not appear to have changed its character during this long succession of ages. In further corroboration of this, Mr Hogg, in "British Pomology," remarks, "the Pearmain, which is the oldest English apple on record, shows no symptoms of decay, neither does the Catshead, London Pippin, Winter Queening, nor any other variety—those only having been allowed to disappear from our orchards which were not worth perpetuating, and their places supplied by others infinitely superior."[1] As regards acclimation, Mr Knight's theory is proved to be equally erroneous, as we have no evidence that plants long cultivated in this country are able to withstand our winter cold better than formerly. The Dahlia, Heliotrope, and the Potatoe, are affected in the same way by frost as when they were first introduced. Mr Knight entertained the opinion, deduced, we may presume, from experiment, that more is to be expected from hybrid varieties than from the mere reproduction of old kinds; he therefore had recourse to the nice operation of dusting the pollen of one kind on the pistil of another. He opened the unexpanded blossom of the variety destined to be the female parent of the expected progeny, and, with a pair of fine-pointed scissors, cut away all the stamens, while the anthers were yet unripe, taking care to leave the style and the stigma uninjured. When the female blossom, thus prepared, came naturally to expand, the blossoms of the other variety destined to be the male parent were applied. Mr Knight has often remarked in the progeny a strong prevalence of the constitution and habits of the female parent, a circumstance confirmed by subsequent experiments.

Although the expected results are not obtained, yet cross-impregnation or hybridization is followed by certain results of immense importance in the production of improved varieties. By this means the Strawberries of the present day are so much improved, in size at least, that many of them bear little resemblance to their original parents of several generations back. The Apple, the Pear, the Peach, and the Plum, have all been so improved, but no perceptible difference has been effected in rendering them hardier than their progenitors.

The process of crossing, or even raising from seed, should nevertheless be encouraged, as it is the only means by which improved sorts are to be procured.

In the case of cross-impregnation, every seed, though taken from the same fruit, produces a different variety; and these varieties, as might be anticipated, prove to be of very various merit. In general, those seeds are to be preferred which are plump and round. An estimate of the value of the seedlings may be formed, even during the first summer of their growth, from the resemblance they bear to those of highly cultivated and approved trees. The leaves of promising seedlings improve in character, becoming thicker, rounder, and more downy every season. Those whose buds in the annual wood are full and prominent, generally prove more productive than those whose buds are small and shrunk into the bark. An early disposition to produce blossom buds, late flowering in spring, and the production of hardy blossoms, are desirable characteristics. It has been observed, that even after a seedling tree has commenced bearing, its fruit has a tendency to improve as the tree itself acquires vigour, so that, if, in the first season, there is any considerable promise, a great improvement may be expected in succeeding years.

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[1] Professor Mohl, a German physiologist of the highest repute, thus speaks of the fallacy of Mr Knight's theory—"Thousands of experiments have shewn that the young shoots of old trees, when used as grafts, slips, &c., furnish as strong plants as the shoots of young trees. Not one single experiment speaks in favour of the opinion promulgated by Mr Knight, that all parts of a tree have a common end to their life, and that the different trees from which they have been raised from one and the same tree by grafts, decay about the same time as the parent plant."

The slowness with which seedlings reach the bearing state has been the subject of complaint among horticulturists, and indeed is the principal reason why this mode of propagation has not been more frequently practised. According to Mr Knight, the pear requires from twelve to eighteen years to reach the age of maturity; the apple from five to twelve or thirteen years; the plum and cherry four or five; the vine three or four; and the raspberry two years. The peach he found to bear in two, three, or four years. This period, however, must depend on the soil, situation, and mode of culture. In the warm and highly manured garden of M. Van Mons at Brussels (called "Pepinière de la Fidélité,") seedling pear-trees produced fruit in considerable quantities in the sixth and seventh summers. The best means of accelerating the epoch of bearing seems to be to make the trees grow vigorously when young. Crude manures are to be avoided; but vegetable earth, and, above all, a liberal supply of rotted turf, are wholesome and excellent stimulants. The seed-bed, and the ground on which the seedlings are transplanted, should be extremely well worked and comminuted with the spade; and should not be too much exposed to the parching rays of the sun, or the action of the wind. Great care ought to be taken to prevent the young plant from becoming stunted. In pruning, the small twigs in the interior should be removed, so as to relieve the tree from the bushy appearance which it frequently assumes. It has been wisely recommended to transfer scions and buds of promising individuals into other trees in a bearing state. This is peculiarly advantageous with respect to the peach and other stone fruits, as it both hastens the period of maturity, and economises the space which must be occupied on the wall.

Propagation by Cuttings.—Gooseberries, currants, figs, vines, and some others, are increased by means of cuttings. An annual shoot is taken off, along with a thin slice, or *heel*, as it is called, of the former year's wood, which is found to facilitate the production of roots. The cuttings are placed firmly in the soil, at various depths, according to their length, the buds or eyes which would thus come beneath the surface having been previously removed. Vines should in all cases be propagated from small pieces of shoots having a single bud; a shoot of an inch in length may suffice. Most of the codlin apples may be increased by cuttings; and even large branches of those which produce *burs*, may be planted at once, with success. In all deciduous trees, the operation is most advantageously performed in winter.

Propagation by Layers.—This is not much resorted to in the fruit-garden. It is occasionally employed as the means of dwarfing trees. "Laying," says Mr George Lindley, "is nothing but striking from cuttings which are still allowed to maintain their connexion with the mother plant by means of a portion at least of their stem." The operation is performed by bending down a branch to the earth, and pinning it there with pegs. A notch or slit is cut upwards, generally from the insertion of a bud. Sometimes the shoot is pierced with a number of holes; a wire is bound round it; or even a ring of bark is removed. The object of these expedients is to retard the descending sap, and thus to promote the formation of radicles, or young roots. This is also aided by bending the branch upward from the point at which the roots are wanted; and the whole branch, except a few buds at the extremity, is covered with soil. The seasons best fitted for these operations are early spring and midsummer, that is, before the sap begins to flow, and after it has completely ascended. One whole summer, sometimes two summers, must elapse before the layers will be fully rooted.

Propagation of Fruit-Trees by Grafting.—By this method apple and pear trees, sometimes plum and cherry trees, are propagated. Our attention must be directed to the *stocks* into which the shoots or scions, as they are called, are inserted; to the *scions* themselves, and to the *mechanical operations* employed in grafting.

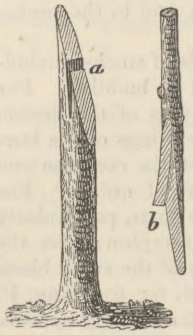
The following are the principal kinds of stocks, including, by anticipation, such as are used in budding. For *apples*, seedlings of the crab apple, layers of the doucin or paradise, and of the codlins, with cuttings of the burknot varieties. For *pears*, seedlings of the common and wilding pear; with seedlings or layers of quince. For *plums*, seedlings of any of the common sorts, particularly the muscle, the Brussels, and the Brompton; also the Bullace plum. For *cherries*, seedlings of the small black cherry or gean, Prunus Avium; and, for dwarfing, P. Mahaleb. For *apricots*, seedlings of the wilding apricot, with the muscle and Brussels plums. For *peaches* and *nectarines*, seedlings of the muscle, white pear-plum, and Damas noir plum, the almond, and the wilding peach.

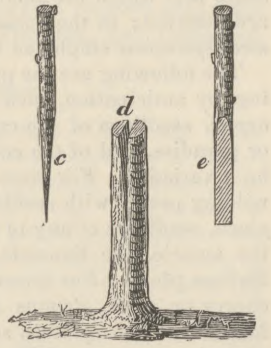
Stocks for this purpose are commonly divided into two classes, viz. *free-stocks* and *dwarfing-stocks*. The former consist of seedling plants, chiefly of the same genus or species as the trees from which the scions are taken. The latter are plants of diminutive growth, either varieties of the same species, or species of the same genus as the scion, which have a tendency to lessen the expansion of the engrafted tree. The Paradise or Doucin is the dwarfing stock for apples, the Quince for pears, the Bullace, and more recently the Sloe for plums, and Prunus Mahaleb for cherries. The nature of the soil in which the grafted trees are destined to grow, should also have weight in determining the choice of stocks. When the garden is naturally moist, it is proper to graft pears on the quince, because this plant agrees with a moist soil, and at the same time serves to check the luxuriance thereby produced. In France, peaches are commonly budded on almond stocks, to adapt them to the dry soils of that country. The seeds from which stocks are to be raised, are generally sown in beds in March; but the germination of some kinds is promoted by placing the seed, for a time, in moist sand in a greenhouse. Next season the seedlings are transplanted into nursery rows, in which they are allowed to reach the size necessary for the various forms of fruit-trees hereafter to be mentioned.

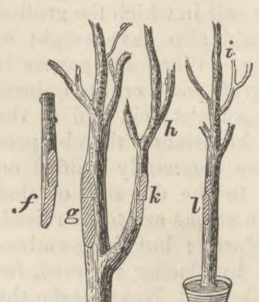
The *scion* is always a portion of the wood of the preceding year. As the diseases incident to fruit-trees are transmitted by this mode of propagation, it is desirable that the parents should be as healthy as possible. In the shy-bearing kinds it has been found beneficial to select shoots from the fruitful branches. The scions should be taken off some weeks before they are wanted, and half-buried in the earth, as it is conducive to success that the stock should, in forwardness of vegetation, be somewhat in advance of the graft. During winter, grafts may be transferred from great distances, as from America, or any part of the Continent of Europe, if carefully wrapped in hypnum moss. If they have been six weeks or two months separated from the parent plant, they should be grafted low on the stock, and the earth should be ridged up around them, leaving only one bud of the scion above ground.

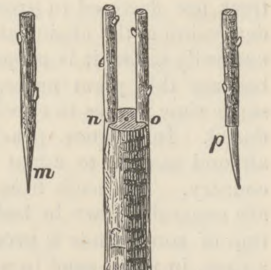
Success in *grafting* depends almost entirely on accurately applying the inner bark of the scion to the inner bark of the stock, so that the sap may pass freely from the one to the other. They are therefore fitted together, and held fast by a bandage of strips of bast matting. To lessen evaporation, a portion of ductile clay is moulded around the place of junction, and is retained until it appears, from the development of leaves, that the operation has succeeded. The best season for grafting is the month of March; but it may be commenced as soon as the sap in the stock is fairly in motion, and may be continued during the first half of April.

The most usual mode of grafting is called *whip-grafting*, or *tongue-grafting*, *a*, *b*. The top of the stock and the base of the scion are cut off obliquely at corresponding angles, as nearly as can be guessed by the eye; the tip of the stock is then cut off horizontally; next a slit is made downwards in the centre of the sloping face of the stock, and a corresponding slit upwards in the corresponding face of the scion. The tongue or upper part of this sloping base is then inserted into the cleft of the scion, and so adjusted that the inner bark may unite neatly and exactly on one side. The junction is then tied up and covered with clay. Several other methods may be mentioned, such as *Cleft-grafting*, *c*, *d*, *e*, in which the scion is sloped at the base, and inserted like a wedge into a cleft in the stock; *Side-grafting*, *f*, *g*, which resembles whip-grafting, but is performed on the side of the stock without heading it down; *Crown-grafting*, in which the scions, *m*, *p*, are inserted between the bark and the wood of the stock; *Grafting by approach* or *inarching*, resembling whip-grafting, except that the scion *h* remains attached to the parent plant, till its union at *k* and *l* with the new stock *i* be complete; when that portion of the stock above the union may be headed down, and the scion at the same time detached from the parent plant.



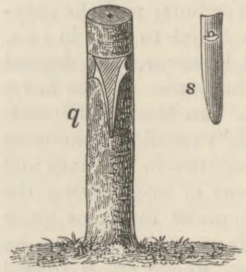


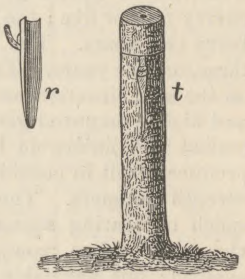




Root-grafting is performed in the modes just described, except that the scion is placed on a piece of root (as a stalk), of proper thickness, and with fibres and fibrils attached to it. In the most unfavourable soils, some sorts of fruit-trees thrive better than others; and it has been suggested, that by using root-stocks of such flourishing trees, and grafting other desirable kinds on them, canker may often be avoided, and the better kinds of fruit produced.

Propagation by Budding.—Most kinds of fruit-trees may be propagated by budding; and there are some, such as peaches and apricots, which can scarcely be multiplied in any other manner. It consists in removing a bud with a portion of the bark from one tree, and inserting it in a slit of the bark of another tree. The season for performing this operation is in July or August, when the buds destined for the following year are completely formed in the axils of the leaves, and when the portion of bark parts freely from the wood beneath. The buds to be preferred are those on the middle of a young shoot. There are many forms of budding, but that which is simplest, and is generally practised in this country, called *Shield-budding*, may alone be described. The operator should be provided with a budding-knife, in which the cutting edge of the blade is rounded off at the point, and which has a thin ivory or bone handle, like a paper-folder, for raising the bark of the stock. A horizontal or transverse incision is made in the bark quite down to the wood, and from this incision a perpendicular slit is drawn downwards, to the extent of perhaps an inch. The slit has now a resemblance to the letter T as at *q*; a bud is then cut from the tree intended to be propagated, having a portion of the wood attached to it, so that the whole may be an inch and a half long, as at *s*. The bit of wood is then gently withdrawn, care being taken that the bud adhere wholly to the bark or shield, as it is called, as at *r*, which is the reverse of *s*. The bark on each side of the perpendicular slit being cautiously opened with the handle of the knife, the bud and shield are inserted, as at *t*. The upper tip of the shield is cut off horizontally, and brought nearly to fit the bark of the stock at the transverse incision. Slight ties of moist bast-matting are then applied. In about a month or six weeks the ligatures may be taken away, when, if the operation has been successful, the bud will be fresh and full, and the shield firmly united to the wood. Next spring a strong shoot is thrown out, and to this the stock is headed down in the course of the summer.





PLANTING FRUIT-TREES.

In transferring the young trees to those places, whether in the open border or against the wall, where they are to remain, it is important that the situations should be carefully selected; adapting the trees to sites suitable in respect of soil, shelter, and aspect. The trees should be cautiously lifted from the nursery lines, all mutilation or bruising of the roots being carefully guarded against; and, to prevent the desiccation of the fibres, they should be planted as soon as possible after being lifted. When they have to be carried to a distance, the roots should be enveloped in damp hypnum-moss. In the ground, which is presumed to have been previously trenched or otherwise prepared, pits or holes are formed, and the soil is finely pulverized; and in these the trees are placed, their roots being spread out and intermingled with the earth. Shallow planting is strongly recommended, two or three inches of soil being in general a sufficient covering. The doucin or French paradise stocks are preferable for this reason, that they throw out delicate fibres which readily spread along the surface, instead of bundles of hard roots which generally characterize crab stocks. On filling up the hole, a surface of at least an equal size is *mulched*, that is, covered with dung or litter, so as to restrain evaporation, and preserve moisture. In the case of wall-trees, a space of five or six inches is usually left between the stem at the insertion of the roots and the wall, to allow for the effects of growth. Young standard trees are tied to stakes, to prevent their roots being ruptured by the wind-waving of the stems. During the dry weather of the first summer, the trees should be watered from time to time as occasion may require.

The selection and distribution of the different kinds of fruit-trees is an important and interesting point in the formation of a garden. Regard must necessarily be had to local situation and climate, as the selection ought manifestly to be different for a garden in the south-west of England, and for one in Yorkshire or in Scotland; for one near the level of the sea, and for another elevated several hundred feet above it. The best walls, having a south or south-east aspect, are devoted to the grape-vine, the fig-tree, the peach and apricot. The finer varieties of French and Flemish pears require and deserve a good aspect, as also the early sorts of cherries. The later cherries, and the generality of plums, succeed very well either on an east or west aspect. In Scotland, the mulberry requires the protection of a wall, and several of the finer apples do not arrive at perfection without it.

The wall-trees intended to be permanent are called *dwarfs*, from their being grafted near the ground. Between each of these, trees with tall stems, called *riders* in Scotland, and standards in England, are planted as temporary occupants of the upper part of the wall. The riders should always be five or six years trained in the nursery, in order that when planted out they may come into bearing as speedily as possible. The distances at which the permanent trees are planted is to be regulated by the known growth of the different sorts, and by the height of the wall. When the walls are about twelve feet high, the following average distances have been recommended:—For vines, 10 or 12 feet; peach and nectarine trees, from 15 to 20 feet; fig-trees, 20 feet at least; apricots, from 15 to 24 feet; plums and cherries, from 15 to 20 feet; pear-trees, 20 feet if on quince stocks, and 30 feet on free stocks; apple-trees, 12 feet if on paradise stocks, and 15 to 25 feet on free stocks. Where the walls are only seven or eight feet high, the distance should be increased by nearly one-fourth, as in this case the want of height must be compensated by greater breadth.

Apples and pears make the best espalier-rail trees. These should be of the more robust sorts, and should be planted at the distance of 15 or 20 feet. Cherries and plums are sometimes introduced into the espalier-rail row, but succeed only where they would do equally well or better as standards.

In many small gardens, dwarf standards are preferred to espalier-rail trees. They are placed along the inner borders at 8 or 10 feet apart. When proper attention is paid to such trees, the effect is very pleasing, each being in itself a handsome object, and generally clothed with fine fruit. Where the situation is warm, and the climate favourable, a few of the finer pears which have hardy blossoms should be planted out in this form. Though they may fail to ripen in some seasons, they will often add greatly to the resources of the fruit-room, their produce being frequently superior in flavour to the fruit grown on walls.

Training.—Two functions belong to training,—that, namely, which modifies the form of the tree, and that which regulates the bearing wood, and consequently the supply of blossom. The latter, more accurately termed *pruning*, being of a varied character, will more properly fall to be considered when treating of the several fruits; at present we shall make a few remarks on the former. The essential properties of training are, that it should be simple, not requiring frequent amputation; that it should be appropriate to the growth of the tree; and that it should be such as to facilitate the production of fruit. The knife is the great instrument in training, and whoever can wield it skilfully, will have a perfect command over his trees: at the same time, it may be laid down as a maxim, that it should be used with some degree of reserve, as nothing is more prejudicial to the health and fruitfulness of all sorts of fruit-trees, than severe and injudicious cutting.

Training of Standards.—Orchard-trees are generally worked in the nurseries with stems five or six feet high. All that is necessary, in pruning trees of this sort, is merely to cut out the branches which cross or press upon one another. Bushy heads should be thinned out, and those which are too lax cut back. Three or four leading branches may be selected, to pass ere long into boughs, and form a handsome skeleton for the tree; but it is useless to be finical in this matter, as these branches will soon grow beyond the power of the pruner, and of any artificial system which he may adopt. Dwarf standards being more accessible, are more under the dominion of training. When worked on paradise stocks, they may be kept not much superior in size to gooseberry bushes, and in a state of abundant fruitfulness. The more fanciful Dutch modes of training apple-trees, in the cup-and-ball fashion, and after many other curious devices, have never been relished in Britain. In this country, they are generally allowed to grow *en buisson*, that is, as bushes. For pears, the French forms, *en pyramide*, fig. 2, and *en quenouille*, fig. 3, are in most esteem.

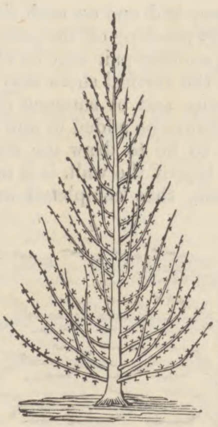


Fig. 2.

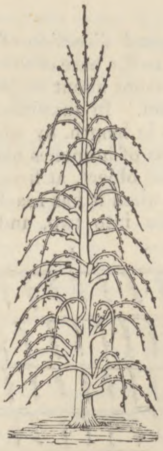


Fig. 3.

Training of Wall-Trees.—A fruit-tree planted against a wall is evidently in a constrained and artificial situation, from which it makes continual efforts to escape. Much attention is necessary to repress this tendency, which, were it permitted to act, would disfigure the tree, and neutralize the advantages of a wall, without imparting in

Fruit Garden.

their place the freedom of a standard in the open air. To be successful, the operator should be acquainted with the theory of vegetation, should study the mode of growth in different trees, and, above all, remember the purpose of all training, viz. the production of bearing wood.

One great difficulty is to preserve equilibrium in the growth of the several parts of the same tree; for the attainment of this object, excellent hints are to be found in the *Pomone Française*. A shoot will grow more vigorously whilst waving in the air than when nailed close to the wall; a weak shoot should therefore be left free, whilst its stronger antagonist should be restrained. A shoot diverging slightly from the perpendicular, will, other things being equal, obtain a more copious supply of sap than one that is laid out horizontally, or is deflected downwards. A luxuriant shoot may be retarded for some time by having its tender extremity pinched off, and may thus allow a weaker brother to overtake it. By these and other expedients, which will suggest themselves to an attentive horticulturist, and by the prudent use of the knife, it will be easy to execute the following forms, which, on account of their simplicity and general excellence, we select out of many to be found detailed in works on gardening.

The *horizontal* form (fig. 4.) has long been a favourite in this country. There is one principal ascending stem, from which the branches depart at right-angles, at intervals of ten inches or a foot. In trees of ordinary vigour the vertical shoot is cut back every winter to within fourteen inches of the highest pair of branches: a number of shoots are produced in the beginning of each summer, out of which three are selected: one is trained in the original direction of the stem, and one on each side of it parallel to the base of the wall. By pinching off the point of the leading shoot about midsummer, another pair may be obtained in autumn. In luxuriant trees, the vertical shoot may be left two feet in length, by which means, and by summer pruning, four pairs of branches may sometimes be added in one season. The great object, at first, ought to be to draw the stem upwards: when it has reached the top of the wall, it is made to divaricate into two, and the tree, thus completed as to its height, is henceforth suffered to increase in breadth only.

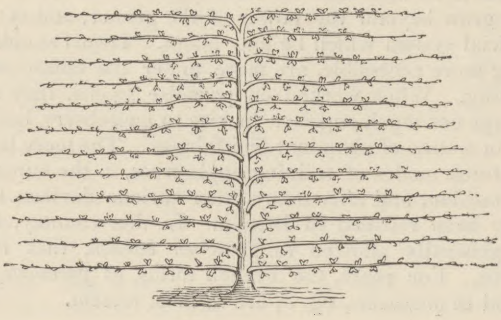


Fig. 4.

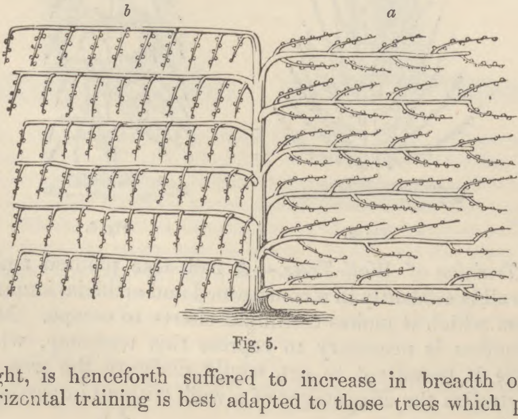


Fig. 5.

Horizontal training is best adapted to those trees which produce strong shoots, as the Ribston Pippin apple, or the Jargonelle pear. For the more twiggy kinds, the form represented in fig. 5 is more suitable. In this the horizontal branches are eighteen or twenty inches distant, and the small shoots are trained in between them, either on both sides, as below letter *a* in the figure, or on the under side and downwards, as below *b*. This last is an excellent method of reclaiming neglected trees of this description. Every alternate branch being taken away, and the spurs cut off, the young shoots are trained in, and soon produce good fruit. It is rather singular that the late M. Thouin, in his account of the *Ecole d'Horticulture pratique du Muséum*, classes the horizontal form among *les tailles hêtéroclites*, and says, that, in consequence of its invariably producing a *tête de saule*, that is, a hedge of young shoots at the top, it has been long since abandoned. From this remark, we cannot help drawing the conclusion, that in France the theory of training must be in advance of the practice.

Fruit Garden.

The other principal form is called *fan*-training. In this there is no leading stem, and the branches are arranged somewhat like the spokes of a fan. Fig. 6 represents this shape as it commonly occurs in gardens. In the case of apple and pear trees, this mode, though frequently adopted, is not superior, perhaps not even equal, to the horizontal configuration: it is evident, that when the branches reach the top of the wall, where they must be cut short, a *tête de saule* is inevitable. It would be better to adopt a modification of the fan shape used for stone fruits (fig. 7); to establish a certain number of mother branches, and on these to form a series of subordinate members, chiefly composed of bearing wood. The mother branches or limbs should not be numerous, but well marked, equal in strength, and regularly disposed. The side branches should be pretty abundant, short, and not so vigorous as to rival the leading members. To ensure regularity, training should commence with maiden plants, or such as have only one year's growth from the graft; leaders of equal strength should be selected, and encouraged to grow out longitudinally as much as possible, and all crowding among the inferior shoots should be prevented. In *riders* this form passes into the stellar arrangement. The French have made considerable improvements in this mode of training, some of which will be noticed when we come to treat of the training of the Peach.

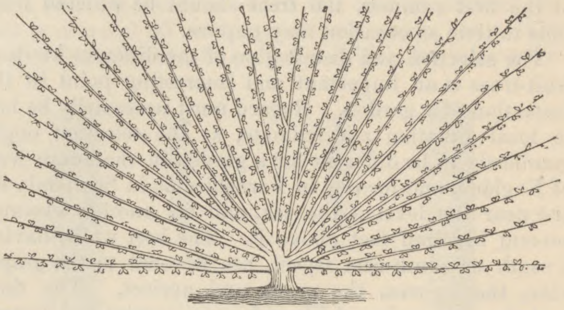


Fig. 6.

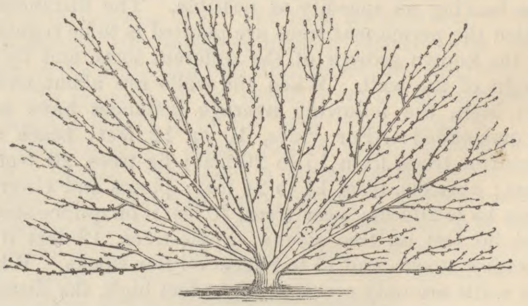


Fig. 7.

Intermediate between horizontal and fan training, is the *half-fan*. It is nearly allied to the horizontal form, but the branches form an acute angle with the stem, and this disposition is supposed to favour the equal distribution of the sap. In the winter pruning, three and sometimes four central branches are cut back; the shoots which arise from these are arranged in the fan order, and, as they elongate, are gradually brought into the horizontal position. The tree is finished at top as in the horizontal form. Sometimes, as in fig. 8, two vertical stems are adopted. For vigorous trees, this figure seems to combine the advantages of both the foregoing.

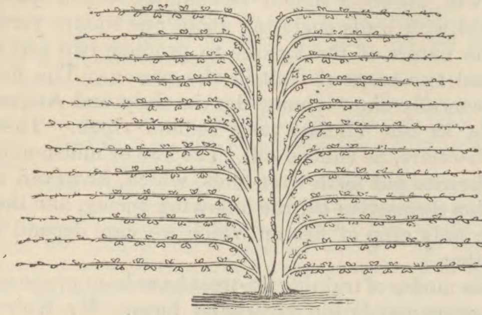


Fig. 8.

The choice of particular modes of training is too often determined by mere fashionable prejudice, which leads to the application of the same form to all sorts of trees. Thus the French are apt to reduce every thing to the *fan* system, while some English horticulturists are inclined to force trees of the most rambling growth into the pillory of a *horizontal* arrangement. Such a uniformity cannot possibly be in accordance with nature. The enlightened cultivator will employ various forms, and will determine for himself which is the most appropriate, not only for every species, but even for each particular variety of fruit-tree. By attentive observation and rational experiment, more knowledge in this department may be attained in a few years, than by a whole life spent in routine practice.

Of the expedients for inducing a state of fruitfulness in trees, the most common is the cutting back of the roots to within three or four feet of the stem; an operation which is generally found efficacious, when barrenness proceeds from over-luxuriance and too copious a supply of sap. To attain the same end, recourse is sometimes had to *ringing* the branches or stem, that is, removing a narrow annular portion of the bark. The trees, it is said, are thereby not only rendered productive, but the quality of the fruit is at the same time apparently improved. The advantage is considered as depending on the obstruction given to the descent of the sap, it being thus more copiously afforded, in its elaborated state, for the supply of the buds. The ring should therefore be made in spring, and of such a width that the bark may remain separated for the season. It ought to be observed, however, that none of the stoned fruit-trees are benefited by ringing. The operation, however, is a species of mutilation, rendered unnecessary by judicious root pruning. Sometimes barrenness proceeds from defect of climate and poverty of soil; in which case, a warmer situation and more generous treatment are the most effectual remedies. Fruit-trees should never, if possible, be allowed to become stunted; for in this state they produce only worthless fruit, and acquire a habit which scarcely admits of amelioration.

Protection of Blossom.—In our variable climate, and particularly in the northern and eastern parts of the island, it is very desirable that the horticulturist should be provided with the means of defending the blossom of his fruit-trees from the late frosts in spring. Some recommend frames covered with bunting, osnaburg, or similar light fabrics, set in a sloping position in front of the trees. The best protection for wall trees are portable wooden copings, about nine inches in breadth, fixed to permanent iron brackets placed in the wall immediately under the stone coping. These wooden protectors should be put on during spring before the blossom buds begin to expand, and to them should be attached scrim cloth (a sort of very thin canvas), admitting light pretty freely, yet of itself sufficient to ward off our ordinary frosts. This canvas to be let down towards evening, and drawn up again in the morning. Any contrivance that serves to interrupt radiation, though it may not keep the temperature much above freezing, will be found sufficient. Standard fruit-trees must be left to their fate, and, indeed, from the lateness of their flowering, they are generally more injured by blight, and by drenching rains, which wash away the pollen of the flowers, than by the direct effects of cold.

CULTURE OF HARDY FRUITS.

We now proceed to the more special culture of the inmates of a British fruit-garden. We shall begin with the more tender, but for details regarding these, we must, to a considerable extent, refer to the forcing department, in which alone many of the finer fruits can be perfected. We will confine our lists of fruits to selections from the very best kinds in cultivation. Those who are curious in this department of pomology, may further consult the "Fruit Catalogue of the London Hort. Soc.," "The Book of the Garden;" for American fruits, "Downing's Fruits and Fruit-trees of America;" for apples alone, "Hogg's British Pomology;" and for coloured representations, the "Pomological Magazine," and "Pyrus Malus Brentfordensis." The recently established "Pomological Society of London" will hereafter be the medium through which information will be gained of all that is interesting regarding the nomenclature and merits of new fruits.

The Grape Vine (*Vitis vinifera*) can scarcely be said to be a hardy fruit in our climate. In every case it requires a good aspect; and north of York, a crop of *dessert* grapes cannot be expected without the aid of a hot wall. In the extreme south-west districts of England, indeed, grapes fit for the manufacture of wine, perhaps equal in quality to those in the north of France, might be produced on dwarf standards; and there is abundant historical evidence that productive vineyards once existed in that part of the country.

In the Lond. Hort. Soc. Catalogue, 197 varieties of grapes are enumerated. Some of these, however, have not as yet been well ascertained; some are pronounced indifferent, and others worthless. We shall name only a few of those most deserving the attention of the cultivator.

Black Damascus. Bunches large, with round berries and sweet juice. This valuable late variety does not set well, and the bunches are improved by the blossom being dusted with the pollen of some hardy kind.

Frontignan (or *Frontignac*). Five varieties under this appellation, and distinguished by the names of *black, blue, grizzly, red,* and *white,* are mentioned in horticultural catalogues. They vary in colour and form of the cluster. The berries are round, the skin thick, and the juice of a rich muscat flavour. They are all of the highest excellence.

Black Hamburgh. This is a well-known grape, of great value, and perhaps more generally cultivated for the dessert in this country than any other sort. It ought to be in every collection. Of this excellent grape there has long existed seminal varieties, and late years have added to their number the following, viz.:—Wilmot's Black Hamburgh; Black Prince Hamburgh; Pope's Hamburgh; Judson's Richmond Villa Hamburgh; Mill Hill Hamburgh; and more recently a white variety said to be a hybrid between the muscat of Alexandria and Black Hamburgh.

Black Lombardy (or *West's St. Peter's.*) Bunches large, berries round, skin thin, with a sweet flavour; an excellent late sort. The fruit will hang on the vines till March.

Chasselas Musqué. Bunches medium size, long and loose, berries globular, yellowish when ripe, and apt to crack if grown in too damp an atmosphere; one of our very best grapes.

Royal Muscadine, L. Hort. Cat. or *White Muscadine* of Lindley. Usual Chasselas of Paris. This, though not a first rate grape, is a favourite with many. Bunches large, berries white, round, with sweet flavour.

Muscat of Alexandria. Bunches long, berries white and oval, with a delicious muscat flavour. This most admirable variety requires a high temperature, and should properly have a small vinery for itself.

White Sweet Water. Bunch loose, berries round, flavour sweet. It ripens early, generally from the middle to the end of September; and in the south of England it succeeds against the open wall.

The bunches should be allowed to hang until they are perfectly ripe, when the berries acquire a slight russet colour. It has long been a favourite grape.

Nice, or *White Nice*. Bunches extremely large, berries medium size, greenish white, globular. Habit robust, foliage large and downy underneath, keeps long after ripening.

Stillward's Sweetwater, or *Chasselas précoce*. It is desirable for earliness, and the bunches possess the property of keeping good on the plant for two or three months after the berries are ripe.

Trebbiana, a comparatively new grape, somewhat resembling the Tokay, esteemed for its keeping long after ripening.

The *Black Prince* is of easy cultivation, and the berries are of a pleasant flavour.

The *Verdelho* has loose bunches, berries of a greenish-yellow colour, small, oval, numerous; when fully ripe, of a rich saccharine flavour. It is the principal grape cultivated in Madeira for making the celebrated wine of that island.

Barbarossa. Of this kind there are a black and a white variety, both recently introduced and esteemed for their properties of long keeping.

The *Esperione*, or *Turner's Early Black*, has the bunches large and shouldered, not unlike those of the Black Hamburgh. The berries are of a fine dark colour, with a bluish farina or bloom; the pulp adheres to the skin; and though neither highly flavoured nor melting, it is very pleasant. This grape ripens on the open wall near London.

The *Syrian Grape* is remarkable only for the extraordinary size and beauty of its bunches; it is a late variety, and the berries are sweet and not without flavour, when properly ripened; but, in general, it is a worthless variety.

For an ordinary vinery the following may be recommended:—Black Hamburgh, Black Tripoli, Chasselas musqué, Stillward's Sweetwater, Royal Muscadine, White Frontignan, and Black Lombardy. For a stove or late vinery may be particularized the Grizzly Frontignan, Black Tripoli, Muscat of Alexandria, Canonhall Muscat, Barbarossa black and white, Hamburgh, Nice, and Chasselas musqué. For training against the rafters of a greenhouse, the Black Prince, Verdelho, Esperione, and Black Cluster, are among the best.

The kinds commonly grown against the open wall in England are the Miller Burgundy, Esperione, White Muscadine, White Sweetwater, Early Black, Grove-End, and Pitmaston White Cluster. In the north of England, and in the south of Scotland, vines always require hot walls. Vine culture on the open wall, in this country, can never be calculated upon with any degree of certainty.

THE FIG.

The Fig-Tree (*Ficus Carica*) is not generally a favourite in this country. Every good garden ought, however, to contain a few trees to furnish a supply during the natural season. The foliage of the tree is large and elegant, and the mode of fructification is curious: the pulpy part, which we call the fruit, being, in fact, a common receptacle, and the anthers and stigmata being produced inside.

The following are the most esteemed:—Angelique, Brunswick, Large White Genoa, Black, White, and Brown Ischias, Malta, Lee's Perpetual, Marseilles, Nerii, Brown Turkey, and Pregussata.

Of these, the Marseilles, the Black Ischia, Lee's Perpetual, and Brown Turkey, are the best adapted for forcing; the others are suitable for walls.

Fig-trees should be propagated by cuttings put into flower-pots, and placed in a gentle hotbed. They are, however, most speedily obtained from layers. The shoots laid down should be two or three years old; and these, when rooted, will form plants ready to bear fruit the first or second year after planting. Suckers ought never to be used.

In some places in England fig-trees are planted out as standards; and in Kent and Sussex a few small fig orchards exist. In Scotland a south wall is indispensable, but if this is procured in a good situation, and when the trees are old enough, they bear remarkably well. The best soil for a fig border is a rich friable loam, on a subsoil not retentive of moisture, or which has been effectually drained. To correct the over-luxuriance of their growth, the roots should be confined within spaces surrounded with walls enclosing about one square yard.

It is the nature of the fig-tree to produce two sets of shoots, and two crops of fruit in the season. The first shoots generally shew young figs in July and August, but these in our climate very seldom ripen. These should, therefore, be rubbed off. The late or midsummer shoots likewise put forth fruit-buds, which, however, do not develop themselves till the following spring, and then form the only crop of figs on which we can depend in this country.

Various modes of training fig-trees have been proposed. Lindley recommends the horizontal form. Mr Knight carried up a central stem perpendicularly to the top of the wall, and then radiated the side-branches horizontally and pendently, in close contact with the wall. Luxuriance of growth is supposed thus to be checked, and the branches thrown into a bearing habit. Root-pruning and walling-in the roots have more effect in inducing fruitfulness than any other sort of pruning.

The Rev. G. Swayne in recommending rubbing off all the young figs which appear in autumn on shoots of the same year, observes that for every young fig thus displaced, the rudiments of one or perhaps two others are formed before winter, and developed in the following year.

The winter dressing of the fig-tree takes place immediately after the fall of the leaf. The immature figs which may remain are removed, irregularities are corrected, and the shoots nailed neatly to the wall. Various modes of protecting the branches during winter have been adopted. Mr Swayne mentions that he wraps up the young shoots with waste paper. Mr Forsyth recommends covering wall fig-trees with the spray of laurel or yew, and then tucking in short grass or moss (*hypnum*) among the spray.

Sir Charles Monck states that the same fig-tree seldom produces fruit containing both perfect stamens and pistils, and conjectures that this is the cause of the fruit being so often prematurely shed. *Caprification*, or assisting the fructifying and maturation of figs, has often been sneered at; but here we see the propriety of that kind of it which consists of hanging or shaking the branches of the wild fig (*caprificus*) over the cultivated tree at the time when both were in blossom.

The Peach (*Amygdalus persica*) is a stone-fruit of oriental origin, said to have been brought from Persia by the Romans, about the beginning of the empire; but the precise period of its introduction into our gardens, of which it has long been the pride and ornament, is not well ascertained. There are two principal varieties: the Peach, properly so called, with a downy skin; and the Nectarine, with a smooth skin. These, following the authority of Linnæus, we consider as one species; and as their culture is precisely the same, we shall speak of them as distinct only when referring to their sub-varieties. Each of these varieties is again divided by gardeners into *freestones* or *pêches*, and *clingstones* or *pavies*, according as the stone parts freely from the pulp, or adheres to it. We shall here treat chiefly of the freestones, as being most hardy, and fittest for the open wall in Britain.

Mr George Lindley, whose arrangement is the best that has hitherto been published, enumerates 60 kinds of peaches and 28 of nectarines. In the Horticultural Catalogue, the names of 183 peaches and of 65 nectarines are recorded. We shall notice only a few of those which are most distinct, and best adapted to our climate.

Fruit Garden.

Peaches.

Red Nutmeg, or *Avant rouge*. This is one of the earliest peaches, ripening about the beginning of August. The fruit small; colour pale yellow towards the wall, bright vermilion next the sun; pulp white, but red at the core; the juice rich and musky. The tree is an abundant bearer.

Acton Scot. This was raised by Mr Knight between the noblesse and the nutmeg peach, in 1814. The fruit is red next the sun, and white on the other side; the pulp rich, juicy, and saccharine; the tree is a good bearer, and not apt to be affected with mildew. It ripens in August.

Spring-Grove. This is another of Mr Knight's peaches, raised from the grosse mignonne crossed with the pollen of the nutmeg. It is dark red on one side, and bright yellow on the other; pulp firm, but melting, and of excellent flavour. The tree is a good bearer, but succeeds best on an apricot stock. The fruit ripens in the beginning of September.

Grosse Mignonne. Fruit large; skin pale yellow, and deep purple next the sun; flesh melting; juice plentiful, and of delicious flavour. This excellent peach is a good bearer, and forces well, but the fruit does not bear carriage. It ripens in the end of August and beginning of September.

Madeleine de Courson; Red Magdalene of Miller. Blossoms large; fruit rather below the middle size; colour yellowish white next the wall, beautiful red next the sun; flesh white, with very little red at the stone; juice rich and vinous. Tree a good bearer; fruit ripening about the beginning of September. "An excellent peach," says Mr. Lindley, "and ought to be found in every collection."

Royal George. This is a well-known peach, much cultivated. By nurserymen it is often given out as the Red Magdalene; but it is at once distinguished from the Red Magdalene of Miller, by the blossoms being small. Against a good wall it ripens in the beginning of September, even in indifferent seasons. Fruit large, purplish red next the sun, whitish where shaded; flesh white, varied with red next the stone, which is free; melting, rich, with an abundant sugary juice. It is also one of the best kinds for a peach-house, fruiting freely, and ripening well. The foliage is, however, rather subject to mildew.

Noblesse. This has long and deservedly been a favourite in our gardens. It is a very large fruit; the skin pale red when ripe, the flesh juicy and rich. The tree is a good bearer, and the fruit ripens in September.

Bellegarde; the *Galande* of the nurseries. Fruit large and globular; skin deep red, with purple streaks on the sunny side; flesh pale yellow, very melting; juice rich. An excellent peach; the tree forces well, and the fruit ripens on the open wall about the middle of September.

Late Admirable, or *La Royale*. Fruit large; skin pale green next the wall, pale red on the sunny side; flesh greenish white, red at the stone; juice abundant, and, when well ripened, of a high flavour. "One of the very best late peaches," says Mr Thomson, "and ought to be in every collection; it is very proper for the peach-house, to succeed the earlier sorts."

Nearly allied to the preceding is the *Teton de Venus*, a beautiful fruit, but requiring a warm situation. In a good season, it ripens at the end of September; is saccharine, and at same time of fine flavour.

Among other excellent peaches may be mentioned:—*Freestones*, Barrington, Chancellor, Knight's Early, Downton Early, Malta, Morrisania Pound, Royal Charlotte, Royal George Mignonne, William's Early Purple, Early Admirable, Alberge, Late Warburton, and Petite Mignonne; *Clingstones*, Catherine, Heath, and Old Newington.

Nectarines.

Fairchild's Early. A beautiful little freestone, chiefly, however, cultivated for its earliness. It ripens about the middle of August.

Elruge is an excellent fruit of a moderate size; flesh white, almost to the stone, which is free. The tree forces well, and is a good bearer. Fruit ripens about the beginning of September. The best sort grown.

Hunt's Tawny. Size moderate; skin pale orange next the wall, russet-red towards the sun; flesh deep orange, juicy, and well-flavoured; a freestone. A very distinct sort, worthy of cultivation for its earliness.

Early Newington. A fine large clingstone; pale green on the shaded side, bright red next the sun; juice saccharine and well-flavoured. Ripens in August.

Red Roman. An excellent old clingstone, now seldom to be found genuine, but worthy of re-introduction.

A few other first-rate nectarines may be enumerated:—*Freestones*, Brinion, Downton, Murrey (*i. e.*, murrey-coloured), Pitmaston Orange, Violette grosse, Violette hâtive, Duc de Tello, Hardwick Seedling, New White. The Barker and the Stanwick nectarines are very recent acquisitions, and are natives of Syria. *Clingstones*, Imperatrice, Newington Tawny. The above sorts are equally suited for open air culture or for forcing, with the exception of the last.

Fruit Garden.

To perpetuate and multiply valuable varieties, peaches and nectarines are budded upon plum or almond stocks. For dry situations, almond stocks are preferable; and for damp or clayey loams, it is better to use plums. An almond budded on a plum stock may be rebudded with a tender peach, greatly to the advantage of the latter. The peach border should be composed of turfy mellow loam, such as is suitable for the vine and the fig, put in as rough as possible, or not broken small and fine. It should be vaulted to render it free from latent dampness. It need not be of greater depth than eighteen inches; for the peach-tree thrives best, and is most productive, when the roots are near the surface of the ground. We believe that in many instances, all that is required to remedy sickly and unfruitful trees is to bring up their roots within five or six inches of the surface. In this country nothing is a greater obstacle to success in peach culture than trenching the borders, and cropping them heavily with culinary vegetables.

The fruit of the peach is produced on the twiggy shoots of the preceding year. If these be too luxuriant they yield nothing but leaves; and if too weak, they are incapable of maturing the fruit. To furnish these, then, in sufficient abundance, and of requisite strength, is the great object of peach training and pruning. All twiggy trees naturally fall into the fan form; and, accordingly, this has generally been adopted in the culture of peaches.

We shall first, therefore, notice the old English method, and then briefly the French, and other new modes of training.

The *old fan* form is very nearly that already given (fig. 6) as a specimen of fan training for twiggy trees. The young tree is often procured when it has been trained for two or three years in the nursery; but it is generally better to commence with a *maiden* plant, that is, in the first year after it has been budded. It is then in ordinary practice headed down to five or six buds, and in the following summer two to four shoots, according to the vigour of the plant, are trained in; the laterals also being thinned out, and properly nailed to the walls. Suppose there are four branches; in the subsequent winter the two central ones are shortened back to produce others, and the inferior ones are laid in nearly at full length. In the following season additional shoots are sent forth; and the process is repeated till eight or ten principal limbs or *mother branches* are obtained, forming, as it were, the framework of the future tree. These mother branches are occasionally raised or depressed, so as to maintain their equilibrium, and are as much encouraged to grow outwards as is consistent with the regular filling up of the tree. The laterals are carefully thinned out (by pinching off with the fingers) in summer, and the remainder are nailed in, to afford subordinate members and bearing wood. When the centre of the tree has been filled up, all the training necessary is merely to prevent the inferior members from acquiring an undue ascendancy over the mother branches. It is highly advantageous to have abundant space, and to draw the tree outwards, so as to render it thin, without being anywhere destitute of young shoots.

Meanwhile the pruning for fruit has been going on. This consists in shortening down the laterals which had been nailed in at the disbudding, or summer pruning. Their length will depend on their individual vigour, and the luxuriance of the tree. The buds, which are generally double, or rather two together, with a fruit bud between them, seldom occur quite close to the insertion of the shoot. Perhaps two or three pairs are left with a wood bud at the point to afford a growing shoot, in order to act as its lungs: for it is necessary that there should be leaves above the fruit. The extent to which the fruit is thinned must depend on the vigour of the tree; a pair of fruit to each square foot of wall being an average allowance. When the fruit begins to swell, the point of this leading shoot is pinched off, that it may not drain away the sap. Any young shoot from the wood-eyes at the base of the bearing branch is carefully preserved, and in the following winter it takes the place of the branch which has borne fruit, and is cut out. If there be no young shoot below, and the bearing branch is short, the shoots at the point of the latter are pruned for fruit; but this must be done cautiously; and if the bearing branch be long, it is better to cut it back for young wood. It is the neglect of this which constitutes the principal error of the English fan system as it is usually practised. Several times during summer the trees ought to be regularly examined; the young shoots respectively to be topped and thinned out; those that remain to be nailed to the wall, or braced in with pieces of peeled willow, and the whole trees ought occasionally to be washed with the force-pump.

The *Montrueil form* is represented by fig. 9. The principal feature is that which constitutes the great principle of all French training, viz., the suppression of the direct channel of the sap. Four, more commonly two, *mère branches* are so laid to the wall that the central angle contains about 90°. The other branches are all treated as subordinate members. This form is open to the objection, that if the under branch should die, the upper one cannot be brought down into its place.

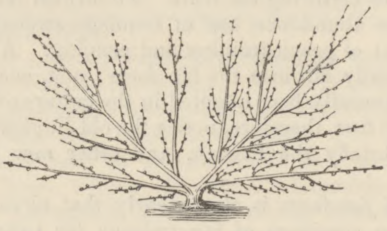


Fig. 9.

The form *à la Dumoutier* (so called from its inventor, and described at great length by Lelieur), is merely a refinement on the Montrueil method. It will be sufficient to mention to the experienced trainer (and none other can be expected to execute this form), that the formation of the tree commences with the inferior limbs and proceeds towards the centre, the branches being lowered from time to time, as the tree acquires strength. What is most worthy of notice in this method, is the management of the subordinates in the pruning for fruit. When a shoot promises blossom, it is generally at some distance from the point of insertion into the old wood, and the intermediate space is covered with wood buds. All the latter, therefore, which are between the old wood *a* and the blossom *c*, in the outer figure, except the lowest *b*, are carefully removed by *ebourgeonnement*. This never fails to produce a shoot *b* in the inner figure, the growth of which is favoured by destroying the useless spray above the blossoms, and pinching off the points of those which are necessary to perfect the fruit. A replacing shoot is thus obtained, to which the whole is invariably shortened at the end of the year. The branch thus treated is called the *branche de reserve*.

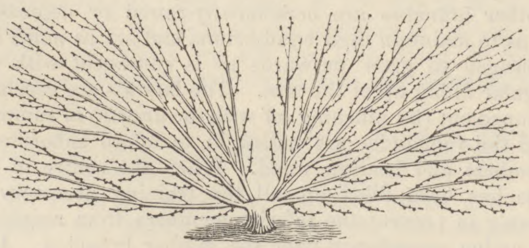


Fig. 10.

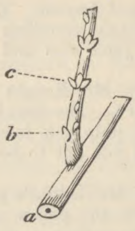


Fig. 11.

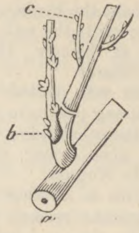


Fig. 12.

The form *à la Sieulle* is another modification of the Montrueil training, of which fig. 13 will give a general idea. The two mother branches are laid in very obliquely, and are never shortened. On the subordinate branches only three buds are left at the winter pruning, one terminal, and two at a considerable distance from each other on the sides of the shoot. This method is not well adapted to our climate.

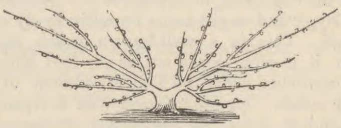


Fig. 13.

Mr Seymour's form approaches more nearly to the French methods than any other practised in this country. It will be seen, however, from the annexed figure (fig. 14), that he does not suppress the direct channel of the sap. This circumstance, although considerable stress seems to be laid upon it, is not essential to the plan, nor is perhaps the best part of it. The principal novelty is, that the bearing shoots are all on the upper sides of the mother branches, and that these bearing shoots are wholly reproduced once a-year. The one side of this figure represents the tree *after* the winter pruning, the other side before it has undergone that operation. It will be observed that on this latter side there are pairs of shoots on the upper parts of the mother branches. The lower shoot, that, namely, which has borne fruit, is cut out, and the other is brought down into its place. This replacing shoot is shortened to about eight or nine inches, care being taken to cut at a wood-bud; and at the time of disbudding, the best situate buds, together with those nearest the base, are left for the future year's bearing. To this plan it has been objected that the annual excision of the bearing shoots produces a series of rugged and increasingly ugly protuberances at their base and along the upper

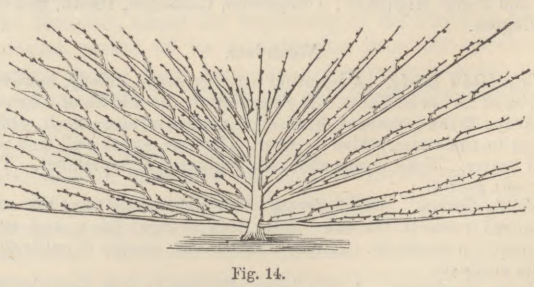


Fig. 14.

surface of the principal members; an objection which also militates against Dumontier's form. Others, on the other hand, declare that Mr Seymour's mode is the most perfect in theory that has been described. For ourselves, we are inclined to prefer the old fan form, when well executed, as nearest the natural habit of the tree, and as best adapted to our uncertain climate. In the training of peaches, "whatever is best administered is best;" and there is no doubt that many ingenious gardeners have only partial success, because, from the multiplicity of their engagements, their trees can receive only partial attention.

For cold and late situations, Mr Knight has very judiciously recommended the encouraging of spurs on the young wood, as such spurs, when close to the wall, generate the best organized and most vigorous blossoms, and ensure a crop of fruit. They may be produced, by taking care, during the summer pruning or disbudding, to preserve a number of the little shoots emitted by the yearly wood, only pinching off the minute succulent points. On the spurs thus procured, numerous blossom-buds form early in the following season. This practice is well adapted to cold situations.

Peach-trees, particularly in the north of England, and also in Scotland, require protection from atmospherical influences, especially at the period of blossoming. Canvass or bunting screens are most effectual. If the protecting screens be applied early in the season, great benefit may be derived from retarding the blossom till the frosty nights of spring be past. If the night frost has been severe, a copious sprinkling of water over the whole tree, before the influence of the morning sun be felt, has been found by Harrison to be very useful in gradually raising the temperature of the foliage and blossoms, and thus preventing injury from the sudden transition.

The Almond-Tree (*Amygdalus communis*), a native of China, may be noticed here rather on account of its affinity to the peach and apricot, than because of its importance as a fruit-tree in this country. Every good garden should contain a tree or two trained as standards; for in very fine seasons they will yield a crop, and they are always ornamental in spring from the beauty of their blossoms. The sorts most worthy of notice are:—the Tender-shelled Sweet Almond or Jordan, and the Commond Almond or Bitter.

The Almond is generally budded on seedlings of its own kind; but for heavy soils, plum stocks are preferable.

THE APRICOT.

The Apricot (*Prunus armeniaca*) is a native of the Caucasus and China; it was cultivated by the Romans, and was introduced into England from Italy in the reign of Henry VIII. It has always, and deservedly, been a favourite. The principal varieties are the following:—

Blenheim. Flowers large; fruit large; form oval; colour orange, tinged with deep yellow; flavour good; stone roundish and impervious; kernel bitter; a good bearer, and of English origin.

Breda. Flowers large; fruit roundish, sometimes almost four-cornered, orange-coloured; juice rich, stone small and impervious; kernel sweet. The true Breda is an apricot of first-rate excellence, and in the south of England the tree bears well as a standard.

Roman. Flowers large; fruit oblong, compressed, pale yellow; flesh soft; stone impervious; kernel very bitter. The tree is a good bearer, but the fruit is fit only for preserving. It is sometimes called the Brussels,—a name also occasionally given to the preceding.

Moorpark. Flowers large; fruit roundish, compressed, orange and red; flesh parting from the stone, juicy and rich; stone pervious; kernel bitter. This is generally considered the best apricot in this country. There are several sub-varieties known under different names; and among these Shipley's is the best. It scarcely differs from the *Abricot Peche* of the French.

Hemskirke. Like a small Moorpark, but with a more tender and juicy pulp, and with the rich flavour of a green-gage plum; kernel small, sweetish. A desirable early fruit, ripening on an east wall in the end of July or beginning of August.

Turkey. Flowers large; fruit middle-sized, spherical, deep yellow; flesh juicy and rich, parting from the stone, which is impervious; kernel sweet. This is an excellent late variety.

Kaisha, new early. Introduced in 1847 from Aleppo. A valuable early variety, completely superseding the Red and White Masculines, which were formerly our earliest sorts.

Musch-Musch. Fruit small; tree rather delicate, requiring a dry soil and warm situation. It is extensively cultivated in Upper Egypt, where the fruit is dried as an article of commerce.

Besides these we may mention the Large Early, the Orange and Royal. The last is a French variety; it is excellent, and ripens earlier than the Moorpark.

Apricots are propagated by budding on muscle or common plum-stocks. Mr Knight recommends the wilding apricot as a stock for the Moorpark variety. Some gardeners have adopted the horizontal form of training, but the most usual, and certainly the best, is the common fan arrangement; for the larger the tree, the greater the produce of fruit. The fruit is produced on shoots of the preceding year, and on small close spurs, formed on the two-year-old wood. The apricot is a tree of much stronger growth than the peach, and therefore requires more room; this and the peculiarity of the spurs being kept in mind, the observations made on the training and pruning of the peach may be readily applied to this tree. It requires a summer and winter pruning. The former should begin early in June, at which period all irregular fore-right and useless shoots are to be pinched off; and, shortly afterwards, those which remain are to be fastened to the wall, to become bearers. At the winter pruning, all worn-out branches, and such as are not duly furnished with spurs and fruit-buds, are removed. The young bearers are moderately pruned at the points; care, however, being taken to leave a terminal shoot or leader to each branch. The most common error in the pruning of apricots, is laying in the bearing shoots too thickly.

The blossom comes early in spring, but is more hardy than that of the peach: the same means of protection, when necessary, may be employed. The fruit often sets too numerously; and in this case it is thinned out in June and in the beginning of July, the later thinnings being used for tarts, for which purpose they are in much request. In the south of England, apricots are sometimes trained against espalier-rails, and occasionally planted as dwarf standards; and in good seasons the fruit from such trees is more highly flavoured than that from walls. In general, however, the protection of a wall is required. An east or west aspect is preferred in England, the full south being apt to induce mealiness of pulp. In Scotland the late varieties require the best aspect that can be afforded.

THE PLUM.

The Plum-Tree (*Prunus domestica*) is considered a native of England. Many of the best cultivated varieties, however, have been introduced from France. The Horticultural Society's Catalogue enumerates 274 sorts, though probably all of these are not well ascertained. We shall first notice a few of the best dessert plums, and then give a list of select kitchen sorts.

The *Green-Gage* is the *Reine Claude* of the French, a great favourite at Paris (as it is everywhere else). It is supposed to have been introduced into England by the *Gage* family, and the foreign name having been lost, it obtained its present appellation. It is a fruit of first-rate excellence, the flavour being exquisite. The tree deserves a place against an east or west wall, where the fruit acquires a larger size without materially falling off in richness of flavour. Treated as a wall-tree, it seldom bears well till it is old, and it is very impatient of exact training, as indeed most plums are. In warm situations it may be properly grown on an espalier-rail, or as a dwarf standard.

Angelina Burdett, along with *Standard of England* and *Woolston Black Gage*, originated a few years ago from seed by Mr Dowling of Woolston, near Southampton, are all plums of the highest excellence. Of them Mr Thomson says:—"These plums are first-rate, and I should recommend their extensive cultivation. As regards the last, it throws the Green-gage into the shade, for it contains all the properties of that fine plum with more sugary sweetness."

The *Drap d'Or* is a small yellow plum of high flavour, ripening in the beginning of September. On a light soil the tree is a tolerable bearer; but on a heavy soil it seldom succeeds. The fruit precedes the Green-gage in ripening, and resembles it in quality.

Coe's Golden Drop is a fine large oval plum; excellent either for the table or for preserving. It keeps well; and Mr Lindley informs us that he has eaten it exceedingly good twelve months after it had been gathered. It requires a wall of the best aspect; and will scarcely answer in a bleak climate.

For a standard, *Gisborne's Early Plum* is one of the best and most productive that can be recommended, particularly for the northern portion of Britain.

Jefferson, a comparatively new plum, of American origin. Fruit very large, golden yellow, tinged with purple on the side next the sun; tree hardy, and an abundant bearer. This is the best of all American plums, and only surpassed with us by the Green-gage, Angelina Burdett, and Woolston Black-gage.

The *Precoce de Tours* is an early sort; of a dark blue colour, with a violet bloom; pulp yellow, and of a very pleasant flavour. The tree succeeds as a standard.

The *Blue Imperatrice* is a fine late plum; the tree is a good bearer, but requires an east or west wall.

Reine Claude Violette. A very high-flavoured variety, resembling, colour excepted, the Green-gage. It succeeds on standards, but is improved by a wall. The tree is a good bearer.

Washington. Fruit large, roundish oval, pale yellow on the shaded side, and of a fine glaucous light purple on the exposed side; of excellent quality, little inferior to the Green-gage. The tree is vigorous, and bears well against a wall, the fruit ripening about the middle of August. Being an early plum, it will, in favourable situations, succeed as a standard. It is, as the name imports, of American origin. It ought to be in every collection.

Reine Claude de Bavay. The most valuable late plum of its class. Originated with M. Bavay, of Vilvorde, near Brussels.

Couper's Large Red is a plum of large size, oval; suture deeply cleft on one side; skin of a bluish glaucous purple on the exposed side; on the other dull red; flesh firm, adhering to the stone; ripening in Scotland in the beginning of September on a south wall. Although this is only a plum of the second quality, yet the tree well merits a place, on account of its great productiveness.

The following are also first-rate plums:—D'Agen, Coe's Late Red, Downton Imperatrice, Kirke's, Blue Perdrigon, White Perdrigon, and Lawson's Golden-gage.

The Cheston, Fotheringham, Goliath, Orleans, Wilmot's New Orleans, La Royale, Sharpe's Emperor, Morocco, and some of the Damasks, though generally regarded as only second-rate plums, deserve notice, and should always have a place in large gardens. The Early Violet is an excellent bearer, and strongly recommended by Lindley to be planted in cottage gardens. Lucomb's Nonsuch plum should not be omitted; for when well ripened, it makes an approach to the Green-gage in flavour.

As kitchen and preserving plums, we may specify the Shropshire Damson, Imperial Diadem, Isabella, White Magnum Bonum, Red Magnum Bonum or Imperiale; the Caledonia or Nectarine Plum, a large and handsome fruit; the Mirabelle, St Catherine, Wine Sour, and Bullace. Dean's Jedburgh Seedling, Denniston's Superb, Gisborn's, Guthrie's new Apricot Plum, Tay-bank Plum, Topaz, Guthrie's Minette, and Pond's Seedling.

Plums are propagated chiefly by budding on Muscle or St Julian stocks. They are sometimes grafted, but gum is apt to break out at the place of junction. The damson, wine sour, and other varieties, planted as standards, are generally increased by suckers, which the old plants afford plentifully. For placing against walls, trees which have been trained for two years in the nursery are to be preferred.

Plum-trees require ample space. On common walls they should be allowed from twenty to twenty-five feet of breadth over which to extend themselves. The horizontal mode of training is adopted by many. The fan form is also very commonly followed, and undoubtedly, where there is room, it is the best. The shoots ought to be laid in at full length. The fruit is produced on small spurs, on branches at least two years old. The same spurs continue fruitful for several years.

Standard plum-trees require only to have a portion of their wood thinned out occasionally when they are young. The hardy kinds grown in this way are very productive, and in some places in the north of England, their produce forms a considerable article of food for several weeks, and also an article of commerce, particularly the wine sour and damson, which is in great request for preserves. It is matter of regret that this branch of fruit culture has not, as yet, met with due attention in Scotland.

The **Cherry-Tree** (*Prunus Cerasus*), is said to have been introduced into Europe from Pontus, by the celebrated Lucullus, B.C. 73. From the "London cries" of Lydgate, it appears that "cherries in the ryse," or in twigs, were hawked in London at the beginning of the 15th century. Excellent sorts have at various times been introduced from the Continent, and, of late years, several first-rate new varieties have been raised in England. Geans included, the Horticultural Society's Catalogue enumerates no fewer than 219 varieties; the following may be accounted some of the best:—

The *Early Purple Griotte* may be first mentioned as being the earliest of all cherries, generally ripening in the end of May.

The *May-Duke* is one of the most common, and, at the same time, one of the most valuable cherries. In fine seasons, and on a good aspect of wall, it begins to colour in May; and in such situations it is generally ripe from the middle to the end of June. The tree also bears well as a dwarf standard, but against a wall the fruit gets larger, and does not fall off in flavour.

The *Late Duke* is a rich sweet cherry, with most of the qualities of the May-Duke. It is identical with the Arch-Duke.

Bigarreau or *Graffion.* This is an excellent fruit, especially when it gets the protection of a wall. In the cherry orchards of England, this sort is now pretty extensively cultivated, the fruit meeting with a ready sale, and vast quantities being required for the London market.

Harrison's Heart is nearly allied to the Bigarreau; it is rather of larger size and of finer appearance in the dessert, but inferior in flavour. The fruit has this advantage, that it is not liable to crack in wet weather.

Belle de Choisy, an excellent cherry. The fruit come in pairs, red, mottled with amber colour, tender and sweet. The tree bears well as a standard.

Black Tartarian. Fruit large, obtuse heart-shaped; flesh half tender. "The quality is good, and in appearance it is one of the finest." It is a good bearer, and well adapted for forcing.

Waterloo. Raised by a daughter of Mr Knight, from the Bigarreau and May-Duke. Fruit black, large, obtuse heart-shaped, pulp tender. It ripens in July, and the tree is a free bearer.

Elton. Raised by Mr Knight from the Bigarreau and White Heart. Fruit large, heart-shaped, pale red, with a sweet delicious juice. The tree is a good bearer and hardy; the fruit ripens shortly after the May-Duke.

Kentish Cherry. One of the oldest and most prevalent cherries in England, abounding in the orchards of Kent. When ripe, it is of a full red colour, and its subacid flavour is very agreeable. It is commonly grown on standards, and ripens in the end of July. The *Hort. Cat.* distinguishes this from the *Flemish* or short-stalked, also a good cherry, to which it is certainly closely allied.

The *Morello.* This is a well-known late cherry, much in request for confectionery. The tree is a copious bearer as a standard, and on a south wall the fruit acquires a peculiarly rich subacid flavour. It succeeds perfectly well on a north aspect, where its fruit may be retarded to the end of October.

The *Amber*, or Yellow Spanish, is a late fruit, and useful in prolonging the cherry season till the beginning of September. It requires a west wall.

Among other excellent varieties may be mentioned the Black Eagle, Black Heart, Bowyer's Early Heart, Carnation, Downton, Florence, Knight's Early Black, and the White Heart.

Buttner's October Morello. An excellent German variety of this useful section of cherries, remarkable for its hanging on the tree till the end of November. The Late-Duke, White Tartarian, and Buttner's Black Heart are also valuable. To that useful section (the Morello), we may add a new acquisition, the Frogmore new Morello, and Rumsey's late Morello.

What are called *geans* or *guignes*, are cherries less removed from their natural state. They are usually

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grown as standards, and bear abundantly, particularly when old. The principal sorts are the Amber gean, a plentiful bearer, with sweet tender fruit; and the Lundie gean, a small black cherry of high flavour.

In the Jardin des Plantes at Paris, the black-fruited cherry-tree, or *Guignier*, is considered as a variety of *Prunus Cerasus.* The forest cherry-tree, *P. avium*, is named *Merisier*; and, besides varieties with red and with black fruit, there is a marked variety called *Bigarotier.*

The great quantities of pale-coloured cherries yearly sold in the London market are chiefly of the kinds called White Heart and Bigarreau. The dark-coloured cherries are chiefly the Courone, which is often passed upon buyers for the Black Heart.

The stock preferred for cherries is the wild gean. Mr George Lindley recommends that dwarf cherry-trees should be grafted, and two or three year-old stocks will do for them.

For standard trees the stocks should be at least four years old, and they should be budded or grafted five or six feet from the ground. High-stemmed cherry-trees, or *riders*, are often temporarily employed to fill up the vacant spaces on newly planted garden walls, till the dwarf trees make sufficient progress; for these, stocks six or seven feet high are required. For dwarf cherry-trees, the best stocks are procured from the *Prunus* (or *Cerasus*) *Mahaleb*, the sweet-scented cherry.

Cherries are generally produced on small spurs which appear on the wood of the second year, and these spurs continue productive for an indefinite period. Any form of training may therefore be adopted; but as the fruit is always finest on young spurs, perhaps fan-training, which admits of the frequent renovation of the bearing branches, is the most advantageous. A succession of young shoots should be laid in every year. For the Morello, which is of twiggy growth, and bears on the young wood, the fan form is absolutely necessary. Whatever method be adopted for general practice, care should be taken not to crowd the branches; for nothing is more unfavourable to the productiveness of the trees than overcrowding of branches.

The *Prunus Marasca*, from the fruit of which is prepared the celebrated liqueur called Maraschina di Zara, is a native of Dalmatia, and would doubtless succeed in Britain, if fairly tried.

THE PEAR.

The Pear-Tree (*Pyrus communis*) is considered by botanists as a native of England. Many cultivated varieties seem to have been introduced by the monks. Remains of perry orchards attached to monasteries of the fourteenth and fifteenth centuries are not uncommon, even in Scotland, and very ancient trees of the finer dessert pears, such as the Colmar and Longueville, are occasionally found.

The list of cultivated pears amounts to more than 600 names; but the number of those truly desirable is not large. We shall specify some of the best dessert fruit, following the usual division of Early and Late; the former class being in season in the months of August, September, and October, and the latter in November, December, and January. It is only a few years since pears fit for the dessert in January were known in Britain; such as the Glout morceau, the Easter Beurré and the Winter Beurré; and they deserve the best attention of horticulturists. It is to be premised, however, that even within the limits of Britain, climate makes an important difference in the culture and ripening of pears, of which a remarkable and extreme example may be seen in the Chaumontelle—a fruit which is produced abundantly and ripened on standards in the south-west of England, and even in the environs of London, while it requires a south wall near Edinburgh.

1. *Early.*

Citron des Carmes (*Madeleine* of Lindley, and in Scotland often called the Premature). This is the earliest pear; it ripens in July, acquiring a yellowish-green colour; it is sweet, but without much flavour. One tree may suffice. It requires a sheltered situation.

Beurré d'Amalis. Above medium size; colour greenish-brown; form obovate; quality excellent; ripe in September.

Doyenné blanc. Colour pale yellowish; about medium size; pyriform; quality excellent; ripe in September and October.

Dunmore. Brownish-green russet; size large; obovate; quality first-rate. Tree hardy and an excellent bearer; ripe in September.

Flemish Beauty. Colour russet-red; obovate; size large; quality excellent; tree hardy; ripe in September.

Fondante d'Automne. Colour pale green; obovate; under medium size; quality excellent; ripe in September and October.

Mansuette. Pale green and brown; size large; oblong obovate; quality excellent; ripe in September and October.

The *Summer Rose.* A handsome round pear, of a russety-red colour, much resembling an apple, flesh white, rich and sugary. This is an excellent variety, succeeds on a standard, and ripens in August.

The *Jargonelle* of Britain is the *Grosse Cuisse Madame* of the French. This is the most common and most esteemed of our early autumn pears. Against the wall the fruit attains a large size and a beautiful appearance; but it is not of so high a flavour as from standards or espalier-rails. The fruit does not keep well, and the tree should therefore be planted in various situations to prolong its season, as it is rather difficult, when it disappears, immediately to supply its place in the dessert.

The *Summer Francréal*, or the Yat of Holland, may be noticed as another pear to follow the Jargonelle, as it ripens about the middle of September. The tree proves, in general, a great bearer.

The *Duhamel* is a good autumn pear, with a delicate flavour. From a wall, it comes in immediately after the Green Yair, and helps to fill up a gap in the pear season, especially in Scotland; standards produce freely, and their fruit is ready in November.

The *Seckle*, of American origin, is of dwarfish size, suited for a border standard, and it seldom fails to yield a crop. The fruit is small, but melting and perfumed. It does not keep.

The *Red Doyenné*, or as it is sometimes called Gray Doyenné, is also an excellent autumn pear, succeeding best on a quince stock.

The *Elton.* Capital as a standard, in ordinary situations. The tree produces healthy wood, and the fruit ripens in September and October.

The *Early Bergamot* was introduced from France in 1820. It is one of the very best early pears, as the tree bears freely as an open standard.

The *Autumn Bergamot*, or English Bergamot, has been long known as one of the most highly flavoured pears. It is not the *Bergamotte d'Automne* of the French, which is liable to canker in this country, while the English bergamot is not. In England the tree succeeds perfectly well as a standard; and in Scotland it answers in good seasons, where it is deserving of a west wall. The fruit is of a depressed globular shape, not large; the flesh juicy, sugary, and rich, a little gritty next the core. It ripens towards the end of October, but does not keep.

The *Van Mons Leon Leclerc* is one of the best autumn pears, ripening from the middle to the end of October. It is of the size and shape of the *Duchesse d'Angouleme;* sugary, and with rich pine-apple flavour.

To the list of summer and early autumn pears might be added the Musk Robine, Summer Francréal, Summer Bonchretien, and William's Bonchretien, generally requiring the protection of a wall; and Ambrosia, Caillot Rosat, and the Hazel Pear.

2. *Late.*

The *Brown Beurré* (Red, Gray, Royal Beurré of various authors). This is a first-rate melting pear. Against a wall with a good aspect, and with a fresh soil, the tree is an abundant bearer. Ripens in October and November.

Belle et Bonne. Yellowish green; size large; roundish; quality good; ripe in September and October.

The *Beurré de Capiaumont.* This is one of the best Flemish varieties. The fruit is beautiful and well flavoured. It ripens in October and November. The tree is a great bearer and hardy.

The *Moorfowl Egg.* There are two varieties, both of Scottish origin, of which the Galston Moorfowl Egg is the best. The fruit is not attractive in appearance, but it is of admirable quality. The tree is hardy, and should be grown as a standard.

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The *Gansel's Bergamot* (sometimes called Brocas Bergamot). This noble pear, which has scarcely been rivalled, certainly not surpassed, by any of the imported varieties, is of English origin. Its blossoms are too tender to enable the tree to succeed as a standard; but it deserves a wall, and it should be placed on various aspects to prolong its season. The fruit ripens in November and December.

Gansel's late Bergamot, having many of the properties of the original, but is harder and sets better.

Bergamotte de Hollande. Esteemed for its long keeping. In use from March till June.

Beurré Bosc. Russet coloured; size large; pyramidal; quality excellent. In use in October and November.

Beurré Gris d' Hiver. Size large; quality first-rate; very productive; one of the best pears in cultivation. In use during February.

Beurré Diel. Yellowish brown; obovate; size large; quality excellent. In use in October and November. One of the most profitable of the Flemish pears.

Beurré Langelier. Size large; obovate; quality first-rate. In use in October and November. One of the very best autumn pears, and exceedingly hardy.

Bezi de La Motte. Pale yellowish green, with russety dots; size medium; roundish; quality good. In use in October. Deserves a place in every garden.

The *Marie Louise.* This excellent and large pear was raised by the Abbé Duquesne. "It is," says Mr Thompson, "one of the very finest, even as a standard, on which it bears abundantly; it succeeds also well on a north wall." In Scotland it is the better for an east or west aspect; but on a standard in a sheltered garden at Luffness, East Lothian, the fruit has attained the weight of 15 ounces. It ripens in October and November.

Beurré d'Aremberg. Is perfectly melting and without grittiness, and rich, sweet, and high-flavoured. The tree succeeds either trained against an east or a west wall, or as a standard in any sheltered situation.

Crasanne. An old French sort, of excellent quality, with a tender and finely flavoured pulp. The tree deserves an east or west aspect on the wall, and it succeeds also on an espalier-rail. The fruit ripens in November and December.

The *Urbaniste* is a very good variety, of a large size, and ovo-globular shape; skin of yellowish colour, with small russety spots; flesh white, melting, with a sweet well-flavoured juice. In Scotland ripens against a south wall by the beginning of November.

Colmar. This is a first-rate pear, with a white flesh, and of high flavour. In Scotland the tree requires a south wall. This is the Poire d'Auch of the Continent. It keeps till February or March.

Passe Colmar. An admirable Flemish variety; of excellent flavour; hardier, and a more abundant bearer than the preceding, and more easily ripened. It is in maturity in December and January.

Poire Neill was raised by M. Van Mons of Louvain. It is a large handsome fruit, with a very white pulp, mellow, and abounding with a saccharine and slightly musky juice. It is in season during the month of October, and should be gathered a few days before it is ripe. The tree succeeds as a standard at Edinburgh, and bears freely.

The *Easter Beurré.* Fruit large, obovate, green and brown; flesh whitish-yellow, buttery, and extremely high-flavoured. "It is," says Mr Thompson, "hardy and a good bearer; one of the most valuable spring sorts, compared with which the early pears of short duration deserve not a wall; its extensive cultivation for a long and late supply is, without hesitation, strongly recommended." In season from January to March. As the tree ripens its wood readily, it succeeds as a standard, even in Scotland, and yields fruit superior in flavour to that from the walls.

Beurré Rance. A Flemish variety, raised by the late M. Hardenpont; "the best very late sort yet known," *Hort. Cat.* It ripens with difficulty in Scotland.

The following, also, may be considered highly valuable sorts as late autumnal and winter pears:—Autumn Colmar, Astontown, Echassery, Delices d'Hardenpont, Beurrê Spence, Bezi Vaet, Bezi de la Motte, Chaumontelle, Sylvange, Downtown, Glout Morceau, St Germain, Duchesse d' Angoulême, Hacon's Incomparable, Winter Nelis, Swan Egg, Doyenné gris, Flemish Beauty, Napoleon, Beurré d'Aremberg, Bonchretien Fondant, Brougham, Calebasse, Chaptal, Comte de Lamy, Althorp Crasanne, Winter Crassane, De Louvain, Dundas, Elton, Emerald, Eyewood, Fondante du Bois, Forelle, Fulton, Groom's Princess Royal, Jean de Witte, Louise Bonne of Jersey, Moccas, Knight's Monarch, Ne Plus Meuris, Thompson's.

Of the *Kitchen Sorts*, or stewing pears, we may name the Bellisime d'Hiver, Catillac, Uvedale's St. Germain, Warden or Black Worcester, and the Gilogil. These are placed on inferior walls, or upon espalier-rails, or kept as dwarf standards. The Uvedale's St. Germain fruit often attains a large size, especially against a wall.

Pear-trees are grafted either on what are called free-stocks or on dwarfing stocks: for the former, which are intended for full-sized trees, the seeds of the wilding pear should be sown; but frequently the pips of the perry pears, and sometimes of the common cultivated sorts, are used. For dwarfing, the quince is preferred; but the white-thorn, as already mentioned, is occasionally employed. Where the space is limited, or the ground is damp, the dwarfing stocks are the more suitable. It is a favourite doctrine with some, that by budding or grafting on quince or hawthorn, pears of too melting and sugary a quality acquire firmness and acidity; to what extent this holds good has not been correctly ascertained, but that the stock exerts a certain degree of influence on the fruit is beyond dispute. Some of the finer pears do not take readily on the quince. In this case double working is resorted to. For example, the Virgouleuse may be easily budded on the quince, and the Beurré d'Aremberg will afterwards succeed freely on the Virgouleuse. It may be mentioned in passing, that the ancient horticulturists seem to have supposed that a fruit was improved by double working; and that the term *reinette*, a name applied to a class of apples, is considered as having been derived from the Latin *renata*, that is, a tree grafted upon itself.

In selecting young pear-trees, some prefer *maiden plants*, that is, plants one year grafted; but if good trees, trained for two or three years, can be procured, so much the better. It is important to ascertain that the stock and stem be clean and healthy, and to take great care that no injury be done by bruising or tearing the roots, in lifting and removing. The trees should be planted immediately after the fall of the leaf. Wall-trees require from 25 to 30 feet of lineal space when on free stocks, and from 15 to 20 feet when dwarfed. Standards on free stocks in the orchard should be allowed at least 30 feet every way, while for dwarfs 15 feet may suffice. Where the trees are trained *en pyramide* or *en quenouille* (see figs. 2, 3), they may stand within eight feet of each other. It is very desirable that the pear orchard should be in a warm situation, with a soil deep, substantial, and well drained, or free from injurious latent moisture. Without attention to these circumstances, pear-trees seldom succeed. Mr Rivers, one of our most successful pear cultivators, recommends planting pear trees on quince stocks, so that the stock may be covered up to its junction with the graft. This is effected by raising up a small mound of rich compost around it, a contrivance which induces the graft to emit roots into the surface soil, and also keeps the stock from becoming hard or bark-bound.

The fruit is produced on spurs, which appear on shoots more than one year old; the object of the pruner therefore ought to be to procure a fair supply of these spurs. The mode most commonly adopted of training wall pear-trees is the horizontal; but each of the forms already mentioned has its advantages, and is peculiarly adapted to some particular habit of growth in the several varieties. For the St Germain, and other twiggy sorts, the fan form is to be preferred; for the Gansel's Bergamot, and other strong growers, the half-fan or the horizontal. In the latter form the trees may often be found fifteen, twenty, or even thirty years old, during which time they acquire an undue projection from the wall, and become scraggy and unmanageable. On the other hand, the finest fruit is produced on young spurs, clearly indicating the necessity of a frequent renovation of the spurs. This would lead to a preference of the fan form, not, indeed, that which is commonly practised, for in it the spurs are as immovable as in any other

Fruit Garden.

Fruit Garden.

arrangement; but rather that recommended for peaches, in which there is a continual renewal of the branches. Or, if the horizontal form, which has certain advantages, be adopted, it should be that modification exhibited in fig. 5, *a*. This is the method followed by Harrison in treating the Jargonelle. Or a portion of the old spurs should be cut out annually, which will induce young ones to form.

The summer pruning of established wall or espalier-rail trees, consists chiefly in the timely displacing or rubbing off the superfluous shoots, retaining only those which are terminal or well placed for lateral branches. In horizontal training, the winter pruning is nothing more than adjusting the leading shoots, and thinning out the spurs, which should be kept close to the wall, and allowed to retain only two, or at most three buds. In fan-training, the subordinate branches must be regulated, the spurs thinned out, and the young laterals, which had been loosely nailed in during summer, must be finally established in their places. No crowding of branches should be permitted. When horizontal trees have fallen into disorder, they may be renovated in the manner represented at fig. 5, *b*, a method approved by Knight; or all the branches may be cut back to within nine inches of the vertical stem and branch, and trained in afresh, as recommended by Mr Lindley. Or they may be grafted with other sorts if a variety is wanted.

When some of the finer pear-trees produce an abundance of blossom, but do not *set* well, as not unfrequently happens, artificial impregnation may be partially resorted to; that is, the blossom of some other kind of pear, plentifully provided with pollen, may be taken, and the farina dusted over the best-looking blossoms of the less productive tree.

Summer and autumn pears should be gathered before they are fully ripe, otherwise they will not in general keep more than a few days. The Jargonelle, as Forsyth rightly advises, should be allowed to remain on the tree, and pulled daily as wanted, the standard fruit thus succeeding the produce of the wall-trees. In reference to the Crasanne, Mr Geo. Lindley recommends gathering the crop at three different times, the first a fortnight or more before it is ripe, the second a week or ten days after, and the third when fully ripe. The first gathering will come into eating latest, and thus the season of the fruit may be considerably prolonged. It is evident that the same method may be followed with the Brown Beurré and Gansel's Bergamot, or with any others which continue only a short time in a mature state.

THE APPLE.

The Apple-tree (*Pyrus Malus*) is, under the name of the Crab, known as a native of Britain. Most of the cultivated sorts, however, are of foreign origin. The finer, high-flavoured apples are prized for the dessert; the juicy and poignant sorts are in request for tarts and sauce; while those of a more austere nature are manufactured into cider, and on the continent very largely into brandy. In the second edition of the London Hort. Society's Catalogue, no fewer than 1400 varieties are enumerated; many of them doubtless not well ascertained, but about 175 are pronounced to be excellent sorts. And a few have been since added in the supplement to the 3d edition, the best of which will be noticed. With such a multitude before us, it would be vain to attempt detailed descriptions; we shall therefore do little more than give a list of those most worthy of attention.

Table Apples.

The earliest of these are the following:—The Juneating, or White Geniton, which begins to ripen in the end of July, and being sugary and slightly perfumed, forms a welcome addition to the dessert. The Early Margaret, or as it is sometimes called Red Juneating or Striped Juneating, and in Ireland Peach Apple. The Summer, or White Crofton, is of Irish origin: the tree bears abundantly; and if the fruit be scarcely equal to the Juneatings for the dessert, it is very desirable for culinary purposes in August. The Oslin or Arbroath Pippin, and the Early Julien of Clydesdale, also deserve notice. The Summer Golden Pippin, the Red Quarrenden of Devonshire, and the Early Harvest, are likewise excellent early dessert apples.

To succeed these in the autumn we have many fine sorts, such as the Early Nonpareil or Hicks's Fancy; the Doonside; Autumn Pearmain or Royal Pearmain of the London Nurseries; Shepherd's Fame; Baird's Favourite; White Astrachan; Red Astrachan: Maclean's Favourite; Pearson's Plate; Pomme de Niege, and Bourassa; Franklin's Golden Pippin, fruit not equal to the Old Golden Pippin, but the tree more productive; Old Golden Pippin; King of the Pippins or Hampshire Yellow, a valuable sort; Kerry Pippin, one of the finest Irish apples; and the Cole Apple or Scarlet perfumed; Leisham's Pippin, a large fruit; Longville's Kernel, of good quality.

The winter dessert apples are very numerous, so that only a few can be mentioned. The Ribston Pippin has long maintained a pre-eminent character, for its rich juiciness and highly aromatic flavour. Hubbard's Pearmain is a Norfolk apple of the very finest quality, and too little known, especially in Scotland. The Dutch Mignonne is another admirable dessert apple, too little known or attended to. The Golden Harvy, or Brandy Apple of Forsyth, is a beautiful though small fruit, and Mr Lindley characterizes it as rich, juicy, spicy, and high-flavoured: the tree is not a large grower, is very hardy, and a great and constant bearer; and no garden, adds Mr Lindley, "capable of containing ten trees, ought to be without one of it." The Downton Pippin, raised by Mr Knight from the Orange Pippin of Herefordshire, dusted with the pollen of the Old Golden Pippin, must not be omitted. The tree is a great bearer; the fruit ripens in the end of October and keeps till January. The Yellow Ingestrie, raised by the same gentleman, is likewise excellent. To these may be added the Beachamwell; Borsdoffer; Court of Wick Pippin, excellent, though of small size; Wood's Transparent; Margill; Scarlet Crofton; Golden Pearmain; Scarlet Pearmain; Dutch Mignonne; Fearn's Pippin; Gravenstein; Paradise Pippin; Old Nonpareil; Ross Nonpareil; Braddick's Nonpareil, very fertile; Scarlet Nonpareil; Pitmaston Nonpareil; Sturmer Pippin; Kirke's Golden Rennet; Reinette de Canada; Sykehouse Russet; Cornish Aromatic, of first-rate quality; and the Sam Young, an excellent Irish apple brought into notice by Mr Robertson of Kilkenny. The Courtpendu plant is a capital winter dessert fruit: the tree is hardy and productive, and the blossom being late in expanding, it is a kind well adapted for cold situations. The Norfolk Beaufin is the best apple for drying and preserving, making an excellent winter preserve.

Dessert Apples.

Ashmead's Kernel; Baddow Pippin; Barton's Incomparable; Breedon Pippin; Christie's Pippin; Clara Pippin; Cockle Pippin; Colonel Vaughan's White Crofton; Cornish Gillyflower; Creed's Marigold; Elford Pippin; Forman's Crewe; Scarlet Golden Pippin; New Golden Pippin; Golden Russet; Winter Golden Pearmain; Lucombe's Pine Apple; Morris's Court of Wick; Morris's Russet; Newtown Pippin; Pitmaston Nonpareil; Ord's Apple; Adam's Pearmain; Claygate Pearmain; Herefordshire Pearmain; Mannington's Pearmain; Lamb Abbey Pearmain; Scarlet Pearmain; Hubbard's Pearmain; Royal Pearmain; Ravelston Pippin; Reinette Franche; Reinette Grise; Powell's Russet; Keeping Russet.

Of American Apples, the best for our climate is the Boston Russet. Mr Thompson states that the tree is quite hardy, very productive, and suitable for dwarf training; the fruit juicy, with a flavour between that of the Ribston and Nonpareil, and in season from December till April. The Newton, or Long Island Pippin, seldom comes to perfection in this country.

Kitchen Apples,

Or such as are chiefly used for tarts or for sauce, are very numerous, and the names of a few of the best can only be given. The Red Fulwood, the Nonsuch, Minshul Crab, Hanwell Souring, Cat's Head, Alexander, Wheeler's Russet, Blenheim Orange, Hunthouse of Yorkshire, and Forman's Crewe, all are good. The Bedfordshire Foundling is a large and handsome apple and the tree a sure bearer. The Cellini is a good kitchen apple for November, the tree hardy and very productive, and the fruit beautiful. Among the best long-keeping apples are the Scottish Gogar Pippin, sometimes called Moncreiff Pippin, or Stone Pippin; Wormsley Pippin; and the Yorkshire Greening and Northern Greening, particularly the latter; Baxter's Pearmain; Winter Strawberry Apple; the Tulip, a small Dutch fruit, of a dark red colour, and with a lively juice; Calvill Malingre; Dutch Mignonne; Winter Lud; Pentcaitland Pippin; Cambusnethan Pippin. The Cockle Pippin or Nutmeg Apple, an excellent apple, and the tree a fertile bearer. Dumelow's Seedling is a very juicy kitchen apple, and keeps firm till April, and the tree is not liable to canker. The Green Fulwood is a good kitchen apple, and keeps till May. The same may be said of the Hoary Morning, and the tree is a great bearer. The Cockpit is a useful culinary apple for winter; the tree hardy and a great bearer. The New Cockpit is an excellent apple, remarkably perfumed. An apple, called the French Crab (but which is of a considerable size, notwithstanding this name), keeps firm in substance till the return of the apple season; and the subvariety of this, called Hambledon's or Deux-ans, is described in Ronald's "Pomona" as still superior. Alfriston; Beauty of Kent; Belle Bonne; Bess Pool; Brabant Bellefleur; Calville Blanche d'Eté; Calville Blanche d'Hiver; Chalmer's Allan Bank Seedling; Cobham; Keswick Codlin; Manx Codlin; Carlisle Codlin; Dumelow's Seedling; Easter Pippin; Ecclenville Seedling; Flower of Kent; Gloria Mundi; Glory of England; Hawthornden; Hoary Morning; London Pippin; Melrose; Pope's Apple; Royal Russet.

Several kinds of stocks are used for apple-trees. The Dutch *paradise*, propagated by layers, has long been used as a stock for dwarf apple-trees, whether intended for the wall or for standards. The *doucin* of the French seems closely allied to this, if not identical with it. The bur-knot varieties increased by cuttings, or young codlin plants procured from layers, furnish convenient stocks for trees of a very diminutive habit. For common purposes, the stocks raised from the pips of crabs or of cider apples are preferred. Stocks kept one or two years in nursery-lines are fit for grafting upon; but if a considerably tall stem be wished, they must remain three or four years in the nursery, and be pruned up, till they attain five or six feet of height. Any common soil, provided the subsoil be dry, suits the apple-tree. Shallow planting should, in all cases, be practised, and young trees should be carefully staked, to prevent wind-waving.

The fruit, as in the pear-tree, is produced on spurs, which come out on the branchlets of two or more years' growth, and continue fertile for a series of years. There is, therefore, no very material difference in the pruning and training of the pear and of the apple tree. On walls, the horizontal mode of training is commonly followed, as best calculated to repress the too vigorous growth of the tree; but for the Nonpareil, and other twiggy varieties, perhaps the fan form, or some modification of the fan form, is preferable. For standards, where the soil is rich and the growth rapid, all that is necessary in pruning is to thin out the branches, and to prevent their crossing and rubbing against each other. Where there is little luxuriance, as in the case of all dwarfs, it is useful to shorten the branches occasionally, and to remove useless twigs. Dwarfs on paradise stocks may be treated almost like currant-bushes; that is, making them open in the centre, or cup-shaped, to the great advantage both of the size and beauty of the fruit. The general winter pruning may take place any time from the beginning of November to the beginning of March. After the winter pruning, some cultivators delay the shortening of the young wood of the former year till the middle or end of April, when the buds have swollen. Cankered or diseased wood, and all unfruitful snags or ragged spurs, are then to be neatly cut out. Where the scars are large, they should be laid over with some composition calculated to resist the action of the air and rain.

If the American blight, or woolly aphis (the *Eriosoma Mali* of Leach) make its appearance on a tree, the utmost care should be taken to clean every part of the bark with a hard brush and some searching wash; for, should the insect be left unmolested, it will speedily spread over all the apple-trees in the neighbourhood. Mr Waterton, in his Essays on Natural History, recommends a simple remedy, which he found effectual, viz., mix clay with water till it be of a consistency to be applied like thick paint to the injured parts, either with a trowel or a brush; a second coat upon the first fills up every crack which may shew itself when the first coat becomes dry; the clay resists for a sufficient length of time the effects both of sun and rain, and before it gradually falls off, every insect is completely smothered. Painting the trees during winter with vegetable spirits of tar is also an effectual remedy.

For the *Storing of Pears and Apples*, there should be attached to every considerable garden a commodious fruit-room, well ventilated, and fitted up with a variety of shelves, drawers, &c. A northern aspect is the most suitable; and it is also desirable that there should be a dry, cool cellar under it, to be employed in retarding the maturation and decay of some of the more fugitive varieties. All the fruit intended for keeping should be plucked with the hand, and when it is perfectly dry. For the finer dessert fruits the shelves should be made of hard wood, not of fir, and the fruit should be laid upon cartridge or writing paper, to prevent its imbibing any taint from the wood. The kitchen fruit may be kept in layers two or three deep, but not in heaps, and should be occasionally examined when decaying fruit is to be removed. The *sweating* of apples and pears, formerly much practised, is now abandoned, as being attended with no useful effects. Darkness, and a low uniform temperature are essential conditions. To ensure the latter, the walls should be built hollow, and lined internally with boarding kept an inch or two from the walls. The roof must also be rendered impervious to sun, heat, and frost.

THE QUINCE.

The Quince (*Cydonia vulgaris*), allied to the apple, is a native of the south of Germany. It is but little cultivated in Britain. The fruit, which is austere when raw, is well calculated for giving flavour and poignancy to stewed or baked apples. The two principal sorts are the Portugal Quince and the Pear Quince, of which the latter is the most productive, while it serves the usual culinary purposes equally well as the other. Quinces may be propagated by layers, or by cuttings, or by grafting. Two or three trees planted in the slip or orchard are in general sufficient. In Scotland, the fruit seldom approaches maturity, unless favoured by a wall.

THE MEDLAR.

The Medlar (*Mespilus germanica*) is a native of the south of Europe, but has been naturalized in some parts of the south of England. The varieties worth notice are the Dutch Medlar, with broad leaves; and the Nottingham Medlar, with narrow leaves; of these the latter is considered the best. The fruit is gathered in November, and kept till it begins to decay, when it is served up in the dessert, and highly relished by some. The treatment recommended for the Quince may be applied to the Medlar.

THE SERVICE-TREE.

The Service-Tree (*Pyrus domestica*) is a native of the mountainous parts of Cornwall, and though not much cultivated, may be here noticed. The fruit has a peculiar acid flavour, and is used only when thoroughly mellowed by keeping. There is a pear-shaped, and also an apple-shaped variety, both of which may be propagated by layers, and still better by grafting on seedling plants of their own kind. Two or three trees may have a place in the orchard, or perhaps in a sheltered corner of the lawn. The tree is seldom productive till it has arrived at a goodly age. The fruit is brought to Covent Garden

Market in winter; but it is never seen at Edinburgh. Near Paris, the tree is a good deal cultivated under the name of *cornier*; and there are several varieties of the Service grown in the north of Italy.

THE MULBERRY.

The Mulberry (*Morus nigra*) is a native of Persia, and in this country requires a warm sheltered situation. The fruit is in request for the dessert during the months of August and September, having a rich aromatic flavour, and a fine subacid juice. Where it is abundant, wine is made from it. In Devonshire, a little of the juice added to full-bodied cider, produces a delicious beverage, called Mulberry Cider, which retains its flavour for many months. The Mulberry is propagated by cuttings or by layers, and also by branches of an inch or more in diameter. Mulberry standard trees succeed only in the southern counties. These require no other training than an occasional thinning out of the branches. They are generally planted on grassy lawns, so that when ripe fruit falls from the higher branches, it can be gathered up without having sustained injury. In the middle districts, espalier-rails may be employed. In colder situations, the mulberry must be treated as a wall-tree; and it has been recommended that the bearing shoots should be trained perpendicularly downwards. The Mulberry as a fruit is little known in Scotland; but a few aged trees exist in old gardens, and in favourable seasons afford berries.

THE HAZEL-NUT.

The Hazel (*Corylus Avellana*), one of our indigenous edible nuts, is the original parent of the red and white Filbert, Cobnut, Cosford-nut, Frizzled, Spanish, and other improved varieties. These succeed best on a rich dry loam, carefully worked, and receiving from time to time a slight manuring. They are generally planted in the slip, but thrive best in an open quarter by themselves. The varieties are propagated by layers or by suckers; but where there are stocks of the common hazel, the other kinds may be grafted upon them. The Cosford is generally preferred, being thin-shelled, and having a kernel of high flavour. If the Filbert or the Cosford be grafted on small stocks of the Spanish nut, which grows fast, and does not send out side suckers, dwarfish prolific trees may be obtained; and by pruning the roots in autumn, the trees may be kept dwarf.

The neighbourhood of Maidstone in Kent has long been celebrated for the culture of nuts for the London market; and as the best Kentish practice is scarcely known in other parts of Britain, we may enter a little into detail. The young plants are almost always suckers from old bushes, and are planted about ten or twelve feet apart. They are suffered to grow without restraint for about three years, and are then cut down to within a few inches of the ground. They push out five or six shoots; and these in their second year are shortened one-third. A hoop is then placed within the branches, and the shoots are fastened to it at nearly equal distances. In the spring of the fourth year, all the laterals are cut off close by the principal stems, and from these cut places short shoots proceed, on which fruit is expected in the following year. Those which have borne fruit are removed by the knife, and an annual supply of young shoots is thus obtained. The leading shoots are always shortened about two-thirds, and every bearing twig is deprived of its top. In the early spring-pruning, attention should be given that a supply of male blossoms be left, and all suckers should be carefully eradicated. These Kentish nut-plantations somewhat resemble large quarters of gooseberry-bushes, few of the trees exceeding six feet in height.

THE WALNUT.

The Walnut (*Juglans regia*) is a native of Persia, and the south of Caucasus; in Britain, therefore, the fruit seldom comes to complete maturity, except in the warmer districts. Besides the common walnut, there are several varieties cultivated, particularly the Large-fruited or Double Walnut, the Tender-shelled, and the Thetford or Highflyer, which last is by far the best walnut grown. The varieties can be propagated with certainty only by budding; but the operation is rather nice, and not unfrequently fails. Plants raised from the seed seldom become productive till they are twenty years old. The fruit is produced at the extremities of the shoots of the preceding year; and therefore in gathering the crop, care should be taken not to injure the young wood. In Kent, the trees are thrashed with rods or poles; but this is rough; and far from being a commendable mode of collecting the nuts.

THE CHESTNUT.

The Chestnut (*Castanea vesca,*) like the preceding, has long been an inmate of our woods, in which it grows to a great size; but it seldom ripens its fruit in the northern parts of the island. Several varieties, remarkable for their productiveness and early bearing, have risen into notice, particularly Knight's Prolific, the New Prolific, and the Devonshire. These are propagated by grafting upon stocks raised from nuts; and when grafts are taken from bearing wood, fruit may be produced in a couple of years. The tree thrives best on a dry subsoil.

SMALL FRUITS.

The Red, White, and Black Currant, the Gooseberry, the Raspberry, the Strawberry, and Cranberry, are usually cultivated in our gardens, under the title of Small Fruits. Their economical uses in cookery, confectionery, and in the manufacture of home-made wines, attach to them considerable importance, and render desirable a separate account of them, however brief.

The Currant. — The *Ribes rubrum* includes as its varieties our Red and White Currants. The principal subvarieties are:—

Dutch Red, Raby Castle, Wilmot's Large Red, Knight's Sweet Red, Knight's Early Red, Woolly-leaved Dutch, Goodwin's Red, Champagne, Dutch White, Wilmot's New White, Victoria White, which to us appears to be identical with Speary's White, and Pearl White.

Black Currants comprise the Common Black, Black Naples, and Ogden's Black Grape.

Red and white currants are readily propagated by cuttings. They succeed in any sort of common garden soil; but seem to thrive best in warm moist situations, where they enjoy an abundance of air. A few plants are sometimes placed against walls, on which they are trained perpendicularly. They are best when planted in compartments by themselves, and trained as dwarf standards or as bushes, from single stems of about a foot in height, care being taken to prevent the main branches from crossing each other. They are sometimes trained with stems three or four feet high, after the manner of standard Roses. In winter the young bearing wood on the sides of the branches is shortened down into spurs from an inch to two inches in length. The leading shoots are left about six inches long. Some careful cultivators reduce the young shoots to about half their length as soon as the fruit begins to colour, an operation which, in consequence of the more free admission of sun, is found to increase the size and improve the flavour of the berries.

The black currant thrives best in a moist, deep soil and shady situation. Its culture is much the same as that of the the other currants, but the young shoots are not spurred. All the pruning necessary is to keep the branches free of each other, and to promote a succession of young wood.

The Gooseberry.—Botanists distinguish two species; *Ribes Grossularia*, or rough-fruited gooseberry, and *R. Grossularia Uva-crispa*, or smooth-fruited gooseberry. The gooseberry has always been a favourite fruit in Great Britain, and is said to be produced in the middle districts of the island in greater perfection than in any other part of the world. Many very large sorts have originated in Lancashire, where the culture has been carried to a high degree of refinement; but it is to be regretted that *weight* seems, unreasonably enough, to be regarded, in the prize competitions in that duchy, as the *sole* criterion of excellence. Berries of 30 or even 34 pennyweights are boasted of; but such Goliaths are almost always inferior in flavour. The following are some of those sorts recommended in the catalogue of the *London Horticultural Society*:—

Red.—Red Champagne, Ironmonger, Rob Roy, Small Red Globe, Keen's Seedling, Lord of the Manor, Leigh's Rifleman, Red Warrington, Wellington's Glory, Shipley's Black Prince.

Yellow.—Yellow Ashton, Yellow Champagne, Golden Yellow, Smiling Beauty, Smooth Yellow, Yellowsmith, Rumbullion, Sulphur.

White.—Bright Venus, White Champagne, Cheshire Lass, White Crystal, White Damson, Whitesmith, White Honey.

Green.—Green Gascoigne, Pitmaston Green-gage, Langley Green, Late Green, Green Laurel, Gregory's Perfection, Green Walnut, Jolly Tar, Cupper's Bonny Lass.

In forming his collection, the horticulturist should especially select a few early and a few late sorts, and by properly disposing the bushes in various situations in his garden, he may prolong the fruit season by several weeks. The same object may be further promoted by defending the fruit of the late sorts from the attacks of wasps, which is accomplished by surrounding the bushes with bunting (the thin stuff of which ship's flags are often made); and still better with Haythorn's hexagon netting; and also by retarding the ripening of the fruit, which is done by planting the latest sorts against north walls. This last contrivance answers equally well with currants as with gooseberries.

The gooseberry-bush affects a loose rich soil, which readily imbibes, but does not retain, much moisture. Gooseberries, like currants, may be grown in lines or compartments. They are propagated by cuttings, and should be transplanted as early in autumn as the beginning or middle of October. They are trained with single stems, from six inches to a foot high; and all suckers, which are apt to spring up from the roots, should be carefully removed. Formerly it was the practice in Scotland to spur all the annual wood; but now the black-currant system of pruning is more generally and advantageously followed. The ground on which the bushes stand should be slightly forked over once a year, and manure applied, either as a top dressing or else in a liquid form, since disturbing the ground so deep as to cover it in the ordinary manner would be extremely injurious to the roots. No further culture is requisite than keeping down weeds, and preventing the extensive ravages of caterpillars. This last object is best attained by dusting the leaves with powdered hellebore, syringing them with lime or tobacco water, and in many cases covering the surface of the ground with fresh tanner's bark has been found efficacious. Gooseberry plants are sometimes trained on walls or espaliers, to accelerate the ripening, or increase the size of the fruit.

The Raspberry (*Rubus Idæus*) is, like the preceding small fruits, a native of Great Britain. The principal varieties are:—

Red Antwerp, Yellow Antwerp, Barnet, Red Globe, Cornish, Williams' Double Bearing, Belle de Fontenay, Cox's Honey, Franconia, Rivers' large-fruited Monthly, Roger's Victoria, White Globe, White Monarch, Folstaff, which last is the most profitable.

Raspberries are propagated from suckers, which are planted in rows five or six feet apart, and at three feet from each other in the rows. The fruit is produced on small branches which proceed from the shoots of the former year. Every year they throw up a number of shoots or canes from the root, which bear fruit the subsequent year, and then decay. In dressing the plants, immediately after the crop is gathered, all the decayed stalks are cut away, and of the young canes only three or four of the strongest are left, which are shortened about a third. As the stalks are too weak to stand by themselves, they are sometimes connected together by the points in the manner of arches, so as to antagonise and mutually support each other, and sometimes they are attached to stakes. The best support is obtained by fastening the points of the shoots to a slight horizontal rail or bar about four feet high, and placed a foot and a half on the south side of the rows. By this means the bearing shoots are deflected from the perpendicular to the sunny side of the row, and are not shaded by the annual wood. The ground between the rows should never be disturbed by digging. Fresh plantations of raspberries should be made every six or seven years. The double-bearing varieties, which continue to bear during autumn, require light soils and warm situations. It may be mentioned that the crop of any of the varieties may be retarded by breaking off the points of the bearing shoots at an early period in spring; but, like all other fruits, the flavour of the raspberry is highest when it is allowed to ripen at its natural season.

The Strawberry (*Fragaria*) belongs to the same natural family as the raspberry. Amongst the numerous kinds cultivated in our gardens, botanists have distinguished several *species*, but as these distinctions imply no difference in culture, and as it is difficult to trace them amid the sportings of the hybrids, we shall not pretend to enumerate them. Scarcely any plant more readily slides into seminal varieties, the nomenclature of which was a mass of confusion, till revised by Mr Thompson. In the Catalogue of the London Horticultural Society, no fewer than 112 varieties are enumerated; but the following are sufficient, and most worthy of cultivation in any garden:—

Grove End Scarlet is the most proper for preserving, on account of its fine carmine colour; Cuthil's Black Prince, for its early ripening; Myatt's Pine; Elton, on account of its late ripening; British Queen, Deptford Pine, Eleanor, Keen's Seedling, Ingram's Prince of Wales, Princess Alice Maud, Princess Royal, Nicholson's Ajax, Trollop's Victoria, Large Flat Hautbois, White and Red Alpine, Sir Harry, Myatt's Mammoth, and Comte de Paris, allied to the Elton.

The strawberry plant is propagated either from runners or from seed. When runners are employed, they should be taken off as soon as their first rootlets are formed—the sooner the better—and be planted in nursery beds, in well prepared soil, and about seven inches apart. They should be shaded and watered till their roots have been formed, and the plants excited into growth, so as to be strong and well developed the same season. They may be then transplanted either in October or early in November, or the operation may be delayed till March.

Fruit Garden.

By this process a good crop of fine fruit will be obtained the first season.

The desire of new varieties has encouraged the practice of propagating by seed; and Keen, Knevett, Myatt, and others, have been extremely successful. The late Mr Knight having observed that the young runners of the alpine strawberry flower and ripen fruit the first year, was led to adopt this mode of reproduction, and followed it with the happiest success. Early in spring he sowed the seed in flower-pots, which were put into a hotbed; and as soon as the plants attained a sufficient size, they were transplanted into the open ground. They began to blossom soon after midsummer, and continued to produce fruit till interrupted by frost. Thus Mr Knight was inclined to treat the alpine strawberry as an annual plant.

A clayey soil or strong loam is considered as best suited to strawberry plants. On a sandy or very light soil they seldom succeed; and in very close situations, and over rich ground, most varieties produce little else than leaves. Before planting, the ground should be manured and trenched, or digged over deeply, and when stiff and compact it should be very carefully worked. The market-gardeners in the neighbourhood of London grow their strawberries in beds, three rows in each, with an alley between them; while those of Edinburgh plant them in rows two feet asunder, and from a foot to fifteen inches in the rows. High cultivators allow three feet between the rows, and two feet between each plant in the line. When the weather is dry, the young plants are watered till they are well established. In May the runners are cut off, with the view of promoting the swelling of the fruit. During dry weather careful cultivators water their plants after the fruit is set, and occasionally till it begins to colour. The old practice, from which the fruit derives its name, of laying straw between the rows to prevent the soiling of the fruit, has been recently revived; and where there are dressed lawns, the short cut grass may be employed for the same purpose. As soon as the fruit season is over, the runners are again removed; the straw or grass is taken away, and the ground hoed and raked. In October the runners, *but not* the leaves, are cut away, and the surface of the earth is stirred with a three-pronged fork, great care being taken not to injure the roots. Strawberries may be raised from the same ground for an indefinite space of time; but the plants should be renewed every second or third year. They are, however, never so good after the third year, unless the soil is a stiff and rich clay. In the garden they are generally put in a quarter by themselves, and it should be one fully exposed to the sun and air. The alpine and wood varieties may be placed in situations rather moist and shady, or in rows behind walls and hedges, in which situations they succeed perfectly well, and produce fruit late in the season.

The culture of strawberries is the most lucrative part of the employment of the market-gardener, at least near large towns. It is not uncommon for him to realize a clear profit of £25 or £35, or even more, per imperial acre of strawberry ground. The greater the diligence and assiduity of the cultivator, the greater will be his returns. It is a common and just remark, that too little labour is in general expended upon the strawberry, and by the ignorant and unskilful gardener least of all.

Strawberries are extensively forced. Keen's Seedling, British Queen, and Cuthil's Black Prince, are the best. Some cultivators have their plants in a state of preparation for nearly a year before fruit is expected. Others provide new plants for forcing every year. But the same plants may be forced for several successive years, provided they are shifted in August, and, at the time of re-potting, the black torpid roots are cut off, leaving only those of a paler colour, and those which are connected with the new shoots or offsets. Entirely new plants are, however, the best. They should be potted as early in summer as it is possible to procure rooted plants, and encouraged in growth till autumn, by shading till rooted, watering, &c. By the beginning of November they should be placed under the cover of glass pits or frames, to protect them from too much damp, but not to induce them to prolong their growth. By the 1st of January they should be plunged into a mild bottom heat, admitting abundance of air, in order to excite the roots into activity before the tops. When this is effected they are to be placed in a mild temperature in a pit, or on suspended shelves near the roof of a forcing-house close to the glass. After the fruit is set, additional heat may be applied, and during their growth they should be abundantly supplied with water.

Forcing Garden.

THE CRANBERRY.

The American Cranberry grows freely, and produces fruit readily in any damp situation; but where there is a pond, it may be cultivated with the greatest success, if planted around its edges in a bed prepared for the purpose. A layer of small stones is deposited in the bottom, and over these, peat or bog earth, mixed with sand, to the extent of about three or four inches above, and half a foot below the usual surface of the water. Plants of the American cranberry placed on this bed, soon cover the whole surface with a dense matting of trailing shoots. There is a variety which is very shy in yielding its fruit, and this should, of course, be avoided. If the prolific variety be employed, from a bed thirty or forty feet in length, by five or six in breadth, a quantity of berries may be procured sufficient for the supply of a family throughout the year. The fruit is easily preserved in bottles.

The native Cranberry (*Oxycoccus palustris*) may be treated in the same manner, and in some places is very successfully cultivated. At Culzean Castle in Ayrshire, the cranberry ground was surrounded by a ditch, the water of which was made to filter through among stones and stakes to the interior, so as to keep the cranberry plants constantly supplied with moisture. In the same garden a second compartment was dedicated to small fruits of this class, having in the centre a rock-work planted with whortleberries (*Vaccinium Vitis Idœa*), and around the rock-work beds of American Cranberry, of Scottish Cranberry, and of Crowberry (*Empetrum nigrum*), also native.

The following plants produce fruit, some of them abundantly in a wild state, others sparingly in our gardens; but they can scarcely be said to come within the province of Horticulture: *Berberis dulcis*, and other species of Barberry; *Sambucus nigra*, the Elder; *Prunus spinosa*, the Sloe; *P. insititia*, the Bullace; and *Rubus Chamæmorus*, the Cloudberry, with various species of *Vaccinium* and *Gaultheria Shallon*.

THE FORCING GARDEN.

PRELIMINARY REMARKS.

The term *forcing* is strictly applicable only to those artificial processes by which vegetation is in a considerable degree accelerated; but in common language it has been applied to all those operations in which glazed frames or houses are concerned, though they may be employed merely in aiding the common progress of nature, or in counteracting the great vicissitudes of our climate. For the sake of convenience, we shall adopt the term in its broadest acceptation. After some preliminary observations, we shall first treat of the structures, and then of the fruits and vegetables which are cultivated in them.

The principal object of hothouses, and other structures of a similar nature, is to produce an artificial temperature and humidity of the atmosphere, which shall resemble,

Forcing Garden.

as nearly as possible, the climate in which the fruits or plants naturally flourish. A command of heat is obviously a primary requisite. A regulated admission of air, and the presence of a certain degree of moisture, are, in the next place, necessary. Lastly, without the free access of light, plants become blanched, or are destroyed by the moisture which they generate. These, then, are the conditions which limit the form of hothouses; when these are attained, any form may be adopted which invention can devise, or wealth execute; but every true lover of the art will aim at simplicity, and will deprecate useless expenditure, so often exhibited in this department, as injurious to the character as well as to the progress of horticulture.

Artificial Heat.—Forcing-houses are heated in various ways; by means of *flues* conveying smoke and heated air; by *pipes* conducting steam or hot water; by so constructing the glazed house as to increase the calorific action of the sun's rays; and sometimes by the heat generated in the course of the fermentation of vegetable substances.

Smoke flues have been long in use; but they are now very properly almost universally superseded by hot-water pipes. The latter have many advantages over the former. They are far more durable, they occupy much less space, they can be placed in situations where flues can not, they give out a more steady and uniform heat, and can seldom be overheated, they require no repairs or cleaning, and are more elegant in appearance. Flues, on the other hand, are liable to bursting, from the explosions which may arise by the ignition of inflammable gases. Noxious gases cannot be prevented from entering the structure, be the flue ever so well built, and when we consider that these gases consist of sulphurated, phosphorated, and carburetted hydrogen, besides various comparts of nitrogen and carbon, all of which are exceedingly injurious to animal and vegetable life, we need not wonder at the preference given to the one mode of heating over the other. The difference of expense in erection is somewhat more for hot-water pipes than for flues, but they, on the other hand, are the cheapest in the end.

The bricks employed in building flues have, from their soft nature, the property of very strongly absorbing from the air of the house the moisture necessary for the health of plants. Hot-water pipes, on the other hand, being unabsorbent, produce no such effect.

The Furnace.—Very much of the success of all modes of heating depends not only on the construction of the furnace, but also on the working of it afterwards. The most perfect furnace is that which gives the greatest amount of heat from the smallest amount of fuel, and which is capable of being applied to the purposes for which it is intended in the most convenient and most effective manner. Although this has been the study of engineers for above a century, truth compels us to admit that no perfect furnace has hitherto been constructed.

The construction of furnaces, whether for smoke-flues or hot-water boilers, is in principle nearly the same. Hood, an engineer of eminence, and author of the best practical work on heating, observes of furnaces, that "the heat should be confined within the furnace as much as possible, by contracting the farther end of it, at the part called the throat, so as to allow only a small space for the smoke and inflamed gases to pass out. The only entrance for the air should be through the bars of the grate, and the heated gaseous matter will then pass directly upwards to the bottom of the boiler, which will act as a reverberatory, and cause a more perfect combustion of the fuel than would otherwise take place. The lightness of the heated gaseous matter causes it to ascend the flue, forcing its passage through the throat of the furnace, with a velocity proportioned to the smallness of the passage, the vertical height of the chimney, and the levity of the gases arising from their expansion by the heat of the furnace." Tredgold assumed that a furnace for burning a bushel of coals per hour should have a fire grate not less than eight, nor more than sixteen square feet, and the surface of the boiler should be four times the area of the grate, with 32 feet of side flues. This we believe to be considerably more than necessary. Hood, on the other hand, says, in the work already quoted—"Supposing the ordinary kind of furnace bars afford about 30 inches of opening for the air in each square foot of surface measured as the bars are placed in the furnace, and allowing half-inch openings between the bars, where the bars themselves are about 1½ inches wide, then the relative proportions between the area of the bars and the length of the pipe should be as follows:—75 square inches of area of bars will supply 150 feet in length of a 4-inch pipe, 200 feet of a 3-inch pipe, and 300 feet of a 2-inch pipe; 100 square inches of area of bars will supply 200 feet of a 4-inch pipe, 266 of a 3-inch pipe, and 400 feet of a 2-inch pipe; 150 square inches of area of bars will supply 300 feet of 4-inch pipe, 400 feet of a 3-inch pipe, and 600 feet of a 2-inch pipe, and so on in proportion.

All the air necessary for causing combustion of the fuel should be made to enter from below, that is, through the ash-pit, and not through the door or sides of the furnace, as by so doing it becomes heated to between 900° and 1000° before it comes in contact with the fuel. To produce this effect it is necessary to have double furnace doors and ash-pit registers, the first suggested by Dr. Black, and the latter by Count Rumford. By such arrangements only can the gardener have control over his furnace, for by shutting up the ash-pit and furnace door closely combustion is lessened, and the fire may be kept almost in a state of suspension for many hours together; while, on opening either the door or ash-pit register, air is admitted and combustion goes on.

Smoke-consuming Furnaces.—The attention of modern inventors has of late years been very properly directed to the consumption of smoke. That of Witty, or rather of Chanter, was amongst the first, and has been found to work well for garden purposes. The very best constructed furnace will not work satisfactorily, unless proper attention is paid to it by the fireman. A vertical section of Witty's furnace is given in fig. 15. The fuel is supplied by the door at *a*, and is pressed down the inclined plane towards the grate, *c*, by a screw placed at the head of it (but this method has given way to the use of the common tools used for feeding furnaces); *b* is the door for regulating the fuel on the grate *c*. In its progress the whole surface of the coal along the inclined plane is constantly kept in a state of inflammation, the flame having naturally a tendency to burn upwards. In this way the greater part of the fresh coal is carbonized, that is, the gas is separated from it and inflamed, leaving only coke. The strong combustion of the coke at the grate produces heat

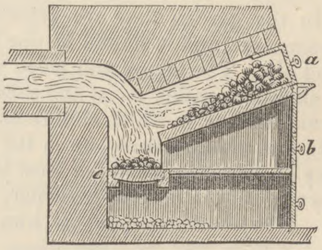

Fig. 15.

Forcing Garden.

Forcing Garden.

enough to carbonize the coal, and air enough to inflame the gas. This furnace, therefore, not only consumes most of the smoke, but effects a considerable saving of fuel. The principal smoke-consuming furnaces adapted to garden purposes are, Williams' improved or argand furnace, that of Mr Wye Williams of Liverpool, and Mr Joseph Williams of the same city. Experiments made as to the action of the latter have shewn that in the front flue of a furnace of common construction the thermometer seldom rose above 1100°, and often fell below 900°, the mean being 975°; while in the same furnace, while consuming its smoke upon Mr Williams' principle, the mean temperature was 1160°, ranging between 1400° and 1000°.

The consumption of smoke not only economises fuel to a very considerable extent, but also prevents surrounding buildings, &c., being discoloured by the escape of unconsumed carbon.

Steam as a heating medium has been so completely superseded by hot water for all horticultural purposes, unless it may be in cases where the waste steam of manufactories, &c., may be turned to account in some adjoining garden, that our observations on it here will be brief. The first expense of a steam apparatus, its expense of maintenance, and liability to get out of order, are some of the principal objections to its use. It is also less uniform and certain in its operation. This is explained by the high authority of Hood, who says, "The weight of steam at the temperature of 212°, compared with the weight of water at 212°, is about as one to 1694; so that a pipe which is filled with water at 212°, contains 1694 times as much matter as one of equal size filled with steam. If the source of heat be withdrawn from the steam-pipes, the temperature will soon fall below 212°, and the steam immediately in contact with the pipes will condense; but in condensing the steam parts with its *latent heat*, and this heat passing from the latent to the sensible state, will again raise the temperature of the pipes. But as soon as they are a second time cooled down below 212°, a further portion of steam will condense, and a further quantity of latent heat will pass into the state of heat of temperature; and so on until the whole quantity of latent heat has been abstracted, and the whole of the steam condensed, in which state it will possess just as much heating power as a similar bulk of water at the like temperature, that is, the same as a quantity of water occupying 1-1694, the part of the space which the steam originally did." It has also been proved that a given bulk of steam will lose as much of its heat in one minute as the same bulk of water would in three hours and three quarters.

Hot Water.—Heating by causing hot water to circulate in iron pipes or vessels was brought into notice in 1827, and may be said to have now superseded all other modes of heating whatever, which is a sufficient proof of its superiority. For several years after its invention the true cause of the circulation of the water in the pipes was misunderstood; nor was it till the publication of Mr Hood's "Treatise on Heating, &c.," that this was explained. The erroneous opinion of Mr Tredgold, which has found its way into many standard works, requires to be noticed. This can, however, best be done by quoting Mr Hood's own words—"Let us suppose heat to be applied to the boiler *A* (fig. 16); a dilatation of the volume of the water takes place, and it becomes lighter—the heated particles rising upwards through the colder ones, that sink to the bottom by their greater specific gravity; and these in their turn become heated and expanded like the others. This intestine motion continues until all the particles become equally heated, and have received as much heat as the fuel can impart to them. But as soon as the water in the boiler begins to acquire heat, and to become lighter than that which is in the opposite vessel *B*, the water in the lower horizontal pipe *d* is pressed by a greater weight at *z* than at *y*, and it therefore moves towards *a* with a velocity and force equal to the difference in pressure at the two points *y* and *z*. The water in the upper part of the vessel *b* would now assume a lower level, were it not that the pipe *c* furnishes a fresh supply of water from the boiler, to replenish the deficiency. By means of this unequal pressure on the *lower* pipe, the water is made to circulate through the apparatus, and it continues to do so, so long as the water in *B* is colder, and therefore heavier than that which is in the boiler; and as the water in the pipes is constantly parting with its heat, both by radiation and conduction, while that in the boiler is as continually receiving additional heat from the fire, an equality of temperature never can occur; or else, if it did, the circulation would cease. We see then that the cause of circulation is the unequal pressure on the lower pipe of the apparatus, and that it is not the result of any alteration which takes place in the level of the water," as erroneously stated by Tredgold, Atkinson, and others.

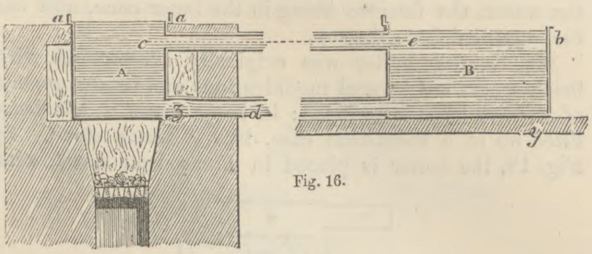

Fig. 16.

Fig. 16 referred to in the preceding quotation, representing the common tank boiler, surrounded by a flue, with a cistern at the extremity of the pipes, exhibits the form in which the apparatus was first erected; but as in this arrangement the process of heating was very slow, many changes have been made; the cistern has generally been abandoned, and boilers of various configurations have been adopted. Fig. 17 is a longitudinal section, and Fig. 18 is a transverse section of a fluid tank boiler, in which the surface exposed to the heat being increased, the effect required is accelerated, and at the same time a considerable saving of fuel is effected.

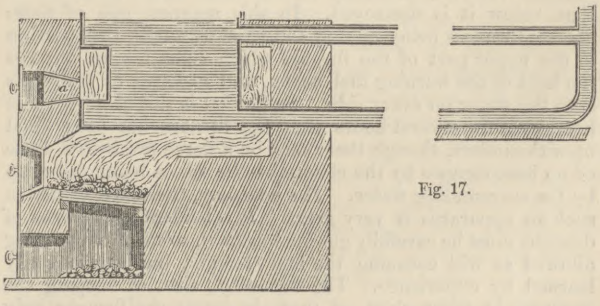

Fig. 17.

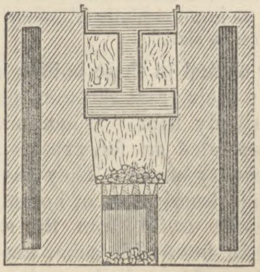

Fig. 18.

Forcing Garden.

Forcing Garden.

The conical boiler, invented by Mr Rogers, of Seven Oaks, Kent, is formed of two truncated concentric cones, with a space of two or three inches between them for the water, the furnace being in the inner cone, and the fuel supplied from the top.

Mr Rogers' boiler was originally surrounded with brick-work, but several modifications and improvements of it have been introduced: in some cases it has been fitted up in a sheet-iron case, like Arnott's stove. In Fig. 19, the boiler is placed in a cast-iron stand, with ground circular furnace, and register ash-pit doors,—*a* being the furnace, *b* the boiler, *c* flow and returning pipes, *d* the furnace door, *e* smoke-pipe to the vent, *f* ash-pit, *g* grating, *h* hole for cleaning the furnace. The best kinds of fuel for this furnace are coke, gas-cinders, and anthracite; but common coal which does not cake very much has been found to be well adapted for the purpose, as it is soon formed into coke.

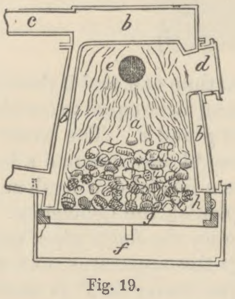

Fig. 19.

The following is the *rationale* of the process of the heating of this boiler, as given by Mr Rogers in the *Gardener's Magazine*:—

> "As fuel cannot be consumed without air, if a furnace be constructed of considerable depth, and filled with fuel, and air be admitted only at the bottom, that fuel alone is consumed which lies immediately on the bars, and first receives the draught of air. The fuel above, provided it transmits the air, becomes red-hot, or nearly so, but does not consume until that below it is destroyed. In this manner, one of these conical furnaces being lighted and filled with fuel, that portion in the upper part of the furnace which cannot burn absorbs the heat of the burning fuel below, and radiates or transmits it to the water on every side. So perfect is this absorption of heat, that for several hours after the furnace has been filled up with cinders, though there may be a fierce fire below, little or no heat escapes by the chimney—the whole being taken up by the surrounding water. The economy, therefore, of fuel in such an apparatus is very great. It is evident that excess of draught must be carefully guarded against, so much only being allowed as will consume the fuel steadily, but this is easily learned by experience. The necessity, also, of keeping the aperture in front close, so that air enters the furnace only through the ash-pit, is hence evident. The water (as may be observed from the above figure) is in close and immediate contact with the red-hot fuel on all sides, no black smoking coals intervening, as in most kinds of boilers; hence the great power in proportion to size."

The economy of fuel in these boilers is not their principal advantage; their great recommendation is a long-continued and steady heat. When properly managed, they may be depended on for preserving the heat for from fifteen to twenty hours. They have been successfully applied to all descriptions of hothouses, but for pits they are eminently useful from the small space they occupy; and when fired with coke, gas-cinders, or anthracite, they give off very little smoke.

The number and variety of forms recommended for boilers are now very great, although many of them, it will be admitted, are of no practical utility. The simpler the form and least complicated the whole apparatus the better, at the same time, those forms are the best that present the greatest surface to the action of the fire, such as Bailey's (fig. 20); and Cottam and Hallen's (fig. 21) boilers, which of themselves form the dome (fig. 22) or roof of the fire-place, having the fire burning below them and round their sides, are valuable in that respect. Burbridge and Healey's fluted boiler presents a larger surface to the flame than a plain surfaced one of the same dimensions; and Weeks and Co.'s tubular boiler possesses this merit in an eminent degree.

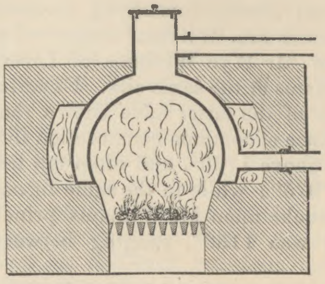

Fig. 20.

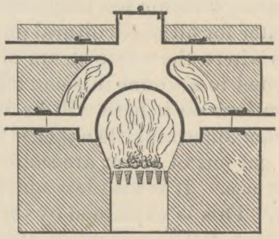

Fig. 21.

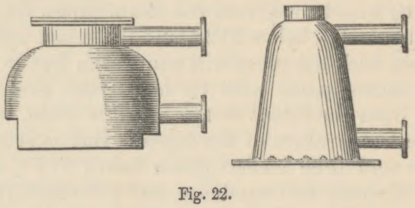

Fig. 22.

Boilers constructed so that several hothouses may be heated by one fire, deserve attention, as they are more conveniently wrought, and are less expensive than having stop-cocks or valves placed upon the pipes at various distances from the boiler. In practice we have found Waldron's boiler (fig. 23) to work well. As will be seen by the diagram, the hot water from the boiler rises in a vertical pipe, and flows into an iron box fixed on its top, from which issue as many pipes as there are houses or pits to heat, allowing one pipe for each. Each of these pipes is furnished with a stop-cock, by which the water is turned off or on as may be desired. The return pipes are all connected with a similar box fitted to the end or side

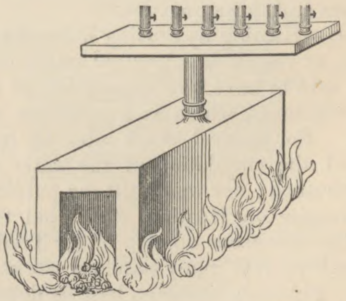

Fig. 23.

of the boiler, and from it through a single pipe the cold water enters the boiler near its bottom.

Connected with this distribution of heated water is Critchley's patent heat-regulator, figs. 24, 25. It is placed a little on one side of the boiler, and to prevent the loss of heat by radiation should be enclosed within double walls of brickwork.

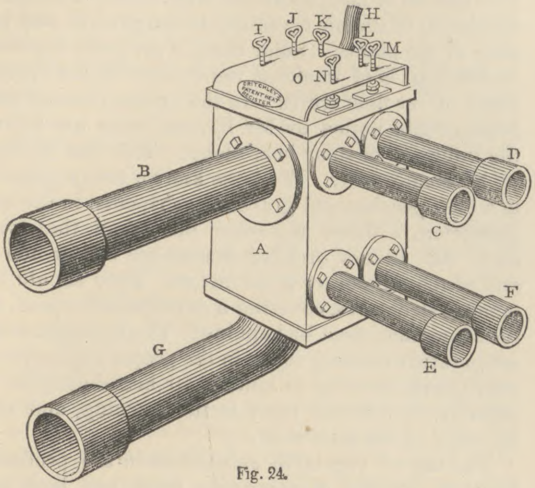

Fig. 24.

Fig. 1.—Exterior of Apparatus.
A.—Iron Box, fitted up water tight.
B.—Pipe for supply of water from Boiler.
C. D.—Pipes for circulating hot water.
E. F.—Pipes for return of water to Iron Box.
G.—Pipe for returning water to Boiler.
H.—Air Pipe to prevent explosion.
I. J. K. L. M. N.—Piston Rods for opening and closing Valves.
O.—Brass Plate, covering Stuffing Boxes, and for marking the regulation of Valves.

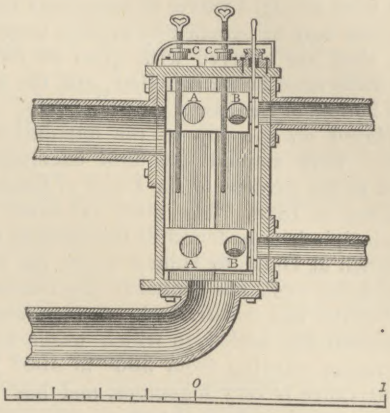

Fig. 25.

Fig. 2.—Section or Interior of Apparatus.
A.—Valve when closed.
B.—Valve half opened.
C. C.—Stuffing Boxes, through which Piston Rods work to close or open the Valves.

It is unnecessary to describe all the numerous modifications of this apparatus; but it may be proper to direct the attention of the reader to the close boiler represented in fig. 26, in which is shewn how the circulation may be conducted over a door or other obstacle. In this case the upper pipe must not ascend and descend twice: air-tubes ought also to be placed in the boiler, and on the highest part of the pipes; and the whole must be made considerably stronger than on common occasions, to resist the pressure.

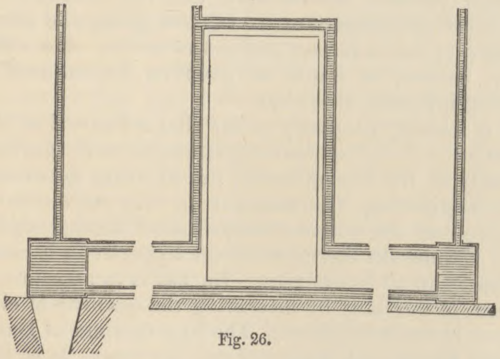

Fig. 26.

To cause heated water to descend below the level of the boiler, by carrying it under a passage (which should be avoided if possible), it is necessary to raise the water, as it is heated, to as great a height above the boiler as it is intended to carry it below it. This depression must take place once only

In the early stages of this mode of heating, flat pipes were used for the flow or upper range of pipes, from a mistaken idea that they presented a greater radiating surface than round ones of the same calibre. These are now abandoned, and both flow and return pipes are made cylindrical. The number of pipes must be regulated by the extent to be heated, and the degree of temperature required. Hence it is often well to have three or even four upper or flow pipes, and only one under or return pipe. As to size, 4-inch pipes are almost universally employed.

As to position, they should be placed near the front or lowest part of the house, and should, to prevent loss of heat by conduction, be supported clear of the ground, upon cast-iron chairs, so as to clear them of the borders not less than six inches.

An ingenious mode of heating has been shown by Mr. Fowler in his tract on the Thermosyphon, as he calls it, by which he has shown how walls, as well as glass-houses, may be heated. He says, "Any one may prove that hot water will circulate in a syphon, by taking a piece of lead pipe, say of half an inch bore, and four or five feet long, bending it like a syphon, but one leg a good deal more bent than the other, in order to give the descending water time and space for giving out its heat; and then, filling this tube with water, and placing one hand on each end to retain it full, immerse the extremities in a pot of water over a fire, as represented in the annexed fig. 27. Supposing the water of a uniform temperature in both legs of the syphon, no circulation would take place; but supposing it to cool sooner in the long leg *a* than in the short leg *b*, then the equilibrium would be destroyed, and the water in the long leg *a* would descend, and draw up water through the short leg *b*; and this circulation would continue as long as the water *c* was maintained at a temperature above that of the surrounding atmosphere."

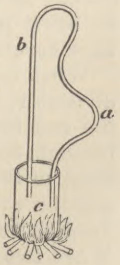

Fig. 27.

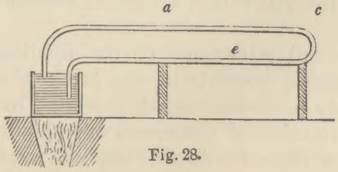

Fig. 28.

Mr Kewley's adaptation of the syphon is one of the simplest and most efficient that has been proposed. In

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fig. 28, *a*, *c*, *e*, are the two legs of a syphon, through the upper of which the heated water ascends, and by the lower descends. Immediately over the descending bend, a pipe connected with an air-pump is inserted, in order to fill the pipes, or remove the air which collects in the superior limb. Instead of the air-pump, a funnel with air-tight valves is sometimes employed.

Hot water may be beneficially applied to garden-walls, whether they are covered with glass or not. To this end the walls must be built hollow, and the pipes placed near the bottom of the cavity, and supported on cast-iron chairs placed on the top of the foundation course of material. This method was first exemplified by Mr Atkinson in the gardens of the Duke of Bedford at Wolburn Abbey in 1828. The most extensive application of the principle is to be found in the gardens of the Duke of Buccleuch at Dalkeith House, where the whole of the principal brick walls are heated in this manner.

Mr Perkins has constructed an apparatus of small tubes hermetically sealed, in which water circulates, of a temperature varying from 300° to 400° Fahrenheit. The contrivance is very ingenious, and has been pretty extensively employed in London and Edinburgh, in heating public offices and warerooms. It is not, however, adapted to horticultural purposes. For further information we may refer to M'Intosh's *Book of the Garden*, in which above 250 illustrations of various methods of heating are given; and for the principles of heating, to "Hood's Treatise on Heating and Ventilation," *new edition*, "Tomlinson on Warming, &c." "Bernan's History of the Art of Warming and Ventilating, &c."

Mr Corbett introduced what has been called the gutter mode of heating. From a common boiler proceeds an upright tube, and this tube leads to a continued series of open gutters. Heat being applied to the boiler, the water rises in the tube and flows forward in the gutters, giving out moisture in proportion to the degree of heat. As the water cools or becomes more dense, it gradually falls back to the bottom of the boiler, through a connecting pipe.

Mr Rendle, of Plymouth, has also introduced a mode of heating, in which he employs tanks instead of pipes, or gutters, for both surface and bottom heat. These tanks are formed of wood, brick, stone, or cast-iron. When formed of wood, they require to be made of good sound plank, not less than two inches thick, properly jointed, and are usually covered with slates. If they are formed of stone or brick, the insides require a thick coating of Roman cement, and for covers, stone, slate, or brick pavement is employed. The cast-iron tanks have covers of the same materials.

When only one tank is fitted up in a house or pit, a division is made along the centre, leaving an opening at the end farthest from the boiler, for the water to flow through, the hot water or flow pipe from the boiler being fixed to the end of the tank, on one side of the division, and the cold water, or return pipe to the boiler, being fixed to the end on the opposite side of the division. When two tanks are used, they are joined to the flow and return pipes respectively, and united at the extreme ends. In pits, the tanks may be carried round the sides and ends of the pit, with a division between the flow and return pipes.

The principal advantage of the application of this mode of heating consists in the production of bottom heat. Proper provision ought, however, to be made for preventing no more of the steam or vapour rising from the hot water (into the house) than is requisite; for, if this precaution be not adopted, there will be too much damp in the winter season for the proper growth or preservation of the plants.

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The rays of the sun, especially by being reflected from walls and other surfaces, become a source of artificial heat. This species of heat, however, is materially affected by the admission of the air necessary to the growth and healthy state of the plants. Solar heat, if properly regulated by ventilation, is of immense importance in the ripening of many of our finer fruits. In the orchard houses recently brought into notice by Mr Rivers, fruits are ripened by the influence of solar heat alone. The idea is, however, by no means new. We have known many glass houses in which peaches and grapes have ripened in the greatest perfection, without any other heat than that from the sun. Mr Rivers' orchard houses are by far too small, and of too temporary a character. They should be permanent structures, covering a considerable space, and, at the same time, must be kept low. The management of the temperature consists solely in the proper regulation of the ventilators, securing as much solar heat during the day as possible, ventilating early in the morning, and shutting up early in the afternoon.

The use of vegetable substances in the production of heat, is rapidly disappearing from our best gardens before the application of hot water, which is far more economical and certain in its effects.

In the management of artificial heat, a considerable degree of caution is required. All the operations of nature are gradual; and in *forcing*, it is well to follow these as the safest examples. The judicious gardener will therefore apply his heat very gradually at first; he will increase it by degrees for several weeks, and, in particular, he will guard against any sudden decrease of warmth, as nothing is more necessary to success than that the course of vegetation be continued uninterruptedly through foliation, inflorescence, and fructification. He will cause the temperature to *increase by day* and *decrease by night*, to *rise in summer* and *fall in winter*. He will, in short, imitate, as much as possible, the natural and varying influence of the sun.

It is scarcely necessary to say that a Fahrenheit thermometer is an indispensable instrument to the gardener, not only in the forcing-house, but in every department. Six's Registering Thermometer is very convenient for pointing out the extreme temperatures during night or day. Besides the thermometer the hygrometer is equally necessary in all hot-houses. Its use is to ascertain the degrees of humidity by measuring the quantity of elastic vapour in the atmosphere. The hygrometers of Daniell, Mason, Leslie, and Simmons are the best. It is justly remarked by Dr Lindley, in his *Theory of Horticulture*, that "skilful balancing of temperature and moisture in the air, and a just adaptation of them to the various seasons of growth, constitute the most complicated and difficult part of a gardener's art. An excess of dampness is indispensable to plants in a state of rapid growth, partly because it prevents the action of perspiration from becoming too violent, and partly because, under such circumstances, a considerable quantity of aqueous food is absorbed from the atmosphere, in addition to that obtained by the roots. But it is essential to observe that, when not in a state of rapid growth, a large amount of moisture in the air will be prejudicial rather than advantageous to a plant; and if the temperature is at the same time high, excitability will remain in a state of continued action, and that rest which is necessary will be withheld, and the result of which will be an eventual destruction of the vital energies. But on the other hand, if the temperature is kept low while the amount of atmospheric moisture is considerable, the latter is absorbed

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without its being possible for the plant to decompose it."

The Admission of Air.—The deteriorating influence which all living plants are supposed to exert on the atmosphere, must operate with tenfold force in a glazed house, where the proportion of air to vegetable substance is infinitely smaller than under the open sky, and where the corrective agitations of the wind, and the changes of temperature, are much less perceptibly felt. The respiration of plants, and the exhalations of putrescent vegetables, require a constant circulation of the aerial fluid, and this is maintained by means of moveable ventilators in the roof and walls of the house.

The best modes of securing a proper amount and equal distribution of air in hothouses, we may as well add in dwelling-houses also, has until lately been little understood. "All ventilation is founded upon the simple principle that cold air is heavier, and has a tendency to sink downwards, while hot air is light and rises to the top. At first sight it may appear that for the purpose of ventilating any building, it is only necessary that holes should be made at the bottom of the apartment for the air to enter, and other holes be placed in the upper part, for the hot air to escape. Practically, however, ventilation is far from being so simple an affair."—(*The Book of the Garden*, vol. i. p. 271.) Plants in the open atmosphere are constantly surrounded with air, which is itself incessantly in motion, and this motion is increased during the night, the time when they are feeding most especially. "The atmosphere," as Dr. Lindley rightly expresses it, "is their pasture, and its ever varying density is a natural phenomenon most intimately connected with the maintenance of vegetable health. It is a beautiful compensation for their want of locomotion; as plants cannot move to the atmosphere, the atmosphere is ever moving towards them. It is therefore certain, without inquiring into the exact philosophy of the matter, that free access of abundant air must be secured, if the health of plants in glass houses is to equal that in the open air."

To secure this important end, it will be necessary to abandon the means, hitherto almost invariably in use, namely, by throwing open the sashes, whether at the top of the house or in front. The sliding down of one sash over the other, as in the former case, greatly augments the shade in oblique sunshine, a glimpse of which we can ill afford to spare in our cloudy atmosphere, and in the latter case the openings being opposite the tender foliage are hurtful to it, particularly when the external air is, as it often is, many degrees below that of the internal.

Fixed roofs should therefore be adopted, and ventilation effected by bringing in fresh air through the parapets, and so close to the floor that it cannot reach the plants in a direct manner. The vitiated or exhausted air should be made to escape through the apex of the ridge.

Most commonly, air is given only during the day, and is excluded at night, with—as is too often the case—an increase of fire-heat. Judicious horticulturists should always reverse this process, since in all countries chilly and cold nights usually succeed the hottest days, and plants require air by night as well as by day.

An injudicious admission of air is often attended with consequences as bad as its almost total exclusion. Cold, dry air, admitted into a glass-house in which the air is moist, and at a much higher temperature, has the effect of abstracting from the plants and the soil in which they grow a great part of their moisture, and thus producing a very injurious effect upon their constitution. The rapid evaporation too, which takes place by the admission of cold, dry air, produces a degree of cold upon the leaves, which, although not measurable by instruments, produces an effect somewhat analogous to the chill experienced by persons sitting in a warm room and exposed to the cold draught from the door or window.

To remedy this defect in ventilation, what has been called of late years aëration, or subterranean ventilation, has been adopted. This is effected by bringing in supplies of fresh air through tubes or drains placed several feet under the surface of the borders, and having one end opening into the open air, while the other opens through various parts of the floor or border, and often very properly under the hot-water pipes. By this means we admit fresh air at almost the same temperature as that of the air, close to the front of the house, and also charged with the moisture which it receives in passing through the damp pipes or drains.

Air admitted in this manner is often beneficially allowed to operate during the night as well as during the day. For plants, like animals, cannot long exist without their necessary supply of that element by night as well as by day.

The Admission of Light.—In addition to the heat with which natural light is always accompanied, it seems to possess another property necessary to vegetation, which, from some cause hitherto unexplained, is partly deranged by its transmission through glass. This fact, though strange, is evident from the circumstance that though the intensity of light is apparently undiminished, plants thrive better near the glass than at a distance from it. The distance from the glass at which this phenomenon takes place has never been determined, although it is an optical problem, the solution of which would be of much importance to the garden architect. The amount of solar light which plants in glass-houses require for the fullest development of their various parts is probably more than even our best hot-houses transmit. Certainly it is much greater than is transmitted through the roofs of houses as generally constructed. Let us first see the beneficial effects of light on plants placed under such circumstances, and then consider how it can be best insured. "It is the property of solar light, when striking upon the leaf of a plant, either directly or indirectly to cause—First, a decomposition of carbonic acid; secondly, an extrication of oxygen; and thirdly, invisible perspiration. By their vital forces plants appear to decompose water, independently of the action of light. Carbonic acid is originally introduced into the interior of a plant, either dissolved in the water it imbibes by its roots, or by attraction from the atmosphere, or by the combination of oxygen—resulting from the decomposition of water or from other sources—with the carbon in its interior. When a leaf is exposed to the direct influence of the sun, it gives off oxygen by decomposing the carbonic acid; whereupon the carbon remains behind, in the interior of the leaf, in a solid state. In the total absence of solar light, there is little or no extrication of gaseous matter, and what little is given off will be found to be carbonic acid, which plants exhale at all times in small quantities; oxygen, however, which was before expelled, is inhaled. Hence plants decompose carbonic acid during the day, and acquire it again during the night, and, during the healthy state of a plant the decomposition of this gaseous matter by day, and its recovery by night, is perpetually going on. The quantity of carbonic acid decomposed is in proportion to the *intensity of light* which strikes a leaf, the smallest amount being in shady places; and the healthfulness of a plant is, *cæteris paribus*, in proportion to the quantity of carbonic acid decomposed; therefore the healthiness of a plant should be in proportion to the *quantity of light* it receives by day."—*Theory of Horticulture.*

Can we, therefore, with glass-houses constructed as they have generally been hitherto, secure light, if not to its fullest, at least to its necessary extent? Certainly not. Nor can we expect it with so large a proportion of their surfaces rendered perfectly impervious to light, with dead walls, massive rafters, framed sashes, and inferior glass, inserted in small fragments with numerous overlaps, and either cross-puttied or filled with dust or muscoid matter. The calculations made in regard to obscurity occasioned by the above, irrespective of solid walls, amounts to 10 feet taken up with laps choked with dirt out of every 60 superficial feet of glazing, and from 18 to 20 feet of unnecessarily heavy timbering and multiplicity of astragals. Hood, in making his calculations of the loss of heat by radiation in glass-houses, arrives at pretty nearly the same conclusion. He estimates the surface of wood alone at an eighth of the whole roof, and adds, that in the generality of horticultural buildings, the wood work fully amounts to this quantity.

Connected with the admission of light, is the determination of the pitch or angle of elevation of the roofs of glazed houses. It is evidently of advantage that the rays of light should fall upon glass perpendicularly, as loss by reflexion is then a minimum, or indeed little or nothing. The angle necessary to obtain this result is easily deducible from the sun's place in the ecliptic. At the equinoxes, the sun's meridional height above the horizon at any point of the earth's surface is equal to the complement of the latitude of that place: and hence, in order that the sun's rays may be perpendicular at that period, it is only necessary to make the elevation of the roof of the hothouse equal to the latitude of the place. The angle, for any other season, may be obtained by subtracting from the latitude the declination of the sun, if at that time to the north of the equator, or by adding it, if to the south.* These periods are of course selected in accordance with the time at which the direct rays are most required. Mr Knight proposed a general elevation of 34° for the latitude of London, an angle which corresponds to the 20th of May and 21st of July. This would afford four months, from the 20th of April to the 21st of August, during which the angle of incidence at mid-day would not at any time amount to 9°, while the deviation at the winter solstice would be 43°, and the loss of light from reflexion would be little more than $\frac{1}{30}$. The Rev. Mr Wilkinson recommended 45°, a pitch extremely suitable for early vineries and pine-stoves. In this case, the midsummer deviation would be 19°, and the loss $\frac{1}{40}$, and the midwinter deviation 30°, while the loss is nearly the same. From these statements, however, it is manifest that much greater exactness has been sought in this matter than is at all necessary. The reduction of the opacity of the roof, arising from the breadth and depth of rafters and astragals, is of much greater consequence. Accordingly, the best hothouse builders now construct these roofs, whether of metallic substances or timber, entirely without rafters or framed sashes, and only use glass of the best quality, and in panes 12 inches in breadth at least, and from two to four feet in length.

Hothouses are in general constructed of the best Baltic pine timber, and unless they are of gigantic dimensions, this material is found to answer better than any other. Metallic structures are far more expensive in their erection, and are liable to great and sudden changes of temperature on account of their being both conductors of heat and cold, whereas timber is a non-conductor of both. The relative difference in cost between metallic and wooden houses, may be taken in ordinary cases as two to one, and in many cases as three to one.

In order to secure the greatest possible influx of light, some scientific horticulturists recommend hothouses with curvilinear roofs. It was remarked by Sir George Stuart Mackenzie, to whom the merit of the proposal is primarily due, that if we could find a form for a glass-roof, such that the sun's rays should be perpendicular to *some part of it*, not on two days, but during the whole year, that form would be the best. Such a figure is the sphere, and he therefore proposes a quarter segment of a globe, or semidome, the radius of which is about fifteen feet.

This form of hothouse roofs was warmly patronised by the late Mr Knight, who, however, was of opinion, that the house proposed by Sir George Mackenzie was too high, in proportion to its length and breadth, and therefore recommended a smaller section of a sphere, with a greater radius. His dimensions are forty feet long, fourteen wide in the centre, and, including the front parapet, twelve feet high. The late Mr Loudon, who, it is believed, was the first that actually erected hothouses on this principle, proposed several sub-varieties of form. He describes, in his "Encyclopædia of Gardening," the *accuminated semidome*, the *accuminated semiglobe*, the *semi-ellipse*, and the *parallelogram with curved roof and ends.*

As far as we are aware, no very satisfactory experimental investigation of the *comparative* merits of curvilinear houses has hitherto been made. A writer in the "Gardener's Magazine" (vol. ii.) states, that he found it necessary, during the summer months, to shade his pine-apples growing in such a house, from nine or ten o'clock in the morning, to three or four in the afternoon, in order to prevent the plants from assuming a rusty tinge, and unhealthy appearance. Another practical gardener complains (vol. v.), that "the circular roof concentrated the sun's rays so immoderately, that the tops of the vines were actually scorched, even when the doors and ventilators at the back were all open. This was always the case in summer; and in winter, it was with the greatest difficulty, and only with the assistance of mats, that they could keep out frost; the thermometer frequently indicating only 40° when strong fires were burning." A considerable portion of the superior lightness of the curvilinear houses is due to the absence of rafters, and as these may also be dispensed with in plain roofs, the effect of these ought to be deducted in making a comparison. Span, and ridge and furrow roofs are now the prevailing forms. Amongst the advantages of these forms is their admission of the greatest amount of light which our climate affords, especially when they are glazed to within a few inches of the ground. The former should always be placed with their ends towards the south and north, and apart from walls and all opaque surfaces. The latter has the advantage of being carried (without sustaining walls) to any extent of area, even whole gardens may be thus covered in—the internal columns of support being neces-

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* The following is part of Bouguer's Table of Reflexions.—Of 1000 incident rays, when the

Angle of incidence is	rays are reflected.
75°	299
70	222
65	157
60	112
50	57
40°	34
30	27
20	25
10	25
1	25

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sary at the same time for conducting the rain water off the roof to underground drains or reservoirs. Indeed, it has been proposed to support such roofs to a great extent upon suspension principles. Any form is better than that of the *lean-to*, both for internal arrangement as well as effect.

Since the repeal of the duty upon glass, small panes have been disused, and glass not only of much larger size, but of greater strength and better quality is now always employed. The advantage of this is the greater admission of light, an element of all others over which we have the least control. The greater the surface of glass, and the less space is occupied by rafters and astragals, as well as overlaps, the better; for these latter, whether cross-puttied or not, all tend to the exclusion of light. The height of such structures has also a good deal to do with the healthy development of vegetable life, as the rays of light pass so as to be beneficial to plants only to a supposed distance beyond the surface of the glass, but what that distance is, appears not to have been very accurately determined. This is the more extraordinary, for while it is universally admitted that the heat of the sun is the cause of growth, and also that light is the cause of maturity in the vegetable kingdom, no one has said whether the beneficial effects of light extend to the distance of six inches or sixty feet beyond the inner surface of the glass, or at what intermediate distance it is most effective.

In closing these preliminary remarks, it is proper to observe, that although the construction of a forcing-house is always a matter of considerable importance, it is not the only, nor even the most important condition necessary to insure success. Much care in management, skill in pruning, and knowledge in physiology must be possessed and applied, in order to obtain abundant and regular crops of fine fruit.

The more minute details respecting the structure of glazed houses, we shall notice along with the peculiar culture required in each; and we shall take them in the following order:—The Vinery, the Peach-house, the Cherry-house, the Fig-house, the Pinery, the Orangery, and the Melonry. The greenhouse and other botanical structures, will come more appropriately under review in treating of the Flower Garden.

The VINERY. *Structure.*—The vinery is susceptible of great variety of form; and, indeed, in this respect, seems more pliable than any other forcing-house. That form, however, which has been most commonly used, till of late, is the plane roof with sliding sashes, of which fig. 29 is offered as an example. Span-roofed houses are now preferred, as affording a greater surface for training the vines to, being more elegant in form, and constructed at a much less expense, that is, presuming that the back wall has to be built. Fig. 30 is an example of this form. The parapet walls all round are supported on a foundation wall piered and linteled over just under the surface line. The parapets themselves consist of a base course of ashlar 12 inches thick each way. The stone piers 18 inches in height, and a foot thick, are placed 3 feet apart, the spaces between being filled with glass ventilators, made to open and shut simultaneously. A cope 6 inches in thickness is placed on the top and upon this the superstructure rests. The sides and roof are of glass and fixtures, but without rafters or framed sashes. The top ventilation is secured by the sides of the lanthorn top being furnished with gun-metal rollers, and made to slide upon an iron rail. The vines are planted within, and trained to a trellis under the roof, sides, and ornamental arched supports, as shewn in the cut. An ornamental cast-iron grating forms the passage which runs along the centre of the house. In the case of span-roofed vineries, double the breadth may be given, and where hot water is employed instead of flues, several such houses can be heated by the same fire. The trellis used for training is generally formed of wires drawn across the roof, at the distance of a foot from each other, and 18 inches from the glass, and attached to iron ribs placed under it. Sometimes the trellis is placed vertically, but this is more appropriate for the peach-house than the vinery. This form, exhibited in fig. 31, is called the hanging trellis. It must, however, be admitted that, according to the experience of some, this arrangement is inferior to the common trellis, that is, so far as vines are concerned.

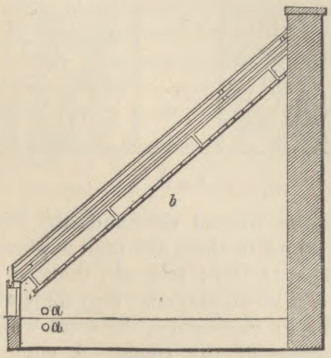

Fig. 29.

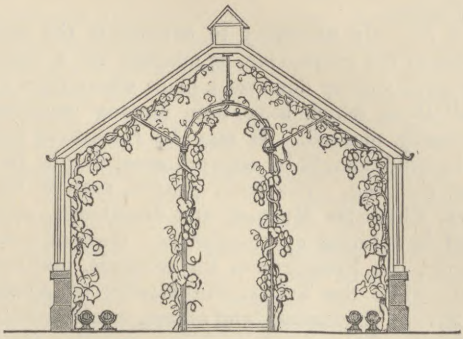

Fig. 30.

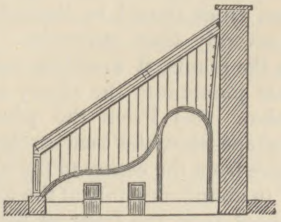

Fig. 31.

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It is of importance that the included soil and front border of a vinery should be fresh and rich. It should not exceed 2½ feet in depth, and should be laid over a vaulted foundation, or one rendered perfectly dry by drainage, and all borders of forcing-houses should be elevated in height equal to their depth above the general ground level. The soil is of far less consequence than a dry bottom, and the following is as good as any—"one-half of good loamy soil with its turf, one quarter of rich old dung, and one quarter of brick and lime rubbish; the turf well rotted, and the whole well incorporated." Plants raised from eyes, and prepared for two years in pots, are preferred for the furnishing of a vinery; and when planted inside the house, there should not be fewer than two plants to each four feet of space.

It is scarcely necessary to enumerate the particular varieties of the grape-vine, as adapted for a vinery, for every good variety deserves a place where there is room, and all those which have been already mentioned are occasionally planted. It may be remarked, however, that the kinds should be assorted according to the order of their ripening. The early grapes, such as the Muscadines, Chasselas Musqué, and Hamburgs, should be planted in a house by themselves; those of a medium character, the Frontignacs, for example, may occupy a second; while the Tokay, the Muscat of Alexandria, Nice, Syrian, Barbarossa, and others, would be fit inmates for a third. This would produce a regular succession, and admit a uniformity of treatment in each house. Where there is not a suite of vineries, but only one large house, the late varieties should be planted near the entrance of the hot-water pipes.

Pruning and Training. Very numerous have been the directions given in reference to these particulars; but we cannot here go into such details, nor is it necessary. The great object is the reproduction of bearing, that is, annual wood, over the whole surface of the house. When this is accomplished, the next matter to be determined is the number of eyes or buds to be left on each shoot, that is, whether we shall adopt the *short* or the *long* system of pruning. The former is most allied to the practice of foreign vineyards, and has been most successfully employed in this country. According to this method, all the lateral shoots are cut down to single eyes, as described in *Lond. Hortic. Trans.* iv. 104. For a particular description of the *long* system, we refer to the same vol., or to "London's Encyclopædia of Gardening." To these references we add a few general remarks. (1.) In this country, it ought to be the great aim of the gardener to make his vines grow as luxuriantly as possible; for the quality of the grapes, when properly ripened, is generally commensurate with the size of the berries. The borders should therefore be made rich; but they ought to be rather wide than deep, deep planting being adverse to the ripening of the fruit. (2.) In order to secure a proper degree of vigour, vines should be limited in extent, and pruned rather severely than otherwise. To enable us to circumscribe the plants, it would be well to introduce as many separate plants into the vinery as can be done without confusion. (3.) From the peculiar mode of growth in the grape-vine, the bearing branches have a tendency to recede from the centre to the extremities, and are often found in abundance only at the top of the trellis. Every young shoot near the front of the house should therefore be carefully husbanded, and cut back by way of reserve. Old wood ought to be removed as frequently as possible; and the skilful pruner will look at least two years before him. Nothing contributes more to regularity in the succession of bearing wood than simplicity in pruning and training; and therefore, all bending, and twisting, and traversing of branches should be avoided.

The summer pruning consists in removing with the fingers the useless lateral shoots, and pinching off the tender points of the bearing branches. The extent to which these bearing branches are allowed to run will depend on their vigour, and the position which they hold in the plant. Sometimes it may be needful to leave them ten or twelve feet long, but, in general, two or three feet will be sufficient. The shorter the better. They seldom or never fail to send out secondary laterals from their points: these and the others which succeed them are stopped at the second or even first eye, and the operation is continued until vegetation ceases. When the fruit is set, all superfluous branches should be cut off, leaving only the best, and the number of these ought to be in proportion to the strength of the vine. When the young grapes begin to swell, the bunches are thinned out, that is, berries are removed wherever they are too much crowded together; and the shoulders or sides of the bunches are supported by slender threads of bass-mat. The quality and weight of bunches should be regarded rather than their number. Nothing seems more contemptible than numbers of small and ill-ripened bunches of grapes, smeared, as they frequently are, with dust and honey-dew. Avarice not unfrequently cheats itself in this matter; and it generally happens in the vinery, as elsewhere, that not he who desires most has most. The ripening, colour, and flavour of grapes on the tree are promoted by free ventilation; this is to be done, however, only after the fruit has attained full size and is beginning to colour.

The forcing of the earliest vinery may commence in January. At first the temperature may vary from 50° to 55° Fahrenheit in the mornings and evenings. When the buds have burst, it may be raised to 70°, and in the flowering season it may be kept at 75°. At this season it is necessary that the air should be preserved moist by frequent syringings. Upon the appearance of colour in the fruit, the waterings cease, and air is copiously admitted. In the early vineries, it is necessary to continue the fire-heat without intermission; in the later houses this is not required, but it must be used occasionally, even in warm weather, to obviate the effects of damp.

The PEACH-HOUSE.—A peach-house, of the *lean-to* form, like the vinery of the same configuration, intended to be commanded by one furnace, is generally about forty feet long, ten or twelve feet wide, and fourteen feet high: but these dimensions may be varied considerably, according to the time at which the crop is desired to come into season. For early forcing, perhaps twenty-five or thirty feet in length, and seven or eight in breadth, are sufficient; while a house, in which the operations of nature are only to be slightly accelerated, may be extended to fifty feet. The span, and ridge and furrow-roofed houses are equally adapted for peaches as for vines, as in such the trees can be treated as standards, which is their natural habit; and in them the fruit is placed in a better position as regards light and air, than in any form of training that can be employed. Fig. 32 is an example of this form. As in the vinery, the front wall is piered to permit the egress of the roots. A common form of a peach-house is represented, of which fig. 33 is a vertical section; *a*, *a*, are the flues or hot-water pipes, placed side by side, *b* is the table trellis, *c* the trellis on the back wall; along with which, a hanging trellis, as in

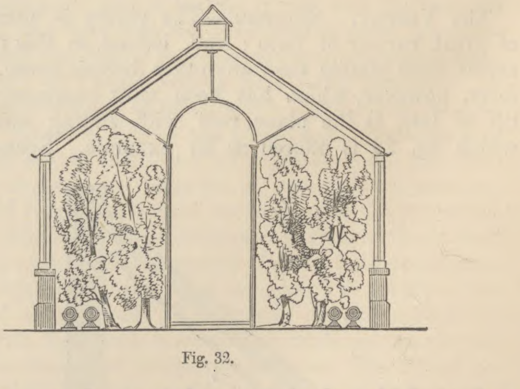

Fig. 32.

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fig. 31, is sometimes employed, although this is not approved of by many. The flues or hot-water pipes, which are built on pillars, occupy the centre of the house. The trees are trained to the two trellises *b* and *c*, and to the hanging trellis, if such be in use. Against the back wall three or four dwarf trees are planted, with intermediate *riders*, the latter being taken out at the end of four or five years at farthest. These, with three for the front trellis, make in all nine or ten trees for each house.

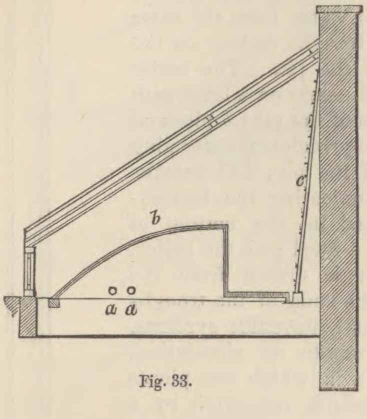

Fig. 33.

Fig. 29, used as a vinery, represents another form of the peach-house, not so generally used as the former, but of equal if not superior merit. We have shewn it heated by a water apparatus, *a, a*. There is no front glass, nor any trellis on the back wall, the trees being planted in front, and trained on a wire trellis *b*, attached to the roof, and covering the whole surface of it. As the peach-tree is not found to extend much more than twelve or thirteen feet on the open wall, the length of the roof, inside measure, need not do more than approach to fourteen feet. But span-roofed houses may be much broader, consequently the length of the sloping roof will be greater, especially as the trees are to be grown as standards.

The pruning and training of peach-trees in the peach-house does not differ materially from the practice out of doors. Fire-heat is commonly applied about the beginning or middle of February; but where there is a large suite of houses, and an extended succession is wanted, forcing, as it then truly becomes, may begin a month sooner. At first the temperature is kept about 45°, but it is afterwards gradually increased to 50° or 55° Fahrenheit. While the trees are in flower, and till the fruit be set, the house is occasionally steamed by sprinkling water on the warm pipes, but much better, in order to secure a more genial evaporation by placing shallow troughs of water so as partly to surround the lower or returning pipe, the lower pipes being less heated than the upper ones. After this period, the foliage is washed, from time to time, with the garden-engine. When the fruit has stoned, or the kernels have been formed, the temperature is raised to about 60°. Water is now copiously supplied to the border; the fruit is thinned out; the various operations of disbudding and tying are performed, and air is admitted in abundance. After the end of April, little fire-heat is required for the peach-house. The trees often suffer from mildew: the best preventives consist in keeping the borders of the peach-house clear, and sufficiently moist, dry air being greatly promotive of that malady, and in observing that nothing be permitted to obstruct the free circulation of air and full admission of sun.

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TROPICAL FRUIT-HOUSES.—Several uncommon kinds of exotic fruits are occasionally grown with success in this country. They should, however, be grown in a house, or houses, by themselves. Such now exist, and are denominated Tropical Fruit-houses. Among tropical fruit may be mentioned the Loquat, *Eriobotrya japonica;* the Jamrosade *Eugenia Jambos;* the Purple Granadilla, *Passiflora edulis;* the Granadilla vine, *P. quadrangularis;* the May-apple, *P. incarnata*; the Water-lemon, *P. laurifolia;* and the Sweet Calabash, *P. maliformis;* the Papaya, *Carica Papaya;* and the Banana, *Musa sapientum.* The Leechee, *Euphoria Litchi;* the Long-yan, *Euphoria Longana;* the Mango, *Mangifera indica*, the China Guava, *Psidium Cattleianum*, and the Carambola, *Averrhoa Carambola*, of the East Indies. These have all ripened in great perfection in the tropical fruit-houses of the Duke of Northumberland at Sion House, and several others have ripened in various other establishments in Britain. Indeed, tropical fruit culture has now assumed an important place in British horticulture.

The FIG-HOUSE scarcely differs in form and management from the Cherry-house, the trees being trained to a back trellis, with the addition, however, of dwarf standard trees in front. Figs are very successfully cultivated in the forcing-houses of the Royal establishment at Frogmore, near Windsor. This delicious fruit is, however, less popular in Britain than most others, and is therefore not found in all gardens. The fig succeeds very well as a dwarf standard in the front of a vinery, provided the roof be not too closely covered with the foliage of the vines. Of late, small standard figs have very commonly been grown in large pots, fourteen or fifteen inches in diameter, and placed in any of the forcing-houses. In this way considerable crops of fruit have been raised. The *Figue blanche* and the *Marseilles* are amongst the sorts best adapted for forcing.

The ORANGE TRIBE (*Citrus*) are cultivated in Britain, rather as objects of curiosity and beauty, than for the purpose of affording a supply of fruit. Commerce with Portugal, Spain, Italy, and China, has brought this class of fruits within the reach of every one; and the copious importations which annually take place, have no doubt discouraged the cultivation of the plants. A few orange trees are nevertheless to be met with in most collections, and in large and sumptuous gardens, it is not uncommon to meet with glazed houses set specially apart for their reception.

C. Medica, the Citron, the Cedrate of the Italians, is a small evergreen tree. The fruit is large, of an oval form, and covered with a rough skin or rind, which is charged with a highly flagrant oil. The citron is generally used in confections. It is supposed to be a native of Media, and will not ripen without protection in Britain. Three subvarieties of citron are described by Risso.

C. Limetta, the Sweet Lime. This is rather a tall tree, with diverging branches. The flower is of a fine white colour, composed of five oblong petals. The fruit is globose, with a black nipple-like protuberance at the apex, having a firm rind, and sweet pulp. The colour is pale yellow. It is a native of Asia, but cultivated in Italy. Seven varieties have been described.

C. Limonum, the Lemon. The petioles of the leaves somewhat winged; fruit oblong, with a thin rind adhering closely to the pulp, which is very acid. This, like the preceding, is a native of Asia, but is cultivated in the south of Europe. There are numerous varieties.

C. Aurantium, Sweet Orange. The petioles almost naked; fruit globose, with a thin rind, and sweet pulp. Risso has enumerated nineteen varieties; of which the principal are, the China, the Portugal, and the Maltese.

The CHERRY-HOUSE, in its general arrangements, has

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hitherto in general resembled the peach-house, with the exception of the front trellis, the place of which is commonly occupied by a stage for pots of early strawberries or kidney beans. The cherry trees are trained against the back wall; the house should therefore be narrow, and the roof steep. The operation of forcing generally commences early in January, with a very moderate temperature. Air is admitted freely till the flowers begin to expand, when great caution becomes necessary. When the fruit is setting, the temperature is kept as steadily as possible at 50°: after it is set, abundance of water is applied to the roots and foliage of the trees. When the fruit is colouring, water is almost entirely withheld, and air is now freely admitted. During the whole process of forcing cherries, any excessive heat from the sun's rays must be carefully guarded against, by shading or by the admission of air. The kind of cherry usually preferred for forcing is the Common May-duke. A cherry-house ought to form a part of every large garden establishment; for nothing graces the tables of the opulent, in March and April, better than ripe cherries and strawberries in the dessert at that season of the year. The best construction of the Cherry-house is the span-roof, whether the trees be planted permanently in the borders, as they sometimes are, or grown in large pots, which they generally are. In the Cherry-house apricots and plums should also be found, their treatment being almost the same.

The Pine Apple, *Bromelia ananas*, (Linn.) is a native of the new world, although it has been found in such abundance in Africa as to have led some botanists to consider it to be indigenous there also. It reached China from South America, and is now naturalized in most of the West India Islands, to which it was introduced from Peru by Europeans. It appears to have been introduced into Europe about the middle of the 17th century, to England about 1690, and to Scotland by James Justice of Crichton prior to 1744, as he gives plans of his own pine stoves in his British Gardener's Directory, published in that year.

The pine is propagated rarely by seed, frequently by crowns which grow on the top of the fruit, but more generally by suckers which rise from the stem.

Select list of Pines. Black Antigua, Enville, Globe, Russian Globe, Old Jamaica, New Jamaica, Montserrat, Queen, Antigua Queen, Moscow Queen, Ripley's Queen, Smooth Cayenne, Prickly Cayenne, Prince Albert, Providence.

Its propagation and culture have long been carried on in three separate structures, each capable of affording the necessary bottom and atmospheric heat congenial to it. These are denominated the nursing-pit, succession-pit, and fruiting-stove. Many excellent cultivators carry on its various stages of growth in one and the same structure. We shall, howevever, yield to common custom, and speak of them separately.

The *nursing-pit* has occasionally assumed a great variety of forms, respecting which, however, it is not necessary to go into minute detail. For summer use, the Alderston Melon-pit, and Atkinson's Melon-pit, described under the head Melonry, are very suitable. In winter, it is desirable to have the assistance of fire-heat from hot water.

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The *succession-pit* performs the same functions as the nursing-pit, but at a more advanced stage of the growth of the plant, and consequently, requires an increase of size. With this difference, Atkinson's Melon-pit does very well for summer use. In colder seasons, we should prefer a pit similar to that represented, figs. 34, 35, in which a hot-water apparatus on the siphon principle is employed to heat the atmosphere of the pits, and the bottom-heat is communicated by the circulation of hot water from the same boiler, in troughs resting on the bottom of the pit. The boiler *a* is placed nearly on a level with the bottom of the pit; *b* pipes on the syphon principle for warming the air of the pit; CC troughs for communicating the bottom-heat, placed in the bottom of the pit on a level with the boiler. The water is drawn from the boiler to the ends of the troughs *d d* by small moveable syphons, which promote its circulation. The bed *e*, in which the plants are plunged, is supported by a flooring of slate, resting on brick piers between the troughs. A boiler placed in the centre is sufficient for a range of sixty feet. Another form of a succession-pit is exhibited in fig. 36, entirely heated by hot water. The surface-heat is supplied by pipes in front; the bottom-heat is kept up by small pipes from the boiler, passing through cisterns of water extending the whole length of the pit. In this case it would be necessary to apply the top heat only during the day.

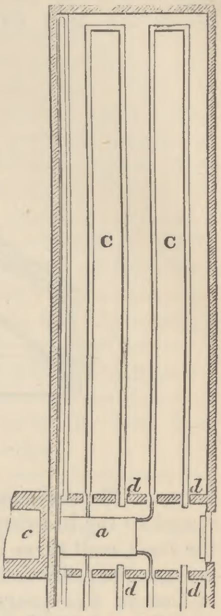

Fig. 34—Ground Plan.

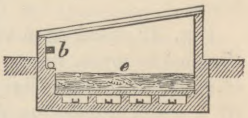

Fig. 35—Section.

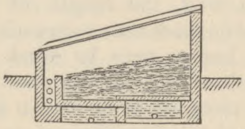

Fig. 36.

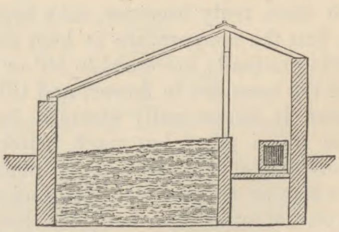

Fig. 37.

In the *fruiting-house*, more room, greater height, and a more powerful temperature, are requisite; and to attain these objects, many varieties of structure have been devised: we shall notice those only which are most worthy of attention. Fig. 37 is a section of Baldwin's Fruiting-pit. The roof is unequally ridged, the north or shorter side being slated and furnished with ventilators, to admit air. With the exception of the slated part of the roof, and the absence of hot-water for bottom and top heat, both of which are great defects, these differ little from the excellent pits of Mr Fleming at Trentham. They have, however, the advantage of being low-roofed, and easily wrought. The sashes are immovable, and the laps of the panes are closely puttied. There is a path within, and a single turn of a flue behind. We should prefer the form exhibited by fig. 38, in which there are also ventilators *a a*, and a hot-water apparatus surrounding the whole pit. The dimensions of this may be fifty feet long, and nine feet wide; the glass being two feet and a half from the curb of the bark-pit in front, and five feet behind. Fig. 39 is a section of a pine-pit with a curvilinear roof, in which the astragals are parallel. A segment of an elliptical arch somewhat less than a quadrant, the origin of the curve being on the front wall, seems better adapted for a pit than any portion of a circle. This pit is supposed to be heated by a small steam-pipe passing through a large iron tank or cistern *a*, filled with water. A section of the old-fashioned pine-stove is given in fig. 40. This was a lofty structure, in the vinery form, with front sashes. It used to be forty or fifty feet long, and twelve or fourteen feet broad, and was commanded by two flues. The flues ought to be exchanged for hot-water pipes, those at the back being placed under the passage, with sufficient cast-iron moveable ventilators let into the pavement for the upward escape of the heat. Or the whole passage ought to be covered with an open cast-iron grating to allow the heat to ascend. In addition to the pine plants in the pit, the roof was also partly covered with vines, a practice justly condemned by Nicol. We are also disposed to agree with that experienced writer regarding the disuse of the pine-stove itself. Besides other grievous faults, a single house affords too little room; and it is a matter of experience, that where the stock of pine plants is not extensive, certain and abundant crops of fruit cannot be expected. Instead, therefore, of a succession and fruiting-house of the old form, with two fires each, involving an enormous waste of fuel, it would be better to have four pits, all of which could be wrought by one fire and boiler. There might be two succession-pits of the form of fig. 34 or fig. 36, and two fruiting-pits similar to fig. 38 or fig. 39. These would contain a much greater number of plants than two pine-stoves, would be much less expensive in erection, and, as the number of fires would be reduced to one, would not consume so much fuel.

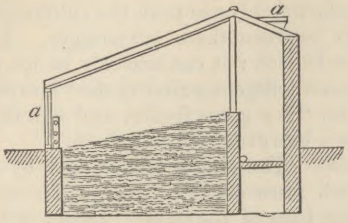

Fig. 38.

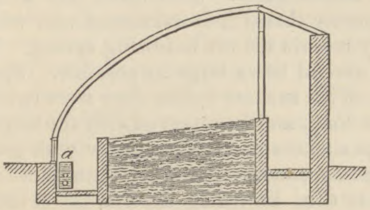

Fig. 39.

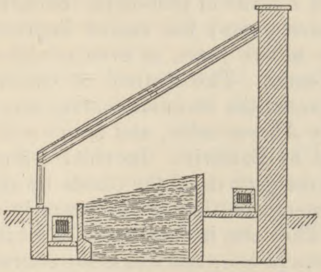

Fig. 40.

The pine being a plant which grows naturally under a tropical sun, it requires all the light our murky climate affords. It is, therefore, better to build the pits of a much greater width than those shewn in our illustrations, for the greater the distance between the side-walls, the more will be the light which obtains access to the plants. A pit, therefore, on the span-roofed principle, 35 feet long, 17 feet wide, and 8 feet from the floor of the passage to the ridge, would be an improvement upon those mentioned. Such a pit could be supplied with both bottom and atmospheric heat from one boiler, the former by placing hot-water pipes within a shallow tank of water placed under the beds, and the latter by carrying a flow and return pipe along the whole length of the sides. Still further to economise fuel, a smoke flue should be placed under the passage, so as to get the benefit of such heat as is not taken up by the water in the boiler, and which usually escapes at the chimney top.

The pine is to be cultivated in its highest state of perfection only when grown in low pits, just sufficient for the full development of the foliage and crown of the fruit. So closely is this adhered to by Mr Fleming of Trentham, one of our most successful cultivators, that he has had occasion to take out a pane of glass to allow the crown of the fruit to protrude into the open air. A passage along the centre of such pits is exceedingly useful, particularly in the fruiting department.

Bottom-Heat. As a substitute for the warmth absorbed by the earth from the powerful rays of the sun in tropical countries, the pots of pine-plants are generally plunged in a bed of tanners' bark, decaying leaves, or other fermenting substances. Tanners' bark is most commonly used.

We have elsewhere stated that no vegetable matter undergoing fermentation can be so economically applied as hot water circulating in properly constructed vaults immediately under the bed in which the plants are set. That the heat may reach by conduction to the roots near the top of the soil in the pots, it becomes necessary that they be plunged in heat-conducting media. When plunged in fermenting material, young pine plants may no doubt be successfully enough grown during summer, nay, even during winter. The question, however, is, does the saving of fuel and the interest on the outlay for the apparatus at all balance the expense of labour and material, the waste of valuable manures, to say nothing of the litter occasioned, and the accidents to which the plants are liable from having their roots burnt or their leaves frozen during winter.

The proper management of bottom-heat is a matter of some difficulty, and in this there have been more failures than in any other part of the pine-apple culture. The heat arising from violent fermentation is greater than the tender roots can bear, and if great watchfulness be not employed, the labour of many months may be blasted in a single day. Bottom-heat is almost universally kept too high. Perhaps the upper limit of its temperature may be fixed at blood-heat, or at most 100°, while the under or winter limit may be brought down to 70° or 75°. The principle of the application of bottom-heat has, until lately, been little understood. In practice, its value has been acknowledged for ages, having been an element in Roman gardening in the days of Claudius. The roots of fruit-trees, even of the hardiest description, become paralyzed whenever they descend too deep into the soil, and this paralysis is one of the evils of deep planting. The summer temperature of our ordinary garden soils is 61° at 6 inches under the surface, 57° at

18 inches, and 44° at 36 inches, but these temperatures are very much diminished if the land is wet or undrained. The roots of trees, therefore, when placed within 6 inches of the surface, or at 61° of temperature, as shewn above, are very differently circumstanced from those which are buried 3 feet, and in a temperature of 44°, when the mean temperature of the air is about 63°. In the former case, there is only 2° of difference, while in the latter there is 19° between the temperature of the air at the roots and that of the air around the leaves, a most serious difference, yet one of frequent occurrence. Hence the necessity of surface-planting and shallow borders, if such borders are not artificially heated below.

The advantage of having the temperature at the roots higher than that in which the leaves are placed, is easily accounted for. Warmth acts as a stimulus to the vital forces, and its operation is in proportion to its amount, within certain limits. If, therefore, the branches and leaves of a plant are stimulated by warmth to a greater degree than the roots, they will consume the sap of the stem faster than the roots can renew it; and therefore nature takes care to provide against this, by giving to the roots a medium permanently more stimulating, that is, warmer, than to the branches and leaves." In all countries where the temperature of the soil is highest, vegetation is strongest, and *vice versa.* Bottom-heat must, however, be regulated, particularly in our forcing-houses, with great care to prevent excess or defect. In its application, bottom-heat must be regulated by the amount of light and of temperature in the air; and hence, so far as practicable, it should be less during the night than during the day, and also less during winter, when we have a deficiency of light, than during summer.

Bottom-heat must also be regulated by the season of the plants; during their winter or season of rest it should be comparatively low—during their summer or season of active growth, it should be considerable; and during their ripening season, it should be highest of all. The necessity of studying these three points may be shewn from the condition of the roots of vines in a cold damp border during the season of forcing, when there is often a thermal difference of 20° between the roots and leaves. This is forcing in the true acceptation of the term. It causes the grapes and peaches to set badly, or not at all, it causes stem or aërial roots to appear on the vines, it causes shanking in the fruit, and the exhaustion and ultimate death of the plants. The malformation in the fruit of the pine, and its starting into fruit at too early a stage of its growth, are also owing to a want of proper unison between the bottom and top temperatures. It is the want of warmth in the soil, fully more than in the atmosphere, that prevents the fine American apples and Flemish pears from ripening so well with us as in other countries, where the winters are much colder than ours, but the summers and soil are much warmer.

Soil. Various nice and minute directions have been given respecting composts for pine plants. Any compost, however, will be found suitable, which is at once rich, fresh, and simple. A mixture of the top-spit, including the turf of an old pasture, and about a half of good, well-rotted dung, combines these qualities as completely as possible. When it is necessary to lighten these materials, a compost of decayed leaves, and a little sand, may be added. It is of importance that the compost, whatever it may be, should be prepared a considerable time beforehand, and frequently turned over. It should be broken with the spade, but not screened; and when used, it should not be too moist. Pine-apple plants are found to shew fruit more readily in a rich light soil, than in strong loam, but do not produce large fruit. In selecting his compost, the cultivator must make his selection between these advantages. At all events the soil must be rich; it can scarcely be too rich. "The pine," says an intelligent writer in the "Gardener's Magazine," vol. ix. "is a gross feeder, and will thrive in vegetable manure, however rich and fresh."

Propagation. The pine is propagated by planting the crowns which grow on the fruit, or the suckers which appear at the base of the stem. These, when removed from the fruit or the stem, are laid aside for a few days, till the scar at the place of separation has dried or healed, as a precaution to prevent their rotting; after which they are potted immediately. Sometimes late in the season, they are merely thrust into exhausted tan, without pots, where they remain till the following spring. In general the offsets should be as large as possible. Speechly did not break off his suckers before they were twelve or fourteen inches long, and he reserved only the largest crowns. These large suckers and crowns grow with greater rapidity, and come sooner into fruit than those of smaller size: and in this, in truth, consists the principal secret of what has been called the short method of culture, by which fruit is obtained in a much briefer space of time than usual. The soil employed in propagation is rather lighter than that afterwards applied. The pots may be from three to six inches in diameter, and, to promote draining, should contain at bottom a layer of shivers or clean gravel. For some time the plants are shaded from the rays of the sun, and in about eight or ten days they receive a little water. As already stated, the older and more common routine of pine-apple culture embraces a period of three years; but recent improvements have reduced these to two years, or even to eighteen months.

Biennial Course. The method of culture which we have denominated the biennial course, was first brought into notice by Abercrombie, and afterwards strenuously recommended by Baldwin. Its chief feature is the acceleration of the growth of the plants by the application of higher temperatures than it was formerly supposed they could bear. They are, in fact, made to attain the growth of two summers in one; and this is the course followed by the best cultivators of the present day.

About the beginning of March, the most forward of the plants potted over winter, or the suckers kept in tan, are taken out, and the earth or tan is shaken away. They are then put into pots about five inches in diameter, which are plunged into frames or pits heated with tan or leaves. They are shaded as usual, and after they begin to grow, receive moderate waterings. When the roots appear around the balls of soil, which will be about the middle of June, the plants are again shifted into larger pots, from six to seven inches in diameter, and, if the heat be declining, are removed into other pits or beds. In the beginning of August they are transferred into larger pots, in which, unless they are intended for early spring forcing, they stand during the winter; and in February they are finally shifted into pots twelve or fourteen inches in diameter. For spring forcing, the last shifting takes place in October, and the pots may be two inches narrower. At every shifting the ball of earth is preserved entire. From March the temperature is gradually increased; air is admitted, and a lively bottom-heat is kept up. When there is danger of burning the roots, the pots are partially drawn up, or even set upon the surface of the bed. The following table will give an idea of the temperature (Fahrenheit's thermometer) and its progressive increase:—

	During Night.	During Day.
March	60° to 70°	70° to 80°
April	70 — 75	80 — 85
May	75 — 80	90 — 100
June	80 — 85	100 — 120

After the beginning of August, the heat is allowed to decline by degrees, until it arrives at the winter temperature of 60°. Where fire-heat is used, and it should always be through the medium of hot water, the nocturnal temperature should only approach towards 80°; and there should be some expedient for the *slow* admission of steam into the atmosphere of the pit. During the whole summer, care is taken to prevent the plants from being *drawn*, and for this purpose they are allowed much space, and are placed as near the glass as possible. In August and September abundance of air, and more copious supplies of water, are given. In winter the chief care is to preserve the roots from damping off, and for this reason, winter pits should have the command of fire-heat.

This mode of *driving*, as it has been significantly called, is by some thought applicable only to the varieties called the Queen. Most of our best cultivators, however, adopt this course, and the fruit produced is larger than that formerly grown upon the triennial course. Those who wish to cultivate such large and coarse sorts as the Providence, may, to a certain extent, adopt the triennial course, either as to time, or to a limited number of plants. This plan will necessitate the following additional routine.

Fruiting-House.—About the beginning of August, the plants, now two years old, are shifted for the last time. The pots are from twelve to fourteen inches in diameter, and the balls are preserved entire. They are then plunged into the bed, and the plants are so treated as to keep them in a growing state during the whole of autumn. In winter, the nocturnal temperature is kept at 60°; but towards the end of January it is gradually raised to 70°. This rise, however, should follow, and not precede or be a cause of, the vernal growth of the plants. About the middle of February, the second fruiting-house may be prepared for the reception of the plants in the biennial succession pit. These are existing in a mild temperature, and start during the general progress of the season.

That period at which pine-apple plants first shew their fruit-stalks, or, as it is technically termed, *start*, is the most critical in their whole culture. It is generally desirable that this should happen at a certain age, and at a particular season; but these are circumstances over which the cultivator can scarcely be said to have a direct control, and accordingly, while the most successful can hardly deem themselves beyond the reach of failure, the less skilful are almost sure to err. We are not aware that the *rationale* of starting has been investigated on the principles of vegetable physiology; and it is certain that the most absurd practices have been resorted to, in order to force the plants into fruit. We pretend not to give a theory; but a few practical remarks may be of advantage. It is evident that the plant must be of a certain age, or at least of a certain magnitude, before it will start freely or to good purpose. Suckers of the first year are wholly taken up with the production of roots and foliage; and if any of them happen to start, they exhibit little more than a tuft of leaves where the fruit should be. In the second year a Queen pine is capable of producing a perfect fruit; and in the third year the New Providence and other large varieties arrive at puberty. The solid part of the stem is then observed to have increased in bulk, and to have ascended considerably above the soil. It is of more practical importance, however, to remark, that the fruit-stalks do not appear until the pot is filled with roots. Apparent exceptions there may be to this principle, but in every case where it does not hold good the plant will be found to be diseased, or the roots to have been violently destroyed. The grower should therefore take care that the roots shall have nearly occupied all the new soil before the end of autumn, and that in the course of the winter the tender fibres be neither exsiccated by drought, nor rotted by excessive moisture. Again, it is probable that at starting there is a peculiar check in the growth of the plant, which causes it to divert the sap from the formation of leaves, and, like most other vegetables in straitened circumstances, to provide the means of reproduction, by throwing out flower-buds. This diversion of the sap is influenced by the quantity of vigorous fibres, for it is observed that when, from some accident, plants not well furnished in this respect, do shew fruit, they bestow the greater part of the sap upon the leaves. Lastly, it is probable that the proper check consists in a transition from growth, however slight, to a temporary suspension of vegetation, which again is followed by a copious flow of the sap, circumstances which, as might be easily shewn, occur both in the winter and summer starting. If these observations be correct, it follows that starting is a natural process, requiring certain conditions in the state of the plant, and therefore not to be forced by violent treatment, or any sudden changes in temperature and watering.

After the plants have shewn fruit, they are never shifted; but the surface soil may be removed, and replaced by a little fresh and rich compost. Water is supplied from time to time as necessity requires; but it is impossible to give any definite rule on this subject. The observant gardener will soon, from experience, discover the proper measure. Water should never be given in a colder state than the average temperature of the house; when, therefore, there is no tank within the house, the watering-pots should be filled, and left in the house for some time before the water be applied. Fire-heat is kept up either continuously or at intervals, during the greater part of the season. It should always be moderate, never exceeding, by itself, 70°. During sunshine, the temperature may range from 70° to 100°. The greater proportion there is of the latter the better. Whilst the fruit is swelling, care must be taken to carry on the growth of the plant with equability and moderation. Violent checks are pernicious; they debilitate the stalk, and cause a stringiness and deformity in the fruit. As the fruit approaches maturity, water is gradually withheld, lest the flavour should be injured. Pine-apples should be cut a short time before they obtain complete maturity. The larger varieties will keep only a day or two; the smaller varieties a week or more.

The Melonry—a department deriving its name from the melon, the principal plant cultivated in it—is an important appendage of the forcing garden. After noticing some of the most necessary apparatus employed in it, we shall treat of the melon, cucumber, &c., and their culture respectively.

The *common hotbed frame* is most usually employed in the absence of more complete structures, and is so well known as to require no description.

The Alderston Melon Pit, of which fig. 41 is a section, is partly above and partly below ground. The front and back walls *a*, *a*, are of brick, supported on piers or stone pillars: *b*, *b*, are spaces enclosed within outer walls, and covered with boards to contain linings, which communicate, without any object intervening, with the fermenting substances in the interior of the pit. These spaces may be two feet wide: the interior pit should seldom be more than six feet in breadth. A principal quality of this structure is its neatness and cleanliness.

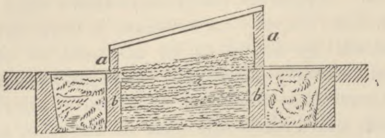

Fig. 41.

West's Melon and Cucumber Pit is also built of brick. It has (fig. 42) a chamber *a* to contain dung; *b* a square opening by which the dung is introduced; *c* rafters of wood or cast-iron, sustaining the interior soil; *d, d,* openings to permit the ascent of steam. The walls are nine inches thick, and the pit may be seven feet wide, inside measure.

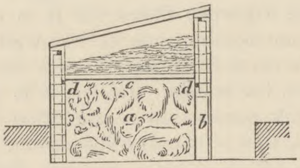

Fig. 42.

Atkinson's Melon Pit (fig. 43) is a brick structure. The back wall *a* and the end walls are four inches thick, built in the pigeon-hole fashion, that is, with square interstices between the bricks. The front wall *b* is double; the interior portion is brick in bed, the exterior brick on edge, with piers under each rafter. The included space communicates with the inside of the bed *c*. The pit *d* is filled with fermenting litter or tanners' bark: *e, e,* are spaces for linings. The whole is sometimes formed of wood, or sometimes only the part above ground.

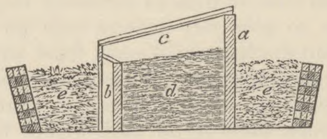

Fig. 43.

The extent of the melonry must depend upon the size of the garden, and the amount of the demand. Where there is a large family, and especially where pine-apples are cultivated (to the forwarding of which some portion of the melonry may frequently be auxiliary), sixty or seventy sashes may be considered as a moderate complement.

Until within a few years, both the melon and cucumber were grown on beds of fermenting material, or in such pits as have just been described. As a matter of course, the fruit in both cases lay on the damp soil in which the plants were grown; in general only separated from it by having a piece of slate or glass placed below them. That neither of these fruits could be brought to their fullest state of perfection in such circumstances will be apparent, when it is considered that they were grown in a high moist temperature, largely charged with ammoniacal and other gases evolving from the vegetable substances employed to produce heat. The underside of the fruit in both cases being deprived of light and air never assumes its natural colour, and the whole fruit often becomes flattened and deformed by its own weight.

The improvements of the present day have provided for these defects by the erection of both Cucumber and Melon-houses, and th employment of large pits, heated by hot water, the plants being trained to trellises under the roof, and the fruit thus allowed to hang suspended in a pure wholesome atmosphere, and exposed on all sides to the influence of the sun and air. These structures are chiefly of the span-roofed form, and are, except in size, exactly similar to span-roofed vineries.

In such structures, cucumbers can be grown during winter with a success unknown in former times, and as the melon is not worth growing during that season on account of the absence of solar influence to ripen it, the Melon-house may be used for forcing kidney-beans or strawberries during the winter months.

The Melon (*Cucumis Melo*) has long been cultivated in Britain, but the period of its introduction and its native country are not well ascertained. The plant is a tender annual, requiring considerable care and skill to rear it in perfection; but it repays the labours of the horticulturist by affording a large, and to most persons a highly palatable fruit. The varieties are numerous, and, from their tendency to sport or vary, are rather fugitive in their duration. Many of the old favourites have disappeared, and those at present in vogue will doubtless take the same course, or will at least assume new forms, while they retain their old names. In these circumstances, it is deemed unnecessary to enter into minute description, or to do more than give a list of the sorts at present deserving of cultivation. It may be premised that they all belong to the species usually called the Musk-Melon (*Cucumis Melo*). The Water Melon (*Cucumis Citrullus*) appertains to the same genus, and is seldom reared in this country except as a curiosity.

Select List of Melons.—Beechwood; Broomham-Hall; Trentham Hybrid, green-fleshed; Cuthill's Early Cantaloupe, remarkable for its hardiness and earliness; Green-fleshed Masulipatam; Green-fleshed Egyptian; Cassabar; Sweet Melon of Ispahan, and Green Valencia.

It is important that none but such seeds as have been procured from approved genuine specimens of the several sorts should be sown. In general, the fresher or more recent that garden seeds are, the better; but the case is different with the melon. Here it is desirable that the seeds should have been kept in a dry state for some years: it is found that plants produced from recent seeds push too vigorously, sending their shoots to a great length before they shew a single fruit; while those from old seeds are less luxuriant in growth, but more fruitful.

The melon succeeds best in a strong, rich soil. A compost, formed of two-thirds of rotted turf, and one-third of old cow-dung, will be found very suitable. This should be prepared some months before being employed in the melon bed.

It is seldom expedient to sow before the middle or end of January, and sometimes it is soon enough a month later. A seed-bed capable of receiving a frame with a single sash is previously prepared. This bed, composed of fermenting stable litter, should be of considerable thickness, perhaps about five feet. Immediately upon its formation, the frame and sash are placed on it, and they are kept close till the heat begins to rise, when the hot vapour is permitted to escape. Three or four days after the bed has been formed, it is covered over to the depth of three inches with earth prepared beforehand. Rich, light, dry earth, is best adapted for this purpose; and that it may be dry enough, it is proper to use such as may have been protected from rain during winter. A few small flower-pots are filled with the same earth, and kept in the hotbed, that the soil in them may acquire a suitable temperature. The seeds are then sown in the flower-pots, and covered half an inch deep; after which the pots are plunged a little way into the earth of the bed. This bed, of course, answers for rearing the early supply of young cucumber plants, and afterwards Chilies, and seeds of other tropical plants. This method is found now to be less expensive than manufacturing the necessary temperature in legitimate Melon or Cucumber-houses during the process of preparing the plants for planting out where they are to produce their fruit.

When hot vapour rises copiously, fresh air is admitted by raising the sash a little. The frame is covered every evening by sunset with mats, and is again exposed in the morning about nine o'clock, sooner or later according to the state of the weather. A single mat is sufficient at first, as the heat in the bed is generally strong. In two or three days after the seed has been sown, the plants appear, and the glasses are raised a little, to admit fresh air, and permit the escape of vapour. Unless this be done, the plants are apt either to damp off or become yellow and sickly. To guard against the casualties of the season, and the chance of miscarriage, it is proper to make two other sowings at short intervals, so that, if any accident befall the first plants, the others may supply their place. Two or three days after the plants have come up, they are transplanted into other small pots, only two or three being put in each pot. If the earth be very dry, it is now moistened with a little tepid water. The pots are then plunged into the earth, and much care and watchfulness are necessary to prevent the roots from being scorched. When the transplanted seedlings begin to grow, they are watered occasionally in the warmest part of the day. As the heat of the hotbed declines, it is supported by linings, applied from time to time, around its outer surface. The lining should not exceed fifteen or eighteen inches in thickness, and should rise above the level of the bed, upon the sides of the frame.

About a month after the seeds have been sown, the beds are prepared in the Cucumber and Melon-houses for the reception of the young plants. This is done by setting the hot water apparatus to work, and by placing upon the beds a supply of compost to become warmed for the reception of the young plants. By the following day, the compost and atmosphere of the house generally acquire a sufficient warmth, and the bed is ready for the reception of the plants. After the tops of the hillocks of earth have been flattened a little, in the centre of each a hole is made capable of containing one of the balls of earth which is to be turned out of the pots. Some of the pots containing the strongest plants are selected, and the young melon-plants are planted out, with balls entire, into the ridges or hillocks already prepared. After this operation has been performed, they receive a gentle watering. When the roots begin to shew themselves through the surface of the hillocks, a quantity of fresh earth is applied all around them, and from time to time additions are made till the whole surface of the bed is covered nearly as high as the top of the hills.

When the plants have got two or three rough leaves, the top of the stalklet, which now begins to elongate, is trained upwards until it reaches the trellis to which the shoots are to be trained. The top is then pinched off, and lateral shoots are produced, which are trained to the trellis as they advance. These laterals will sometimes shew flowers at the second or third joints; if they do not, they are topped in their turn, and afford laterals, which seldom fail to be fruitful. As these runners advance, they are trained along the trellis, and all weak useless shoots are removed. This should be done frequently, as it is found injurious to cut out a great quantity of shoots and foliage at one time. No plant, as has been shown by Mr Knight (*Hortic. Trans.* vol. i.), is more beholden to its leaves, both as respects health and flavour of fruit, than the melon.

It is seldom proper to leave more than one fruit on each shoot, and in the large kinds perhaps not more than four or five fruit should be left on one plant. During the process of growth, the fruit is, from its suspended position, fully exposed on all sides to the rays of the sun. At this period water is given with moderation, and abundance of air is admitted. The fruit should be gathered before being quite ripe. Its approaching maturity is known by the appearance of a number of cracks near the footstalk, and by the emission of a rich odour. It is cut in the morning, and is kept in a cool place till served up; if this precaution be not attended to, there will be a considerable deficiency of flavour.

The average heat required for the successful growth of melons is about 70° Fahrenheit. In the common hotbed, this is maintained by defending the bed during the night, and by applying linings from time to time. In pits or houses heated by hot water circulation, this is easily effected at any season; and such pits doubtless supersede the hotbed frame altogether.

The CUCUMBER (*Cucumis sativus*), like the melon, is a tender annual, requiring the assistance of artificial heat. It properly belongs to the class of culinary vegetables, being used in salads and pickles, and has long been cultivated in this country. Its culture, however, requires the closest attention of the gardener.

Select List of Cucumbers.—Like the melon, these run into endless varieties, if more than one sort be grown in the same structure. The present leading varieties are:—Victory of Bath, Tiley's Captivation, Tiley's Phenomenon, Victory of England, Cuthill's Black Spine, Lord Kenyon's Favourite, Hunter's Prolific, Sir Colin Campbell, Canrobert, Conqueror of the West, Allen's Victory of Suffolk, Snow's Prize, Duncan's Victory, and Sussex Hero.

The culture of early cucumbers so much resembles that of the melon, that it would be useless repetition to enter into minute details. The cucumber, indeed, is somewhat hardier, and therefore in summer requires less heat; but in every other respect the management of the plants is precisely the same. The first crop of cucumbers is generally sown in the end of December, or the beginning of January; a second in March, and a third in June. In summer, cucumber plants, after they have been fairly established, require scarcely any other attention than to thin them out occasionally, and to supply them with water. Seed for a winter supply is sown in August.

Cucumbers, particularly the prickly sorts, are often raised in the warmer months under hand-glasses. A cavity is made in a border in front of a wall or other warm place, and is filled with hot dung. This dung is covered with earth, and two or three plants are put into it, and sheltered with a hand-glass. They are watered and dressed from time to time; and by this means a sufficient supply of small cucumbers, or *girkens*, is obtained for pickling.

In the southern counties of England, pickling cucumbers are easily raised without any artificial heat, being sown in drills in the open ground. The earth is made fine and level, and shallow circular hollows are formed with the hand, a foot wide, and half an inch deep in the middle. The distance between each hollow is three feet and a half, and the distance between the rows five or six feet. Eight or ten seeds are deposited in each cavity. This is done in the beginning of June. When the plants appear, they are thinned out to three or four, the weakest or least healthy being rejected. They are watered occasionally, according to the state of the weather.

The cucumbers are gathered chiefly from the middle to the end of August. Vast quantities of these open ground girkens are taken to the London market. The village of Sandy, in Bedfordshire, has been known to furnish 10,000 bushels of drilled cucumbers in one week.

Gourds, species or varieties of the species of the genus *Cucurbita*, may be grown like drilled cucumbers, or trained against walls or on pales. Though occasionally used as esculents, they are regarded chiefly as curiosities. The *Succada*, or vegetable marrow, is a very useful sort, and in request for the table, being eaten stewed with sauce or mashed like turnips. It may be raised in an exhausted melon-frame or pit; or it may be sown under a hand-glass, and afterwards transplanted into a good aspect, and trained against a wall or trellis.

The **Mushroom** (*Agaricus campestris*), though not properly an inmate of the Melonry, may appropriately enough, from the nature of its culture, be taken along with the plants grown in this department of the garden. It is a well-known fungus, a general favourite, and esteemed a delicacy during winter and the spring months.

Mushrooms are much grown in England on ridges or prepared beds, in sheds, or covered with litter in the open air. The Russian form of the mushroom-house was introduced into Britain by Mr Isaac Oldacre, and is now in very general use. Its arrangement is simple enough, and may be understood from the following description:—Two tiers of boxes, three in each tier, and supported by a strong frame-work, are constructed round the whole house, with the exception of the spaces occupied by a door and two windows. The boxes may be from two feet and a half to three feet and a half broad, and about a foot deep. The house is supposed to be heated by hot water circulation. In the centre is a narrow pit, by which the house may be worked by means of fermenting litter instead of the hot water, or in which rhubarb stalks, &c. may be forced. The windows are furnished with shutters to regulate the admission of light, and are moveable, to permit the ingress of air.

It was long, and by some is still, considered essential to grow mushrooms in darkness. This view is erroneous, and upon correct principles they are grown in houses with as much light as is found in almost any other forcing-house. Mr. John Hawkin has shewn that the principal requisites for its successful culture are heat, *light*, air, and a humid atmosphere. His manner of making up the beds does not essentially differ from that of Oldacre, except that instead of earthing them over with soil, he covers them with turf, having the green or grassy side uppermost.

Mushrooms are propagated from what is technically called *spawn*, which is a collection of vegetable threads pervading dried dung or other similar substance, having the smell of mushrooms, and is apparently the fungus in its undeveloped state. It may be obtained from old pastures, decayed mushroom beds, or purchased from nurserymen in the form of *bricks* charged with spawn. When once obtained, it may, like leaven, be indefinitely preserved. If not otherwise procured, it may be produced, or in a manner generated, by placing quantities of horse-dung and rich earth in alternate layers, and covering the whole with straw, to exclude the rain and air. Mushroom spawn commonly appears in the heap in about two months after the dung and earth have been laid together. The droppings of stall-fed horses, or of such as have been kept on dry food, are found preferable for this purpose.

The old or *ridge* method of growing mushrooms has been referred to above; and, as it has some conveniences, particularly for those who have not extensive apparatus, it may be proper to give some account of it. The beds are formed of horse-droppings which have been laid out for some time without having fermented, and may be made two or three feet broad, and of any length. A layer of dung about eight or ten inches thick is first deposited, and covered with light dryish earth to the depth of two or three inches; then another layer of dung of the same thickness, covered like the former; and lastly a third layer, with its covering. The whole should grow narrower as it advances in height. When the bed is finished, it is covered with straw to protect it from rain, and from the parching influences of the sun and wind. In ten days the bed will be ready for planting or spawning. Pieces of spawn-bricks are inserted in the sloping sides of the bed, about four or five inches asunder. A layer of fine earth is then placed over the bed, and the whole is covered with a thick coat of straw. When the weather is temperate, mushrooms will appear in about a month after the bed has been made; but at other times, a much longer period may elapse. The principal things to be attended to are to preserve a moderate state of moisture, and a proper degree of warmth; and the treatment at different seasons must vary accordingly.

Of the many other methods of raising mushrooms, Mr Oldacre's, already referrrd to, may deserve to be particularized. In forming the compost, he procures fresh short dung from a stable, or from the path of a horse-mill. To this is added about a fifth part of sheep-droppings, or of the cleanings of a cowhouse, or of a mixture of both. The whole ingredients are thoroughly mixed and incorporated. A stratum of the prepared mixture, about three inches thick, being deposited in the boxes already described, is beat together with a flat wooden mallet. Another layer is added, and beat as before; and this is repeated till the beds are rather more than half a foot thick, and very compact. The boxes are then placed in the Mushroom-house, or any outhouse where a slightly increased temperature can be commanded. A degree of fermentation generally takes place; but if heat be not soon perceptible, another layer must still be added, till sufficient action is excited. When the beds are milk-warm, or between 80° and 90° Fahrenheit, some holes are dibbled in the mass to receive the spawn. The holes are left open for some time; and when the heat is on the decline, but before it be quite gone, a piece of spawn-brick is thrust into each opening, and the holes are closed with a little compost. A week afterwards the boxes are covered with a smooth coating, an inch and a half thick, of rich mould mixed with about a fifth part of horse-droppings. The apartment is now kept as nearly and equably at 55° Fahrenheit as circumstances will allow. When the boxes become dry, a little soft water may be sprinkled over them, but sparingly and with circumspection. The more that free air is admitted the better is the flavour of the mushrooms; but the exclusion of frost is indispensable. If a number of boxes has been prepared at first, a few only at a time may be covered with mould and brought into bearing, the rest being covered and cropped in succession, as mushrooms may be in demand.

Mr Callow, in a tract on the artificial growth of mushrooms, describes a method in which the pits are wrought by means of dung heat. His structure somewhat resembles Aitkinson's Melon-pit, only the roof is covered with thatch, and a suite of air-flues is formed within the interior of the pit, with branches crossing the principal bed which occupies the floor. Linings of fermenting litter are applied to the exterior of the house at the back and front. The atmosphere of the pit, in the earlier stage, is kept at 50° to 65° Fahrenheit, and when the bed is in full bearing, about 70°. The other details of this method, or indeed those of the majority of writers on this subject, scarcely differ from those of Mr Oldacre's.

KITCHEN GARDEN.

In this department those plants are cultivated which, after being subjected to various culinary processes, are used as articles of food. They may be enumerated in the order of their importance, each, for the sake of precision, being accompanied by its botanical name.

Cabbage Tribe.

The *Brassica oleracea*, Lin. is a plant indigenous to our rocky shores; but no one, seeing it waving in its native habitat, could possibly anticipate that it would ever appear in our gardens, disguised as the ponderous drumhead or sugar-loaf cabbage, or on our tables as the delicate cauliflower and broccoli. The cultivated varieties are numerous; but the following are the most important.

Common White Cabbage. The economical uses of this vegetable are well known. Its principal subvarieties are the following:—

Atkin's Matchless, Knight's Early Dwarf, Sutton's Dwarf Comb, Sutton's Imperial, Early Dutch Twist, M'Ewen's, Cattel's Dwarf, Barn's, Shilling's Queen, Enfield Market, King of the Cabbages, Chappel's Colewort, London Market, Sprotsboro, Pomeranian, Large Drumhead, Flattened Drumhead. The names in seed lists are endless.

The Cabbage is propagated from seed, which may be sown in beds four feet wide, and covered over with a thin layer of earth. The proper seasons for this operation are the middle of August, the beginning of March, and midsummer. By observing these times, and employing different sorts, the succession may be kept up through the year. For the early spring crops, the late sown plants are in October transferred from the seed-bed to some open and well manured ground, where they are arranged in rows two feet asunder. The principal supply may be put out in February, affording the larger sorts more width between the rows. The crops sown in spring are planted out in May and June. For subsequent culture, all that is necessary is, to keep the ground clear of weeds, and to draw up the soil about the stems. In some situations watering in summer is beneficial.

The cabbages grown late in autumn and in the beginning of winter are denominated *Coleworts*, from a kindred vegetable no longer cultivated. The object is to have them with open or slightly closed hearts. Two sowings are made, in the middle of June and in July, and the seedlings, when they acquire sufficient strength, are planted out in lines, a foot or fifteen inches asunder, the rows being eight or ten inches apart.

The Red Cabbage, of which the large or Dutch red is the common variety, is much used for pickling. It is sown along with the white varieties in August and in spring, and the culture is in every respect the same.

The Savoy. This variety, like the preceding, forms into a close head, but is distinguished by the wrinkling of its leaves. It is a very useful vegetable during the winter months. The principal subvarieties are:—

The Early Green, Globe, the Yellow, the Winter, Marcellin, Flat Green Curled, Large Green German, Early Ulm, and the Feather-stemmed, of which there are various forms.

The seed is sown in autumn and in the end of spring, and two plantings may take place, in April, and in June or July.

Brussels Sprouts. This vegetable is allied to the foregoing, but does not close or cabbage. From the axillæ of the stem-leaves proceed little rosettes or sprouts, which resemble Savoy cabbages in miniature. The seed should be sown in spring, and the seedlings planted out before midsummer, during showery weather. In October the plants should have additional earth drawn to their roots, to firm them, and save them from being destroyed by frost. The earliest sprouts become fit for use in November, and they continue good, or even improving in quality, till the month of March following. Mr Van Mons of Brussels mentions that by successive sowings the sprouts are there obtained for the greater part of the year. In spring, when the plants have a tendency to run to flower, their growth is checked by lifting them, and replanting them in a slanting direction, in a cool shady situation.

Open Kale. The principal subvarieties are:—

German Greens or Curlies, Scotch Kale or Green Borecole, Purple or Brown Kale, Delaware Greens, Buda Kale, Jerusalem Kale, Woburn Kale, and Couve Tronchuda or Portugal Kale.

Of these the first three are considered the most valuable, and are the sorts chiefly cultivated in this country. The seed is sown at various times from February to May, and the seedlings are planted out in moist weather during summer, in rows two feet asunder. The Buda Kale is sown in May, planted out in September, and being hardy, affords a supply in the following spring.

Turnip-rooted Cabbage, or *Kohl-rübe*. Of this there are two varieties, one swelling above ground, the other in it. There is nothing peculiar in the culture, unless that, in the case of the first mentioned, the earth should not be drawn so high as to cover the globular part of the stem, which is the part used. The seed may be sown in the beginning of June, and the seedlings transplanted in July; they are thus fit for use at the approach of winter.

Cauliflower. This variety is cultivated for the sake of the flower-buds, which form a large dense cluster or head, and afford one of the most delicate products of the kitchen-garden.

The varieties are Early London White, Early Dutch, London Particular, Large Asiatic, Walcheren, Wait's Alma.

The sowing, for the first or spring crop, is made in the latter half of the month of August; and, in the neighbourhood of London, the growers adhere as nearly as possible to the 21st day. A second sowing takes place in February on a slight hotbed, and a third in April or May.

The cauliflower being tender, the young plants require protection in winter. For this purpose they are sometimes pricked out in a warm situation at the foot of a wall with a southern exposure, where, in severe weather, they are also covered with hoops and mats. A better method is to plant them thickly in the ground under a common hotbed frame, and to secure them from cold by coverings, and from damp, by giving air in mild weather. For a very early supply, it is useful to be at the pains of potting a few scores of plants; these are to be kept under glass during winter, and planted out in spring, defended with a hand-glass, and watered when necessary. Sometimes, as in market-gardens, patches of three or four plants are sheltered by hand-glasses throughout the winter in the open border. It is advantageous to prick out the spring-sown plants into some sheltered place, before they are finally transplanted and committed to the open ground in May. The later crop, the transplantation of which may take place at various times, is treated like early cabbages. Cauliflower succeeds best in a rich soil and a warm situation. After planting, all that is necessary is to hoe the ground, and draw up the soil about the roots.

It is found that this vegetable, being induced to form its large and crowded clusters of flower-buds in the autumn, may be kept in perfection over winter. Cauliflowers which have been planted out in July, will be nearly ready for use in October. Towards the end of that month, the most compact and best shaped are selected and lifted carefully with the spade, keeping a ball of earth attached to the roots. Some of the large outside leaves are removed, in order that the plants may occupy less room, and at the same time, any points of leaves that immediately overhang the flower are cut off. Where there are pits unoccupied, the plants may be arranged close together, but without touching. Or they may be placed in the same manner in hotbed frames. In mild dry weather the glass frames are drawn off, but they are kept close in rain; and in severe frost they are thickly covered with mats. In this way cauliflower may be kept in an excellent state for several months.

Broccoli has a close affinity to cauliflower, being, like it, of Italian origin, and differing chiefly in the greater hardiness of its constitution. The subvarieties are numerous, and exceedingly diversified. The following are those which are in most repute at present:—

Purple Cape, Green Cape, Grange's Early, Early Purple, Early White, Cream-coloured, Sulphur-coloured, Spring White, Late Purple, Late Danish, Gillespie's, Ellitson's Gigantic Late White, Wilcove's Late White, Hammond's White Cape, Dilcock's Bride, Knight's Protecting, Chappel's Large Cream, Portsmouth, Russian Dwarf, Stewart's Early White, Addison's, and Penzance.

Of the autumnal sorts there should be two sowings, one in the middle of April, and one in the middle of May. As the plants acquire strength they are shifted into the open ground, where they are placed in lines two feet apart. The Cape varieties are of great excellence, being of a delicious flavour when dressed; but on account of the plants being apt to start into flower, their cultivation has in many places been neglected. With proper management, however, this tendency may be overruled. The first sowing may be made on any border of light soil, scattering the seed very sparingly. In about a month the plants may be transferred directly into a quarter consisting of sandy loam, well enriched with rotten dung. The greater part of the second crop should be planted in pots likewise directly from the seed-bed. These pots are to be sunk in the open ground till the heads be formed; and in the end of November they are to be placed under a glass frame, where very fine broccoli may be produced during the severest weather of winter.

The spring varieties are extremely valuable, as they come at a season when the finer vegetables are scarce. They are sown in the middle of March or the beginning of April, and afford a supply from March to May inclusive of the following year.

To obtain seed of the Brassica tribe, true specimens of the different varieties should be selected, in such a state of advancement as that they will flower as early as possible in spring. They should be planted in a an open situation, and kept as far apart from other kinds of the same tribe as possible. As they are very liable to *cross* or hybridize, it is perhaps better, except in the case of some favourite variety, to procure supplies from a respectable seedsman, from whom they are almost uniformly to be had genuine, the extensive seed-growers being at great pains to prevent intermixture of crops.

Leguminous Plants.

Of the Pea (*Pisum sativum*), there are two principal varieties, the Field or Gray Hog Pea, and the Garden Pea. The latter alone requires our attention here. Its chief subvarieties are:—

Bishop's New Long Pod, Prince Albert, D'Auvergne, Dancer's Monastery, Knight's Dwarf Marrow, Fairbeard's Surprise, Fairbeard's Champion of England, Flack's New Large Victory, Victoria Marrow, Bedman's Imperial, Hair's Dwarf Mammoth, Lyn's Prolific, True Early Frame, Warwick. The last two and Prince Albert are adapted for early crops, and the others for successional supplies. In the Sugar Pea, of which there are two sorts, the tall and dwarf, the inner filmy lining of the pod is absent, and the young legumes are used like kidney-beans.

The first crop of peas is sown about the beginning of November, in front of a south wall; and these, after they have appeared above ground, are defended by spruce fir branches, or other spray, throughout the winter. In January and February other sowings are made, and sometimes the seed is put into flower-pots and boxes, and the young plants afterwards planted out in spring. From the end of February moderate sowings should be made twice a month till the middle of August, thus insuring a supply of successive crops of delicate green peas. For the latest crops, the Early Frame and the Charlton are the best. Peas are in general sown in rows from three to five feet asunder, according to the height which the different sorts are known usually to attain; but it is better to sow them in single lines at from ten to fifty or sixty feet apart, and sow the intermediate spaces with other crops. As they grow up the earth is drawn up to the roots, and the stems are supported with stakes, a practice which, in a well kept garden, is always advisable, although it is said that the early varieties, when recumbent, arrive sooner at maturity.

The early crops come into use in May and June, and by repeated sowings, the supplies are prolonged to November. Peas grown late in autumn are subject to mildew, to obviate which, Mr Knight has proposed the following method. The ground is dug over in the usual way, and the spaces to be occupied by the future rows of peas are well soaked with water. The mould on each side is then collected, so as to form ridges seven or eight inches high, and these ridges are well watered. On these the seed is sown in single rows. If dry weather should at any time set in, water is supplied profusely once a-week, In this way the plants continue green and vigorous, resisting mildew, and not yielding till subdued by frost.

Of the Garden-bean (*Faba vulgaris*), amongst many varieties may be mentioned:—

The Early Mazagan, Early Lisbon, Long Pod, Green Genoa, Windsor, Green Windsor, White-blossomed, New Royal Dwarf Cluster, Marshall's Early Dwarf Prolific, Green China, Dwarf Crimson-seeded.

The Mazagan and Lisbon are sown in November, and are defended during winter in the same manner as early peas, but they are more difficult to preserve. The same sorts should be sown again in January and February. In March the New Royal Dwarf Cluster and Long-pod may be put in the ground for a general crop, and subsequently the Windsor and White-blossomed. The latter is a variety of considerable merit, and when the pods are taken at an early stage, they have little of the peculiar bean flavour, or only enough to render them pleasant. During the growth of the bean crop, all the culture necessary is, that the earth be drawn up about the roots. Topping the plants is usually practised, being found to promote the filling of the pods.

Kidney-bean. Under this general title are included the common kidney-bean (*Phaseolus vulgaris*, Lin.) of many varieties; and also the Scarlet Runner (*P. multi-*

florus, Willd.) Kidney beans are the *haricots* of the French, who enumerate upwards of 200 varieties. The sorts usually cultivated in this country are:—

Early Red Speckled, Early Black, Early White, White Battersea, White Canterbury, Black Speckled, Brown Speckled, Scarlet Runner, Dutch White, Early Dwarf Dutch, Fulmer's Early Dwarf, Wilmot's Forcing Cream-coloured, Black Belgian, Newington Wonder—the last two are the best of the family—Dwarf Negro, Long-podded Negro, Sabre.

The first three, and Fulmer's Early Dwarf, are the earliest; the others are more productive, and better fitted for a general crop. As the plant is of tropical origin, our climate is scarcely sufficient for the extensive cultivation of the ripe beans, which are the principal object in France and Italy. The immature legumes are chiefly used in this country.

It is seldom advantageous to sow kidney-beans in the open ground before the middle or end of April; after which period successive sowings may be made every fourteen days to the end of July. The plants are grown in rows two feet apart, and the earth is carefully drawn to the roots. Kidney-beans are well adapted for forcing, in hotbeds, or in hothouses; the climate of the Peach-house, when it can be obtained, being considered the best. The sowings may begin in January; they are made in pots, and a supply may be thus obtained in the months of March, April, and May. Wilmot's, Fulmer's, and Newington Wonder, are the best for forcing.

Esculent Roots.

The **Potato** (*Solanum tuberosum*). This well-known plant is a native of the elevated regions of equatorial America. It was introduced into Europe about the middle of the 16th century, but remained little known or regarded till within the last hundred years; it is now so generally cultivated, as to have effected almost an economical revolution in this country. Most of the original British sorts were derived from Ireland. Its multitudinous varieties now set enumeration at defiance, and many are indeed appearing and disappearing every year. The descriptive list of Messrs P. Lawson and Son contains 175 sorts. The culture of the late sorts properly belongs to the farm, and when the gardener has to take them under his care, he will find it best to adopt such as are common in the agriculture of the district. Of the early kinds, most of which are supposed to have originated in Lancashire, the following may be esteemed the best:—

Early Royal Dwarf, Early Ash-leaved, Early Frame, Early Kidney, Walnut-leaved Kidney; Tyer's Early and Golden Dwarf are the best fitted for forcing and very early crops; and the Forty-fold, American Early, Lapstone Kidney, Fluke, Alstone Kidney, are the best for general crops; while the Prince Regent, Stafford Hall, and Pink Eyed, continue good till May or June.

Potatoes are commonly propagated by dividing the tubers, leaving to each segment one or two eyes or buds. The sets are then planted by the aid of the dibble or spade, in rows at a distance varying from fifteen inches to two feet. It has been suggested by Mr Knight (*London Hortic. Trans.* vol. vii.), and his views have been amply confirmed by experiment, that by planting whole tubers, and at greater distances, a larger produce will be obtained. Mr Knight proposed to leave four feet between the rows, a distance which, except with the larger varieties, was found to be too great. An experienced horticulturist in Scotland states, that by planting whole tubers, and by leaving in the case of dwarfs two feet, and in the tall varieties two feet and a half, between the rows, a return from one-third to one-half more was obtained than could be had by the old method. Of course a greater quantity of tubers is required for planting, but this bears no proportion to the great increase which results; and besides, early potatoes at the planting season being unfit for eating, there is little economy in sparing them.

The earliest crops should, if possible, be placed in a light soil and in a warm situation, and be planted about the middle of March. Sometimes the eyes of the tubers are made to spring or vegetate on a hotbed, and the plants are put out as soon as the leaves can bear the open air. When the sprouts are about two inches long, they may be planted out towards the end of March. Young potatoes are thus procured in seven or eight weeks. A secondary planting of tubers should be made before the middle of April. When the stems are a few inches above ground, the earth should be drawn to them; an operation, however, which, while it improves the crop, delays its maturity for two or three weeks. Mr Knight recommends removing the flowers as they appear, and states that by this means the produce is increased by a ton per acre. The fine early varieties, however, scarcely produce any flowers.

An important fact in the cultivation of the potato was observed about the year 1806, by Mr Thomas Dickson of Edinburgh, viz., that the most healthy and productive plants were to be obtained by employing as seed-stock unripe tubers, or even by planting only the wet or least-ripened ends of long-shaped potatoes; and he proposed this as a preventive of the well-known disease called the *Curl*. This view has been confirmed by Mr Knight. An intelligent writer in the *Gardener's Magazine* (vol. ii. p. 171) states a method by which sprouting of the eyes is accelerated. He takes up the seed potatoes a considerable time before they are ripe, and exposes them for some weeks to the influence of a scorching sun. The resulting crop is at least a fortnight earlier; but it is not said how this practice affects the curl.

The forcing of early potatoes on hotbeds has long been practised; but it is attended with considerable trouble and expense. Small supplies of young waxy tubers are now often produced during winter, in boxes placed in a Mushroom-house, or in a common cellar, if free from frost. In October, old potatoes are placed in layers, alternating with a mixture of tree leaves and light mould. Vegetation soon proceeds; and there being no opportunity for the unfolding of stems and leaves, the energies of the plants are expended in the production of young tubers. Before midwinter these often attain the size and appearance of early potatoes; but they are much inferior, being watery and of little flavour. Of late years the potato has been so seriously attacked by an epidemic disease, as almost to threaten its total extinction. The cause of this has led to much controversy without any satisfactory result. Potatoes were more healthy in 1855 than they have been in any year since the appearance of the disease, and there is hope that the malignity of the epidemic is passing away.

Jerusalem Artichoke (*Helianthus tuberosus*), or tuberous-rooted sunflower. This plant, which is a native of Brazil, derives its epithet *Jerusalem* from a corruption of the Italian *Girasole*, a sunflower, and *Artichoke* from the resemblance, in flavour, which its tubers bear to the floral receptacles or *bottoms* of the artichoke. It is propagated by means of its tubers in the manner of potatoes. In March they are planted out in rows three or four feet asunder, and in autumn the new tubers are fit for use. For the sake of convenience, it is advantageous to store them, though the roots are hardy enough to bear the winter frosts. Some, indeed, allow them to remain in the ground, and dig them up when required. In this way a sufficient number of sets is generally left in the ground, and the stalks are thinned into rows in summer; but this is a slovenly mode of treatment, and seldom produces well-flavoured crops. To insure large tubers, a rich soil is required, and if of a peaty nature so much the better.

The Turnip (*Brassica Rapa*), like the potato, has, to a great extent, migrated into the fields, and become the care of the husbandman more than of the gardener. The following are the most esteemed garden sorts:—

Early White Dutch, Early Stone, Green-topped White, Long White, Early Yellow Maltese, Dutch Yellow, Aberdeen Yellow, Long Yellow, Robertson's Golden Stone, Yellow Jelly, Finland, Early Six Weeks.

Besides these, the *Navet* of the French (*Brassica Napus* v. *esculenta*) is occasionally cultivated, and more frequently the *Swedish Turnip* (*Brassica campestris* v. *Napo-brassica*, L.), which is a most excellent winter sort, though it belongs more properly to the farm. For early crops, the white Dutch is the principal variety; the other white sorts, and the beautiful yellow Maltese, are useful in summer and in the beginning of autumn. The yellow Dutch, being capable of enduring any degree of frost, affords the best winter supplies.

Turnips succeed best in a rich, well-worked soil, of a light or medium quality. The first sowing is made about the end of March, in a warm situation; and it is usual to put in additional sowings, once a fortnight or three weeks, till the end of August. The early crops are sown *broadcast*, and the later in drills. After the plants have shewn a rough leaf or two, they are thinned out, being left at the distance of eight or ten inches in the drill; and the ground is hoed and kept free from weeds. As turnips which have stood the winter throw up their seed-stalks early in spring, after which their roots become stringy, and are much deteriorated, it is useful to store the turnips in winter, keeping them in a close place, and covering them with straw. Seed from three to four years old is better than that of the preceding season, particularly for the early varieties, the plants from such being less liable to run to seed without forming bulbs. The same holds good in field culture, while the plants run less to leaves and expend their energies in the formation of larger and better formed bulbs.

The young plants, while in the seed-leaf, are often destroyed by a small beetle called the turnip-fly (*Haltica nemorum*). Many remedies have been proposed; it has been found beneficial to dust the rows with quicklime; but perhaps the best precaution is to sow thick, and thus insure a sufficient supply both for the insect and the crop.

The Carrot (*Daucus Carota*) is one of our native Umbelliferæ, but has been much transformed by cultivation. The best varieties are the Early Horn and the Long Horn, the former for early, the latter for general cultivation. The Altringham is also a good garden sort. The carrot loves a light, deep, fresh soil, in which it may be at liberty to push down its long spindle-shaped roots. A few Early Horn carrots may be sown in February on a moderate hotbed. In the beginning of March, the same sort may be sown in the open air. In April, the other sorts may follow as a general crop; it succeeds best in drills. In many old gardens the early plants are liable to the attacks of a small grub, the larva of *Psila rosæ*, or carrot-fly; it is therefore a useful precaution to sow a moderate crop of the Early Horn variety in July. After sowing, it is only necessary to thin the plants and keep them clear of weeds. The roots are stored in winter in the manner of turnips.

The Parsnep (*Pastinaca sativa*) is now less cultivated than it was in Catholic times, when it was a favourite accompaniment to dried fish in Lent. To some its flavour is not agreeable; but it is a very nutritious vegetable, and of easy digestion. Like the carrot, its root is long and tapering, differing chiefly in being of a whitish colour. Its culture is also very much the same. The best sorts are:—

The Long Jersey, Early Short Horn, Turnip-rooted, and Hollow-crowned.

Red Beet (*Beta vulgaris*) is a biennial plant, a native of the shores of the south of Europe. The boiled root is eaten cold, either by itself or as a salad; it is also often used as a pickle. The varieties are numerous, but the best are—

Barrat's New Crimson, Whyte's Black, Glen Dwarf Red, Atkin's Crimson, and New Blood-red or Mulberry.

There is a fine French variety called Castelnaudary, from a town in Languedoc, which is esteemed for its peculiar flavour.

Red beet prospers in a rich, deep soil, not recently manured, and which has been well pulverized by the spade. During April the seeds may be sown in drills, fifteen inches asunder, and the plants are afterwards to be thinned to eight inches from each other in the lines. In the northern parts of the island, the roots are stored in winter, care being taken not to break them or cut off the leaves too closely, as they bleed when injured.

Skirret (*Sium Sisarum*) is a native of China, too seldom seen in our gardens. Its tubers are used like parsneps. It is a perennial, and may be propagated by separating the roots in spring; but it succeeds better by annual sowings, which may be made in April.

Scorzonera (*Scorzonera Hispanica*) and Salsify (*Tragopogon porrifolius*) are generally associated together in gardens, and are now less cultivated than they deserve. The roots are used in soups, and sometimes as dressed side dishes. They are sown in lines, and treated like the crops of red beet or parsnep.

The Radish (*Raphanus sativus*) is a native of China. There are two principal varieties, the spindle-rooted and the turnip-rooted radish; and of these the subvarieties are numerous. The following may be mentioned:—

Early Frame Scarlet, Short-topped Scarlet, Scarlet Salmon, Long White, White Turnip, Yellow Turnip, White Spanish, Black Spanish.

The first two and the white turnip radish are best suited for early crops; the scarlet salmon for summer, the yellow turnip for autumn, and the white and black Spanish for winter.

Some cultivators sow their earliest crop in November, in a warm situation, at the foot of a wall or in front of a pinery, and continue sowing once a-month, if weather permit, during winter. Others grow their first radishes under frames, aiding vegetation by a slight bottom-heat. As the season advances, successional supplies are sown once a fortnight. From the middle of July to the middle of September, the turnip-radishes are sown from time to time; and on the approach of frost they may be stored up in sand like carrots, and kept throughout winter.

Oxalis Roots (*Oxalis crenata*, Jacq.; *O. arracacha*, G. Don) and some other species of the genus, have of late years been cultivated for the table in this country. They are not, however, held in much esteem, and are very rarely cultivated. The same may be said of the recently introduced Dioscoria Japonica.

Alliaceous Plants.

The **Onion** (*Allium Cepa*) is too well known to require description; it has been cultivated in this country from time immemorial. Among the varieties may be enumerated:—

Strasburgh, Deptford, James's Keeping, Silver-skinned, White Portugal, Blood Red, Potato Onion, Brown Globe, New White Globe, Reading, Tripoli, Madeira Large, Lisbon.

Besides these, the Welsh Onion or Ciboule (*Allium fistulosum*, L.), a native of Siberia, is sometimes grown for scallions. For a general crop, the Strasburgh, Deptford, and Globe varieties may be esteemed the best. The White Portugal grows to a large size, but does not keep well. The Silver-skinned is chiefly used for pickling.

The onion affects a light, rich, well-worked soil, which has not been recently manured. The principal crop may be sown in the course of the month of March, according to the state of the weather and the dryness of the ground. Onions are grown in drills, ten inches apart, and are regularly thinned, hoed, and kept free from weeds. About the beginning of September the crop is ripe, which is known by the withering of the leaves; the roots are taken up, and, after being well dried, are stored in a garret or loft, where they may be perfectly secured from damp.

Towards the end of August a secondary crop is sown, to afford a supply of young onions or *scallions*, as they are called, in the spring months. The Strasburgh and White Portugal may be used for this purpose. Those which are not required for the kitchen being allowed to stand, if the flower-bud is picked out on its first appearance, and the earth stirred about them, frequently produce bulbs equal in size and quality to the large ones that are imported from the Continent.

Some horticulturist srecommend the transplanting of onions. Knight sows the White Portugal onion in spring under the shade of a tree, where it remains of a diminutive size. The onions are kept over winter, and are planted out in the succeeding spring. Some cultivators used to collect all the minute bulbs of the ordinary crop, and use them in the same way; while others confined the operation to one summer, and sowed in February on a slight hotbed, or sometimes merely under a glass frame. In the first or second week of April, according to the state of the weather, they are transplanted in rows, eight inches asunder, and at the distance of four or five inches in the row. Previously to planting, the roots of the seedlings are dipped in a puddle of one part of soot to three parts of earth, an expedient which is found to secure the transplanted onions from the grub. Onions thus treated attain a large size. Autumn-sown onions submitted to a similar treatment produce excellent crops.

The **Potato Onion** is propagated by the lateral bulbs, which it throws out, under ground, in considerable numbers. It is planted about mid-winter, and ripens in summer. Its flavour is strong, and not unpleasant; but the plant being rather delicate and troublesome in cultivation, is not likely to supersede the common onion.

The **Pearl Onion** produces clusters of small bulbs at the root. These little bulbs are of a fine white colour, like the silver-skinned onion, and very fit for pickling.

The **Leek** (*Allium Porrum*) is a native of Switzerland, but has probably been cultivated in this island for many centuries. The varieties are:—

The London flag, Musselburgh, Dutch flag, Erfurt, and Rouen. Of these the Musselburgh leek is considered the most hardy.

Leeks are sown in beds in spring; and in June or July are planted out in rows fifteen or eighteen inches apart, and six inches asunder between the rows. When the weather is moist, it is found beneficial merely to lay the plant into the hole made by the dibble, without closing the earth upon it, the stem being by this means encouraged to swell out and fill the hole, as well as being blanched at the same time.

Shallot (*Allium Ascalonicum*) is a native of Palestine. It is much used in cookery for high-flavoured soups and gravies, and is sometimes put into pickles. It is propagated by offsets, which are commonly planted in September or October. Some recommend the mixing of soot with the manure as a protection against maggots, by which this plant is greatly infested. Autumn planting, however, is found the best expedient, as the bulbs are ripe before the larvæ commence their depredations. There are two sorts, the Common, and the Russian which is much larger and less pungent.

Garlic (*Allium sativum*) and **Rocambole** (*Allium Scorodoprasum*), though common ingredients in Continental cookery, are comparatively seldom used in this country. A few rows will generally be found sufficient. They are propagated by offsets from the roots, or by the bulbils which grow on the flower-stem. The **Chive** or *Cive* (*Allium Schœnoprasum*), a pleasant little native plant, is used occasionally as salad and alliaceous seasoning. A single row may be planted as an edging, and it is easily increased by parting the roots in spring and autumn.

Spinaceous Plants.

Spinach (*Spinacia oleracea*) is an annual plant, and is a native of Western Asia. It has long been cultivated for the sake of its succulent leaves, which, when properly dressed, form a pleasant and nutritious article of food. There are three varieties; the round-leaved or smooth-seeded, the angular-leaved or prickly-seeded, and the Flanders. The two latter, as being the most hardy, are used for the winter crop.

The first sowing is made in August, in some sheltered but not shaded situation; the plants, as they advance, are thinned, and the ground is hoed. In the beginning of winter the outer leaves become fit for use; in mild weather, successive gatherings are obtained, and, with proper management, the crop may be prolonged to the beginning of May.

To afford a succession crop, the seeds of the round-leaved variety should be sown in the end of January, and again in February and March. From this period it is proper to sow small quantities once a fortnight, summer spinach lasting only a very short time. The open spaces between the lines of peas will generally afford enough of room for these transient crops. They are generally sown in shallow drills, and are thinned out and weeded as may be required.

White Beet (*Beta Cicla*) is cultivated for the leaves, which are used as spinach. The midribs and stalks of the great white beet, when separated from the leaves, are stewed and eaten as asparagus, under the name of Swiss Chard. The culture does not differ materially from that of the red beet.

Garden Orache (*Atriplex hortensis*), **Wild Spinach** (*Chenopodium Bonus Henricus*), and **Garden Patience**

(*Rumex Patientia*), are sometimes used in place of common spinach; but as, in this country at least, they are deemed rather curious than useful, it may be sufficient to indicate their names. The same may be said of the NEW ZEALAND SPINACH (*Tetragonia expansa*), and QUINOA SPINACH (*Chenopodium Quinoa.*)

Asparaginous Plants.

ASPARAGUS (*Asparagus officinalis*) is a perennial plant, a native of the shores of Britain, where it occurs sparingly, and of the steppes in the east of Europe. Though somewhat unpromising while in a state of nature, it affords, in cultivation, an esculent of considerable value, and is therefore grown extensively both in private and in sale gardens. The principal varieties are the *Red-topped* and the *Green-topped*, of which the latter, while it is less succulent, is considered the better flavoured. There are numerous subvarieties, such as the Battersea, Gravesend, Giant, &c., which differ only slightly or not at all from those already mentioned.

Asparagus, growing naturally on loose sand, loves a light deep soil, through which it may be able to shoot its long stringy roots. Two feet and a half is considered a desirable depth, but in France the ground is sometimes prepared, by sifting to double that depth. A considerable portion of well-rotted dung or of recent sea-weed is laid in the bottom of the trench, which may be from two to three feet deep; and another top-dressing of manure should be digged in preparatory to planting or sowing. The older horticulturists used to grow their asparagus in beds four or five feet wide, with intervening alleys of about eighteen inches in breadth. At present, in Scotland, it is customary to sow or plant in rows from three to four feet asunder; a method which, in every way, is found to be most convenient. Except where the garden is new, when, of course, it is advantageous to procure a supply of ready grown plants, it is thought preferable to keep up the stock of asparagus by sowing.

The sowing is made in March, in slight drills; and, as a portion of the seed often fails to germinate, it is a good precaution to employ nearly a double quantity of seed. If the plants come up too thickly, they may be thinned out towards the end of the first summer, to the distance of about six inches in the rows. The ground is hoed, and kept clear of weeds. It is a common practice to take slight crops of onions, lettuce, cauliflower, or turnip, between the lines of asparagus during the first, and, if the rows be wide, also during the second year. The young heads or stalks, the part used, should not be cut before the third spring, and they are not in perfection till the fourth or fifth.

The asparagus quarter can scarcely be over manured. The proper time to perform this operation is in the end of autumn, when the annual flower stalks are removed, preparatory for winter. When beds are employed, their surface should be stirred with a fork; a layer of well-rotted hotbed dung is then laid on, and the whole covered with a sprinkling of earth from the alleys. If the plants are grown in rows, the manure is simply dug in by means of a three-pronged fork, care being taken not to injure the roots. This operation is repeated annually. No other culture is required; but it is necessary to observe a due moderation in reaping the crop, as the shoots, when much cut, become progressively smaller and less valuable. Hence a considerable quantity of ground is required for the cultivation of this vegetable, and it is a general rule never to gather it after peas have come into season.

Asparagus readily admits of being *forced.* The most common method is to prepare, early in the year, a moderate hotbed of stable litter, and to cover it with a common frame. After the heat of fermentation has somewhat subsided, the surface of the bed is covered with a layer of light earth or exhausted tan-bark, and in this the roots of plants five or six years old are closely placed. The crowns of the roots are then covered with two or three inches of soil. A common three-light frame may hold 500 or 600 plants, and will afford a supply for several weeks. After planting, linings are applied when necessary, and air is occasionally admitted. Care must be taken not to scorch the roots. Where there are pits for the culture of late melons or succession pine plants, such as the Alderston-pit, or the succession-pit with the hot water circulation, they may advantageously be applied to this purpose; but a pit heated in the tank manner is by far the most convenient and certain.

It has been recommended (*Lond. Hortic. Trans.* vol. v.) to force asparagus on the ground on which it grows. This practice is very generally followed on the Continent, but the result is by no means to be compared with that of taking up the roots and treating them as above. A succession of crops must be maintained by annually sowing or planting new beds so as to keep up the supply.

Before leaving this subject, it may be mentioned, that about Bath, the young flower-spikes of *Ornithogalum pyrenaicum*, found native in that neighbourhood, are used like asparagus, under the name of *Prussian grass.*

SEA-KALE (*Crambe maritima*) is a perennial plant, growing spontaneously on the shores of the southern parts of the island. The roots are spreading, the leaves waved, glaucous, and covered with a fine mealy bloom, and the stalks rise to about two feet high, bearing white flowers, which smell of honey, followed by seed-pods, each containing a single seed.

The country people in the west of England have long been accustomed to use in spring the young shoots, which, by passing through the sand and gravel on which they grow, are somewhat blanched and rendered tender. In conformity with this practice, the cultivation formerly recommended consisted merely in covering the beds on the approach of spring with a little dry earth or sand, in order to blanch or intenerate the shoots. These were cut as they appeared in March and April. Now, however, the blanching is not only much more completely effected, but simple means have been devised for supplying the table for half the year, including all the winter months. It has, within these few years, become a vegetable of common occurrence in the markets both of London and Edinburgh.

Sea-kale seems partial to a light dry soil. If manure be added, it should consist of sea-weed or leaves of trees. The plants may be propagated by offsets, or small pieces of the roots having buds or eyes attached to them; but the most eligible method is by seed. We have seen very tolerably blanched stalks produced by plants only nine months old from the seed, and after two summers, seedling plants will have acquired sufficient strength for general cropping. The sowing is made in March, the seeds being deposited in patches of three or four together, the patches being arranged in lines three feet apart, and two feet in the line. In order to secure a succession, and to obviate the bad effects of forcing, it is proper to sow a few lines of sea-kale every year.

With the aid of pots, sea-kale is forced in the open border in the way now to be described. In the latter end of autumn, the plants are dressed, that is, the stalks are cut over, and the decayed leaves are removed. The ground is, at the same time, loosened about the eyes, and a thin stratum of gravel or sifted coal-ashes mixed with salt, is laid on the surface to keep down earth-worms. A pot with a moveable cover is placed over each plant or each patch of plants. Leaves of trees are then closely packed all round the pots, and raised up to about a foot above them; the whole thus assuming the form and appearance of a large hotbed. When fermentation commences, a thermometer should be occasionally introduced into a few of the pots, to ascertain that the temperature within does not exceed 60° Fahrenheit, and the depth of the leaves is to be regulated accordingly. The vegetation of the included plants is speedily promoted; so that, in the space of a month or six weeks, the shoots will be ready for cutting, and, being thus excluded from the light, they are most effectually blanched, and are exceedingly tender and crisp. By means of the moveable lids, the plants are examined and the shoots gathered without materially disturbing the covering. By commencing at various times, a supply for the table can be readily furnished from the middle of November till the middle of May.

The Artichoke (*Cynara Scolymus*) is a perennial plant, a native of the south of Europe, and is a well-known inhabitant of our gardens. It resembles a thistle on a large scale. In France, the entire head or whole leaves of the involucre of the artichoke are eaten, when in a young and tender state, *en poivrade*, or with pepper, salt, and vinegar; but in this country the only parts used are the base of the leaves of the involucre, and the immature floral receptacle, or phoranthium, commonly called the *bottom*, freed from the bristly seed-down which has been called the *choke*. The varieties are the Conical or French, the Globe or Red Artichoke, and the Dwarf Globe. Of these the first is the highest flavoured, the second is well adapted for a general crop, and the third is prolific, and occupies little room.

The artichoke loves a deep cool dry soil. It is propagated by parting the roots in April, the sets being planted in rows four or five feet asunder, and two feet apart in the rows. The young plants generally afford a crop which succeeds that of old plants; and for this reason a new plantation is made in some gardens every year. During summer the plants are kept clear of weeds, but require little other attention. In November the decayed stems and leaves are removed, and the ground cleared. In some gardens the earth is ridged slightly around the roots, in order to defend the stools from the frost. This, however, is done more effectually by a covering of sifted coal ashes or rotten tan, of the depth of a foot, drawn close round the base of the leaves. In April this protection is taken away, the stocks are examined, and two or three only of the strongest shoots are permitted to remain. The offsets, which are carefully removed, afford materials for a young plantation. The ground between the rows is forked over. At this time manure may be applied; well-rotted hotbed dung, and above all seaweed, being considered preferable.

The Cardoon (*Cynara Carduncului*) is a perennial plant, a native of the south of France and Spain. It has a close resemblance to the artichoke, but surpasses it in size. The edible part, or *chard*, as it is called, is composed of the blanched and crisp stalks of the inner leaves. Besides the common sort there is a prickly variety, known in France by the name of the Cardoon of Tours. The common artichoke is also used for the production of chard. Cardoons are found to prosper on light deep soil. The seed is sown annually about the middle of May, in shallow trenches, like those for celery, and the plants are thinned out to ten or twelve inches from each other in the lines. In Scotland it is preferable to sow the seed in small pots, one seed in each, placing them in a mild temperature, and when the plants have attained the height of eight or ten inches, to transplant them into the trenches. In dry weather water is copiously supplied, not only to increase the succulence of the leaves, but to prevent the formation of flower-stalks, which render the plant useless. In autumn the leaves are applied close to each other, and wrapped round with bands of hay or straw, the points of the leaves only being left free. Earth is then drawn up around the leaf-stems to the height of fifteen or eighteen inches. Sometimes cardoons are blanched by a more thorough earthing up, in the manner of celery, but in this case the operation must be carried on from the end of summer. During severe frost the tops of the leaves should be defended with straw or litter.

The Rampion (*Campanula Rapunculus*) is an English native biennial, the roots of which, under the name of *ramps*, are used as a salad, or boiled like asparagus. It is but little cultivated in this country. The seed is sown broadcast about the beginning of June, in a cool situation, and the young plants are merely to be thinned and kept clear of weeds. On the approach of frost, the roots, which somewhat resemble small radishes, are stored in sand, and will keep fresh and firm till spring.

Salads, &c.

Lettuce (*Lactuca sativa*) is a hardy annual, but of what country it is a native is unknown. Some suppose it to be a seminal variety of the native *L. virosa*, a poisonous plant, "which," says Professor Lindley, "would not be more remarkable than the fact, that the indigenous celery is one of our strongest poisons." Besides its well known uses, it may be mentioned that the late Dr. Duncan senior, of Edinburgh, prepared from its milky juice a medicine denominated *Lactucarium*, similar in its action to opium, but capable of being administered in cases where that powerful drug is inadmissible. There are two principal varieties, the Cos or upright, and the Cabbage-lettuce. The subvarieties are numerous; we may mention the following:—

Early Forcing Cos, White Cos, Cilicia, White Cabbage, Brown Dutch Cabbage, Imperial Cabbage, Grand Admiral, Green Paris Cos, Paris White Cos, Brown Cos, Wait's White Cos, Neapolitan Cabbage, Malta Cabbage, Hardy Green Hammersmith, Tennis Ball, Black-seeded Grotte.

By proper care fresh lettuce may be had throughout the whole year. The first sowing is made in January, in some sheltered situation, or under hand-glasses, or in February on a gentle hotbed. The seedlings are transplanted as soon as the weather will permit. A second sowing may be made in the beginning of March, and another in April. Besides the ordinary compartments, the seedlings may be planted on celery ridges, between rows of slight crops of other vegetables, and, in short, in any odd corner which may occur. To obtain a winter supply, a sowing is made in August or September, and the plants are pricked out in October, along the bottom of walls, or under glazed frames.

Endive (*Cichorium Endivia*) is an annual plant, a native of China, from which it was introduced in 1548. It is the lettuce of winter, the blanched hearts being used for salads and in soups.

There are two highly marked varieties, namely, the Batavian or broad-leaved and the Curled, and of these there are many subvarieties, the best of which are, the Broad-leaved Batavian, Narrow-leaved Batavian, and Lettuce-leaved Batavian. Of Curled subvarieties, Large Green Curled, Small Green Curled, White Curled, Italian Green Curled, and Triple Curled Moss.

A sowing may be made in the beginning of June, and another in July, the seeds being scattered very sparsely, that the plants may not come up in clusters. The seedlings are transplanted into a rich soil, and are arranged in rows twelve or fifteen inches asunder, and at the distance of ten inches in the row. Sometimes they are planted in drills to facilitate the operation of blanching. The latter crop should be placed in a sheltered situation, where it may be able to withstand the winter. When the plants have reached their maturity, the leaves are gathered up, and tied together an inch or two below the tips, and afterwards about the middle of the plant. In two or three weeks they are found sufficiently blanched for use. In winter it is necessary to draw the earth quite up about the leaves. At that season, too, the plants may be inserted into a sloping bank of earth, or blanched in boxes in the Mushroom-house, or in a cellar.

Succory (*Cichorium Intybus*) is an indigenous plant, the cultivation of which may be said to have been introduced by the foreign refugees during the French revolutionary war. By the French it is much esteemed as a winter salad, and when blanched, is known by the name of *Barbe du Capucin*. When intended for winter use, the seed is sown in May or June, commonly in drills, and the plants are thinned out to four inches apart. If at first the leaves grow very strong, owing to wet weather, they are cut off perhaps in the middle of August, about an inch from the ground, so as to promote the production of new leaves, and check the formation of flower-stems. About the beginning of October the plants are raised from the border; all the large leaves are cut off; the roots are also shortened. They are then planted pretty closely together in boxes filled with rich light mould, and watered when needful. When frost comes on, the boxes are protected by any kind of haulm. As the salad is wanted, they are removed into some place having a moderately increased temperature, but with little light, such as a Mushroom-house or cellar off the kitchen. Each box affords two crops of blanched leaves, and these are reckoned fit for cutting when about six inches long. The roots of this plant, it may be added, have been employed as a substitute for coffee-beans, and in Flanders, and some parts of France, a portion of them is very often mixed with coffee.

Parsley (*Apium Petroselinum*) is a biennial plant, of well-known use in cookery. It is said to be a native of Sardinia, but it now grows spontaneously in various parts of Britain. The varieties are the Common, the Curled-leaved, and the Hamburg, the last of which is cultivated for the sake of its tuberous roots. Parsley loves a light rich soil. It is sown in drills about the beginning of March, and the seed lies some weeks in the ground before the plants appear. As they grow up they are thinned out, and are defended by branches or other coverings from hard weather in winter. The Hamburg variety being cultivated for its roots, is sown about the same time in a well trenched soil, in drills a foot apart, and it is thinned to about nine inches in the rows. In the beginning of November the roots are taken up and stored in sand.

Celery (*Apium graveolens*) is a native biennial, an inhabitant of the sides of ditches near the sea. In its wild state it is of an acrid nature, and of a coarse rank flavour; but by cultivation it is improved into one of the most agreeable salads. There are two principal varieties; *celery* properly so called, with upright stalks and fibrous or slightly tuberous roots; and *celeriac* with large turnip-shaped roots. Of the former, the principal subvarieties are:—

Cole's Superb Red, Cole's Superb White, Lion's Paw, Seymour's White Champion, Nutt's Champion, Manchester Giant Red, Wall's White, Cole's Crystal White, and Cole's Dwarf Red.

Celery is usually sown at three different times; on a hot-bed in the beginning of March, and in the open ground in March, and again in April. The seedlings, when about two inches high, are pricked into rich soil, in which they are allowed to stand till they are four or five inches high. The first crop is defended by frames or hand-glasses, and is planted wide to admit of being lifted with balls of earth adhering to the roots. Towards the end of May trenches for blanching the celery are prepared. These trenches are three and a half or four feet apart, fifteen inches wide at the bottom, and about a foot below the natural level of the surface. The soil at the bottom of the trench is carefully digged and manured, and a single row of plants is placed in each trench. Sometimes where a large supply is required, the trenches are made six feet wide, and after a similar preparation, rows fifteen or eighteen inches apart are planted across the trenches. As the plants advance in growth, earth is laid up about the stalks of the leaves, an operation which is repeated at the end of every ten or fifteen days, care being taken not to choke the plants. Many delay the earthing up until the plants have nearly attained their full size, when the operation is performed at once, and it is believed that by this process the stalks are rendered more crisp and tender. As the celery approaches maturity, scarcely any thing but the tips of the leaves appear above the ridges, and, when lifted, the stalks are found to be completely blanched. Successional crops should be planted out from the 1st of June till the 1st of August. Celery loves a rich light soil and an abundance of moisture.

Celeriac, or turnip-rooted celery, is treated at first like the early crop of common celery. In the beginning or middle of June it is planted out in a flat bed, in drills fifteen inches apart. A single earthing afterwards suffices. Its large round roots are used in soups, and are much relished by some. It is, however, more attended to in France and the Low Countries than in Britain.

Garden Cress (*Lepidium sativum*), and White Mustard (*Sinapis alba*) are generally associated in their use as salads, and in their culture in the garden. They are annual plants, and are eaten only when very young. In winter they may be raised on a slight hotbed, or in shallow boxes or pans placed in a temperature of 60° or 65°, in spring under hand-glasses, or in drills near a south wall, and in summer, when they should be sown once a fortnight, in drills, in any cool shady situation. Table mustard (which is made from *Sinapis nigra* L.), belongs rather to the department of agriculture. Durham mustard, which is distinguished for its pungency, though not remarkable for fine colour, is said to be made principally from the seeds of the common yellow field mustard or charlock (*Sinapis arvensis* L.)

Of Rhubarb (*Rheum*), several species and many varieties are cultivated for the purpose of supplying materials for tarts, the foot-stalks of the leaves being well adapted for that purpose, and coming into use at a most convenient season. R. *rhaponticum* and *palmatum* were the species first employed; but the sorts now preferred are seminal varieties, mostly allied to *R. hybridum* and *R. undulatum*. The following are the most worthy of notice:—

Myatt's Victoria, Myatt's Linnæus, Royal Albert, Britannia, Goliath, Elford or Buck's Early Scarlet.

They may be multiplied by dividing the roots, and this is the common practice; but they thrive much better when grown from seed. Sir Joseph Paxton recommends sowing on a slight hotbed in spring, and transplanting out in rows in the month of May. No stalks are gathered from them for the first two years, but in the third season they are fit for use. A portion of the crop is allowed to come on under the general influence of the season; but much also is forced, which may be done in a variety of ways. Some treat it like sea-kale, covering the root, which is allowed to remain in the ground, with a large pot or box, and wrapping it round with litter. Others take up the roots in autumn, pot them, and force them in the pits or Mushroom-houses. The best method is to procure long narrow boxes of a moderate depth, and to place them, packed full of roots, in a Mushroom-house or cellar, where there is a considerable temperature. The rhubarb soon throws up its stalks, and these being partially etiolated, possess a delicacy and flavour superior to those grown in the open air. It is easy, by varying the time of subjecting the boxes to the increased temperature, to keep up a succession of rhubarb stalks, from the period at which kitchen apples become scarce or begin to lose their flavour, till green gooseberries come into season.

The following annual plants are occasionally used in cookery, or as salads:—*Chervil*, Scandix cerefolia; *Purslane*, Portulaca oleracea; *Lamb's-lettuce*, Fedia olitoria; *Indian Cress*, Tropæolum majus; *Marigold*, Calendula officinalis; *Borage*, Borago officinalis. These may be sown in spring, or in the beginning of summer, in any fresh light soils. In general a small quantity will suffice.

The *Common Sorrel*, Rumex acetosa; and the *French Sorrel*, Rumex scutatus, which should give place to the Large Dutch; and the *Horse-radish*, Cochlearia Armoracia, are perennials, and are increased by parting their roots. They thrive in any cool shady situation.

The *Capsicum* or *Chile*, Capsicum annuum, and the *Love-Apple*, Solanum Lycopersicum, are tender annuals from tropical climates. Both are sown in hotbeds in spring, and after being transplanted and nursed in separate pots, are planted out, the former in a warm border, and the latter against a wall. In Scotland the Capsicum will scarcely mature its fruit without the aid of glass.

Dill, Anethum graveolens, and *Angelica*, Angelica archangelica, are umbelliferous biennials, which have been for a long period, though not extensively, cultivated in our gardens. They are easily raised from seed. With these may be associated the beautiful perennial, *Fennel*, Anethum Fœniculum, used in salads and sauces. It may be propagated either by parting the roots, or by seeds, which should be sown in autumn soon after they are ripe.

In every garden there is a small department set apart for the culture of Sweet Herbs and Medicinal Plants. We need not here enter into details respecting their uses or culture, but shall merely give classified lists.

Shrubby Plants increased by parting the roots, or by cuttings:—*Thyme*, Thymus vulgaris; *Sage*, Salvia officinalis; *Winter Savory*, Satureja montana; *Rosemary*, Rosmarinus officinalis; *Lavender*, Lavandula Spica; *Hyssop*, Hyssopus officinalis; and *Rue*, Ruta graveolens.

Perennial Herbaceous Plants, increased by parting the roots:—*Spearmint*, Mentha viridis; *Peppermint*, M. piperita; *Pennyroyal*, M. pulegium; *Balm*, Melissa officinalis; *Tarragon*, Artemisia Dracunculus; *Tansy*, Tanacetum vulgare; *Costmary*, Balsamita vulgaris; *Chamomile*, Anthemis nobilis.

Biennial or Annual Plants, increased by sowing the seeds:—*Clary*, Salvia Sclaria; *Coriander*, Coriandrum sativum; *Caraway*, Carum Carui; *Sweet Marjorum*, Origanum majorana; *Summer Savory*, Satureja hortensis; *Sweet Basil*, Ocimum basilicum; and *Bush Basil*, O. minimum. These last, the basils, which are natives of the East, and in much request for their delicate flavour, are raised on hotbeds in spring, and transplanted with balls, into some warm situation. In Scotland, they are mostly treated as tender annuals, and are grown, under glazed frames, in flowerpots.

There are besides a few others, which, in each of the classes, more properly belong to Dietetics, and Materia Medica. The young green leaves of Prunus Laurocerasus (under the name of laurel), may properly enough be employed in garnishing; but they ought never to be used, as they too often are, for giving a nutty flavour, or for *greening* other articles; hydrocyanic acid being given out and proving injurious, even in small quantities.

THE FLOWER GARDEN.

The cultivation of flowers, if not the most useful, is at least one of the most pleasing occupations of the horticulturist, and has generally shared largely in his attention. It is probable that at first, flowers, as objects of curiosity, were confined to a few patches or borders in the garden, as is still the case in many old places; but in the progress of art, and the diffusion of taste, separate departments were allotted to them under the name of Flower Gardens. After some general remarks on style and situation, we shall treat of the component parts of flower gardens, their various decorations, and of floriculture.

The designing of flower gardens unquestionably belongs to the fine arts, involving in it, the exercise of invention, taste, and foresight. Its principles are more vague and evanescent than those of any of the sister arts. The hand of the designer is not here guided by the imitation of nature, for his work is wholly artificial in its arrangements and appliances; neither does utility come in, as in architecture, to supply a form and frame-work, which it is the artist's part to adorn. "As flower gardens," says Loudon, "are objects of pleasure, the principle which must serve as a guide in laying them out, must be taste. Now, in flower-gardens, as in other objects, there are different kinds of tastes; these embodied are called styles or characters; and the great art of the designer is, having fixed on a style, to follow it out unmixed with other styles, or with any deviation which would interfere with the kind of taste or impression which that style is calculated to produce. Style, therefore, is the leading principle in laying out flower gardens, as utility is in laying out the culinary garden. As objects of fancy and taste, the styles of flower gardens are various. The modern style is a collection of irregular groups and masses, placed about the house as a medium, uniting it with the open lawn. The ancient geometric style, in place of irregular groups, employed symmetrical forms; in France, adding statues and fountains; in Holland, cut trees and grassy slopes; and in Italy, stone walls, walled terraces, and flights of steps. In some situations these characteristics of parterres may, with propriety, be added to or used instead of the modern sort, especially in flat situations; such as are inclosed by high walls; in towns, or where the principal building or object is in a style of architecture which will not render these appendages incongruous. There are other characters of gardens, such as the Chinese, which are not widely different from the modern; the Indian, which consists chiefly of walks under shade, in squares of grass; the Turkish, which abounds in shady retreats, boudoirs of roses and aromatic herbs; and the Spanish, which is distinguished by trellis work and fountains; but these last gardens are not generally adapted to this climate, though, from contemplating and selecting what is beautiful or suitable in each, a style of decoration for the immediate vicinity of mansions, might be composed preferable to any thing now in use." It may, however, be remarked, that the flower garden properly so called, has generally been too much governed by the laws of landscape-gardening, and these often ill-understood, and misapplied. In the days of "clipped hedges and pleached alleys," the parterres and flower-beds were of a description the most grotesque and intricate imaginable. At a subsequent period, when the natural and the picturesque became the objects of imitation in the park, there appeared the most extravagant attempts at wildness in the garden. The result has been unfortunate. It is not meant that when there are merely a few patches of flowers by way of foreground to the lawn, they should not be subordinated to the principles which regulate the more distant and bolder scenery; but wherever there is a flower garden of considerable magnitude, and in a separate situation, it should be constructed on principles of its own. In such a spot, the great object must be to exhibit to advantage the graceful forms and glorious hues of flowering plants and shrubs; and it is but seldom that mere elegancies in the forms of compartments, and other trickeries of human invention, can bear any comparison with these natural beauties. To express the peculiar nature of garden scenery, as distinct from the picturesque in landscape, Loudon has invented the term *gardenesque;* and, whatever may be thought of the term itself, it is very desirable that the distinction should be preserved.

Two varieties of flower gardens have chiefly prevailed in Britain; one, in which the ground is turf, and the pattern, so to speak, is composed of a variety of figures cut out of the turf, and planted with flowers and shrubs; and another, when the flower-beds are separated by gravel walks, without being interspersed with grass at all. The choice of one or other of these varieties ought greatly to depend upon the situation. When the flower garden is to be seen from the windows, or any other elevated point of view, from which the whole or the greater part of the design may be perceived at once, perhaps the former should be preferred. Where the surface is irregular, and the situation more remote, and especially where the beauty of flowers is the chief object of contemplation, the choice should probably fall on the latter. This variety, too, seems preferable, on the principle of contrast, where there are large lawns in the outer grounds, in order that *kept* (or smoothly mown) grass may not be found every where.

Respecting the situation of the flower garden, no very precise directions can be given, as it must be influenced by the nature of the lawns, and of the site of the mansion to which it is attached. Generally speaking, it should not be at any great distance from the house; and in places where there is no distant view of importance, it may be constructed under the windows. In retired scenes, it is delightful to step out of the drawing-room into compartments of flowers, in the vicinity of a greenhouse or conservatory. On the other hand, when the park is spacious, and the prospects extensive and picturesque, it is perhaps better that the flower garden should be at some distance, say not more than a quarter of a mile, and out of sight of the house, but with an easy access in any sort of weather; an arrangement which would give an agreeable termination to a short walk, a desirable matter in most cases, for it has been often remarked that many parts of extensive grounds remain unvisited, because they afford no remarkable object to attract the attention.

The particular form of a flower garden is equally beyond the inculcation of specific rules. Indeed, it may be of any shape, and, except where the dimensions are extremely limited, the boundaries should not be continuously visible. The taste of the proprietor or designer, and the capabilities of the situation, must determine not only the external configuration, but also the arrangement of the interior parts. By judicious management, it may be made to pass through shrubbery, gradually assuming a more woodland character, and groups of trees, into the park on the one hand, and into the kitchen garden or orchard on the other. In most cases, even when it is in the vicinity of the mansion-house, the flower garden should be encircled with some sort of fence, in order to convey the idea of protection, as well as to furnish security to the vegetable inmates of the parterres, it being impossible to carry on floriculture to any great extent in open places which are accessible to hares and rabbits. In detached localities, the fences may be made sufficiently strong to preclude the intrusion of every species of vagrant; and these it is not difficult to mask with shrubs and trees. The style of the mansion should determine that of the flower garden, and also its position. The flower garden attached to a highly architectural mansion, should, for the most part, occupy the lawn on the south, the east, or the west front; and the carriage-entrance, where possible, should be on the north front, the park extending close up to the front door. There are cases, however, where this arrangement must be departed from, and the flower garden must occasionally be placed even on the north front. These deviations are caused in a great measure by the difficulties of providing a proper approach to the entrance-door; and also by the position of the principal sitting-rooms, which should always command a view of the flower garden. A flower garden on the north front, if sufficiently distant from the house to prevent injury from shade, has this advantage, that the flowers will naturally turn towards the windows, whereas, when placed on the south front, their faces are directed towards the sun, and much of the effect of colour is lost. Flower gardens in connection with highly architectural mansions should be in the geometrical or systematic style, and bounded by parapet walls, with the appropriate mural decorations of ballustrading, piers, vases, &c. When upon a large scale, and especially where a natural inclination in the ground exists, or can be formed artificially, winding terraces and parapet walls should be introduced, with flights of steps, and the necessary embellishments in connection with them, as well as a profusion of fountains, statuary, sculpture, &c. Grass terraces have always a mean appearance in such a position. The parapet walls afford excellent accommodation for half-hardy and beautiful flowering plants.

Formerly the flower-beds were made either circular, straight, or in curves, and were turned into knots, scrolls, volutes, and other compartments; and this taste prevailed, perhaps, in some measure from a desire on the part of the contrivers, to compensate by their ingenuity for the paucity of the ornamental plants which they then cultivated. Now that the riches of Flora have poured into our gardens, a simpler taste has obtained. It is needless as well as impossible to specify the numerous configurations of flower-plots, for they abound in kaleidoscopical variety. Good taste will suggest that those only should be associated which harmonize well together; and it is better to incur the hazard of an apparent monotony, than to excite wonder by incongruous combination. When the figures are separated by turf, it is necessary that the little lawns or glades should have a certain degree of breadth, as nothing has a worse effect than overcrowding. A multitude of little figures should also be avoided, as they produce what Gilpin calls *spottiness,* and which, as he has correctly pointed out, is a grievous deformity. In this sort of flower garden, it is desirable that a gravel walk should skirt along at least one side of the principal figures; in our humid climate, the grass would otherwise render them inaccessible with comfort during a great part of the year. In those gardens in which turf is wholly or partly excluded, the compartments should be of a larger and more massive character. Narrow borders, bounded by parallel straight lines and concentric curves, should be avoided. The centres of the figures should be filled with tall-growing shrubs, and even with an occasional low evergreen tree, such as a yew or a holly. The walks, arranged in long concave

Flower Garden.

curves, may communicate here and there with one another. A dial, a few seats and arbours, with an urn or two or a vase, may be introduced with good effect. It is to be regretted that few good specimens of this species of flower garden have hitherto been executed in Britain.

Amongst the accompaniments of the flower garden may be mentioned the Rock-work. This consists of variously grouped masses of large stones, generally such as are remarkable for being figured by water-wearing, or for containing petrifactions or impressions; and into the cavities between the stones, filled with earth, alpine or trailing plants are inserted. In proper situations, a small piece of water may be introduced, for the culture of aquatic plants. One of the walks is sometimes arched over with wire-work, and covered with ornamental climbing shrubs, forming a delightful promenade in the glowing days of summer. A separate compartment, generally of a regular figure, is set apart for roses, under the name of the Rosary. A moist or rather a shady border, with bog earth, is devoted to that class of shrubs, commonly, but not very accurately, designated "American plants." In extensive places, a separate "American Garden" is often formed, in a locality which, if not damp, has at least the command of water, and occupies generally some warm corner of the park.

Some writers have advocated the formation of Winter and Spring Gardens in separate localities; but we are not aware that their ideas have ever been embodied to any great extent. It is proposed that in the winter garden should be assembled all the most beautiful evergreen shrubs and plants, together with the few flowers that bloom during the winter months. The situation, it is recommended, should be well sheltered, and open only to the warm rays of the sun, which are peculiarly grateful in our cold winter seasons. Masses of evergreens have a sombre and monotonous effect, even in winter, unless occasionally broken and varied by deciduous trees, which to some extent may be introduced. The contrast of these leafless neighbours relieves the intenseness of the gloom, and sets off the brilliancy of the rest. If the shrubs be grouped carefully according to their habits, instead of being planted promiscuously, the monotony will be softened down by the irregularity of surface which such groups present, and still more so when plants with variegated foliage are grouped together in masses proportionable to the extent of plantation. Though a winter garden, the very name of which is chilling, is perhaps in the estimation of some not very desirable by itself, the object to be attained in it should be kept in view in the formation of the park or flower garden. We can easily suppose a particular section of the latter to contain a predominance of evergreens, and to possess the principal characters of a winter garden, without the formality of its name and purpose. In the immense variety of situations, it is not difficult to imagine a sloping bank, for instance, facing the sun, with a long walk skirting its base, the lower side of which might be adorned with a border or narrow parterre planted with arbutus and periwinkle, whilst the slope is covered with the higher evergreens, and the summit of the acclivity is crowned with groups of deciduous trees, interrupted by a few straggling firs, through which the wind, unfelt below, might sigh its melancholy music. Again, the spring garden, which need not be of very great extent, may take refuge in the vicinity of the greenhouse or conservatory, with which it is naturally allied.

Soil.—A variety of soil is required in the flower garden, to suit the very different kinds of plants that fall to be cultivated. *American plants* require a peaty earth, varying from boggy peat to almost pure sand. Alluvial peat, that is, boggy earth which has been washed away and incorporated with white sand, is to be preferred; peat, cut from its natural bed and only partially decomposed, is of no value at all, or is positively prejudicial to plants. In collecting soil from the surface of a moor, it is proper to take no more than the upper turf or sod, with the peat adhering to it, and only from the driest parts of the ground, where, besides the common heath, fescue-grasses occur. Where this cannot be procured, a good substitute is found in vegetable mould, that is, decayed leaves swept from lawns or woods, and allowed to lie in heaps for a year or two. For the general purposes of the flower garden, a light loamy soil is advantageous; and where the natural covering is thin, or requires making up, recourse should be had to the surface-earth of old pastures, which, especially when incumbent on trap-rocks, is found to be excellent. It is expedient to have a large mass of this material in the compost yard. The turf, and the surface-soil adhering to it, should be laid up in a rough state, in which way it is continually ameliorating by the decomposition of the vegetable matters, and the action of the air.

Garden Walks.—During the prevalence of the Dutch taste, grass-walks were common in our gardens; but, owing to their frequent humidity in our climate, they have in a great measure disappeared. Their disuse is perhaps to be regretted, as in some situations, particularly behind lengthened screens of trees, or in gardens from which grass has been in a great measure excluded, an example or two of them would be agreeable. It is justly observed by Sir William Temple, that "two things peculiar to us, and which contribute much to the beauty and elegance of our gardens, are the gravel of our walks, and the fineness and almost perpetual greenness of our turf;" and therefore no trouble should be spared in securing excellence in these respects. In old times grass walks were formed with much care. After the space which they were to occupy had been digged and levelled that it might subside equally, a thin layer of sand or poor earth was laid upon the surface, and over this a similar layer of good soil. This arrangement was to prevent excessive luxuriance in the grass. In selecting the seed, all annual, wiry, and coarse sorts of grass should be avoided. The best mixture of grasses for this purpose, and their proportions per acre, is as follows, viz.:—Cynosurus cristatus, 5lbs., Festuca duriuscula, 3lbs., F. tenuifolia, 2lbs., Lolium perenne tenue, 20lbs., Poa nemoralis, $1\frac{1}{2}$lbs., Poa nemoralis var. semper-virens, $1\frac{1}{2}$lbs., Poa trivialis, $1\frac{1}{2}$lbs., Trifolium repens, 7lbs., and T. minus, 2lbs. This is also very suitable for lawns upon light soils.

Gravel-walks, in this department, are formed precisely in the same manner as those in the kitchen garden. It may, however, be remarked, that a multitude of gravel-walks, particularly when narrow, have a puny effect. All the principal lines should be broad enough to allow at least three persons to walk abreast; the others may be narrower. Much of the neatness of walks depends upon the material of which they are made. Gravel from an inland pit is to be preferred; though occasionally very excellent varieties are found upon the sea-coast. The gravel of Kensington and Blackheath has attained considerable celebrity; and is frequently employed in remote parts of the kingdom, the expense being lessened by its being conveyed to different sea-ports as ballast for ships. In summer a gravel-walk requires hoeing and raking from time to time, to clear it from weeds and tufts of grass. After this operation, or even after a simple sweeping, it is rolled down with a hand-roller; and this is repeated as often as the surface is ruffled. Nothing contributes more than frequent rolling to the elegance and convenience of garden walks.

Edgings.—Walks are generally separated from the borders and parterres by a variety of plants planted closely in line. By far the best edging is afforded by the Dwarf Dutch Box. It is extremely neat, and, when annually clipped, will remain in good order for many years. It may be planted at any season, except when in full growth or mid-winter. Excellent edgings are also formed by Sea Pink (*Statice Armeria*) and Double Daisy (*Bellis perennis.*) Dwarf Gentian (*Gentiana acaulis*) and London Pride (*Saxifraga umbrosa*) are also sometimes used. Indeed, any low-growing herbaceous plant, susceptible of minute division, is fitted for an edging. Edgings may also be formed of narrow pieces of sandstone flag, slate, fire-clay tiles, wire, or cast-iron. In shrubberies and large flower-plots, verges of grass-turf, from a foot to three feet in breadth, according to the size of the border and width of the walk, make a very handsome border to walks. These should not be allowed to rise high above the gravel: an inch and a half may be assigned as the limit they should not exceed. The grass is kept short by repeated mowings, and the edges are defined by clipping with shears, or cutting once a year with a paring iron.

Shrubs.—Much of the beauty of the pleasure garden depends upon the proper selection and disposition of ornamental trees and shrubs; and it is to be regretted that this department of the art has often been greatly neglected. In many gardens we still find only a few evergreens, and a parcel of rugged deciduous species, introduced probably before the age of Miller. No wonder is it, therefore, that we sometimes hear of the insipid scenes of the shrubbery. Nevertheless, shrubs are highly elegant in themselves, and they afford a most efficient means of diversifying garden scenery. Of the many beautiful species now to be had in Britain, and affording the materials of exquisite decoration, we can mention only a few.

Of Evergreens, besides the Common Laurel (*Prunus Laurocerasus*) and the Portugal Laurel (*P. lusitanica*), we may notice the American Arbor Vitæ (*Thuja occidentalis*), as adapted to large masses of shrubs; and the Chinese Arbor Vitæ (*T. orientalis*), whose size and mode of growth fit it for smaller compartments. The different varieties of Rhamnus Alaternus, and the species of Phillyrea and Juniperus, have long and deservedly been favourite evergreens. The Sweet Bay (*Laurus nobilis*), in favourable situations, rises into a handsome shrub or low tree, and may convey to the student of the classics an idea of the Delphic laurel. The Strawberry tree (*Arbutus Unedo*), a native of Ireland as well as of the south of Europe, will always find a place as one of the most elegant of plants, equally beautiful as regards foliage, flower, and fruit; nor should its countryman, the Irish Yew, ascending like the pillared cypress, be forgotten. The Cypress itself, though rather a denizen of the park, may be sparingly introduced. The Laurustinus (*Viburnum Tinus*), with blossoms approaching the snow in whiteness, enlivens the winter season, when nothing else is in flower in the shrubbery. The Swedish and Irish Junipers deserve a place. Different species of Daphne will not be forgotten; it may be sufficient to enumerate pontica, collina, Cneorum, and hybrida. As extremely low evergreens, we may mention Gaultheria procumbens and Shallon, Polygala Chamæbuxus, and Astragalus Tragacantha; but these would probably be better placed among what are popularly called American plants. Of the more tender evergreens, we should name the Andrachne (*Arbutus Andrachne*), a beautiful shrub, but liable to be injured by severe frosts. The Broad-leaved Myrtle (*Myrtus romana*), in warm places, and with the aid of a covering in the depth of winter, may be made to clothe the walls with its brilliant verdure for eight months in the year, and with its white flowers for some weeks in the end of summer. Aucuba japonica and Buxus balearicus are handsome shrubs, of a somewhat stronger constitution; the former is very ornamental in dull shady places, where no other shrub will grow. The beautiful tribes of Cistus and Helianthemum, some of which are quite hardy, are admirable for adorning sloping banks.

Amongst the shrubs that require a peaty soil, or at least a damp and shady situation, the splendid genus Rhododendron holds the principal place. Of the larger species may be mentioned R. ponticum, Catawbiense, and maximum, with their many beautiful varieties. In early spring, R. däuricum expands its blossoms among the first of flowering shrubs. Nor should we overlook R. punctatum, hirsutum, ferrugineum, and Chamæcistus, of humbler growth, but not inferior in beauty. With these the closely cognate genus of Azalea, with its multitudinous species and varieties, disputes the palm of elegance. The pale and drooping Andromedas are scarcely of inferior interest. The more recently introduced are the Taxodium, Cryptomeria, Torreya, Podocarpus, Dacrydium, and smaller growing Coniferæ. The hardy Heaths, particularly Erica carnea, Tetralix, and stricta, Menziesia polifolia and cœrulea, and the Canadian Rhodora, combine to bring up the rear of this department of Flora's train.

The deciduous flowering shrubs are too much neglected in many gardens. They are seldom well managed, either in point of arrangement or in the evolution, by pruning, of picturesque effect. Very often they are huddled together promiscuously, and grow up into the shape of huge sheaves of rushes. With judicious management, there is not a finer object in the vegetable kingdom than the common Lilac (*Syringa vulgaris*), or the hybrid var. (*S. rothomagensis*). Even the old Guelder-Rose (*Viburnum Opulus*) is worthy of the poet's eulogy; the "scentless rose," which he describes as "tall,"

> "And throwing up into the darkest gloom,
> Of neighbouring cypress, or more sable yew,
> Her silver globes, light as the foamy surf
> That the wind severs from the broken wave."

It would lead us into disproportioned detail to specify a tithe of those showy shrubs which should be dear to every floriculturist. Suffice it to name Ribes sanguineum, Daphne Mezereum, Spartium of many species, Cytisus, Amygdalus, and Pyrus. The Ribes speciosum, or Fuchsia-flowered gooseberry, seems to require the protection of a wall, but deserves it. The fine suffruticose plant Pæonia Moutan, requires the most sheltered position in the shrubbery, where, in May and June, its flowers excel all others in magnificence.

There are many fine climbing shrubs, such as the species of Clematis, and of Lonicera or Honeysuckle. Others, though not precisely of this class, are much beholden to the shelter of a wall, such as the beautiful Magnolia conspicua, Edwardsia tetraptera, microphylla, and grandiflora, Glycine sinensis, Eccremocarpus scaber, and Jasminum nudiflorum. The numerous species or varieties of Fuchsia, Escallonia, and Ceanothus, when planted against a wall, or even in the open ground, and shaded with an occasional covering in winter, convey to us a better idea of the riches of Chilian vegetation, than when they are confined to the shelves of the greenhouse. Many roses are also well adapted for walls, such as the varieties of Noisette, Boursault, and the different species from China.

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A separate compartment, called the Rosary, is generally devoted to the cultivation of roses. It is often of an oval or circular form, with concentric beds, and narrow intervening walks of grass or gravel, but it may assume any configuration which is suited to display this favourite plant. Of the thousand varieties of roses which exist in the nurseries, we pretend not to give any selection. It may, however, be remarked, that in planting the Rosary, care should be taken to classify the sorts according to the sizes and affinities, otherwise the effect will be much impaired. The climbing sorts may be advantageously introduced, being trained to pillar-like trellises. When the rosary is extensive, it is judicious to intersperse some of the most showy hollyhocks; for thus the beauty of the quarter is maintained in the later months of autumn, when the roses are chiefly past. Standard roses are well adapted to stand singly on the little lawns in flower gardens, or to break the uniformity of low flower borders.

Nearly all shrubs may be propagated by layers, some by budding or grafting, many by separating the roots. In planting, shrubs may be arranged either singly or in masses: the latter method is the most efficient in the production of effect, but it should not be very servilely adhered to, as it is apt to beget monotony. Some kinds should never appear in masses: the white Portugal broom, for instance, when so arranged, gives a limy tint to a garden. Perhaps it is better that groups should contain a predominance of one shrub, set off by a few others of a contrasting figure or colour, than that they should be entirely homogeneous.

Herbaceous Plants.—Common perennial flowers, whether strictly herbaceous or bulbous, afford the principal materials for floral decoration. Botany supplies, as it were, the colours for the picture, and gardening grinds and prepares them for use. The painting is continually varying, and new shades are arriving and departing in succession. The least consideration of the subject will suggest the rule, that in planting flowers they should be arranged according to their stature, otherwise many of the most beautiful little flowers would be lost among their taller compeers. The lowest plants should therefore stand next the margin of the border or parterre, and they should increase in height as they go back. To produce a full show, a profusion, just not amounting to crowding, is requisite. The flower-plots should present a regular bank of foliage and blossom, rising gradually from the front; but as this might convey an idea of too great precision, a few *staring* plants, on the same principle as those employed in greenhouses, should be thinly scattered over the surface. These may be shrubs, or any tall showy plant, such as Bocconia cordata, Papaver bracteatum, Gladiolus Byzantinus, or Lilium candidum. The management of colour is more difficult. When the length of the flowering season is considered, it will be obvious that it is impossible to keep up the show of a single border or plot for six months together, and consequently that much of the labour employed in mixing colours is misspent, since plants, as they are commonly arranged, come dropping into flower one after another; and even where a certain number are in bloom at the same time, they necessarily stand apart, and so the effects of contrast, which can be perceived only among adjacent objects, are entirely lost. To obviate this defect, it has been recommended that ornamental plants should be formed into four or five separate suites of flowering, to be distributed over the garden. Not to mention the more vernal flowers, the first might contain the flora of May; the second that of June; the third that of July; and the fourth the tribes of August and the following months. These plants should be kept in separate compartments, arranged either singly or in masses; but the compartments themselves should be so intermingled, as that no particular class should be entirely absent from any one quarter of the garden. The May parterres should, however, chiefly occur in the vicinity of the greenhouse or conservatory, or, when these are absent, in a warm sunny situation. The flowerings of June and July, as being highly showy, should occupy the most conspicuous parts of the garden. The autumnal perennials, not being so imposing, may retire into the more secluded situations, as they are supplanted by the superior brilliancy of the annuals, which fill the vacant beds of florists' flowers, or are scattered over the faded clumps of May and June.

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Before attempting to plant, the floriculturist would do well to construct tables or lists of flowers, specifying their respective times of flowering, their colours, and altitudes. These tables, when skilfully used, would prevent mistakes, produce a greater facility of execution, and put the colours nearly as much under control as they are on the painter's pallet. To diversify properly and mingle well together the reds, whites, purples, yellows, and blues, with all their intervening shades, requires considerable taste and powers of conception; but if success is not attained in the first attempt, inaccuracies should be noted, and rectified at the proper time next season. Certain series of colours have been given, but these it is needless to mention, as it is quite immaterial whether the first flower in a row be red or white. The principal object is to preserve an agreeable contrast; and as at particular seasons a monotony of tint prevails, it is useful at such times to be in possession of some strong glaring colours. White, for instance, should be much employed in July, to break the duller blues and purples which then preponderate. Orange, too, is very effective at this season. On the other hand, yellows are superabundant in autumn, and therefore reds and blues should then be sought for.

Besides mere vividness of colour and elegance of form, there are other qualities which render plants desirable in the flower garden. Whoever has visited a botanic garden, must have been sensible of an interest excited by the curious structure or by the scarcity of some plants. Even quaintness of form is deserving of attention. The writer of this article has seen Allium fistulosum (the common Welsh onion) making a conspicuous figure in a flower garden; and he remembers well a plant of seakale (*Crambe maritima*), which the good taste of the owner had introduced into the parterre, to the great disturbance of the ideas of the gardener. At the same time, it must be admitted that such expedients should be employed with reserve. No handsome plant should be rejected because it is common, nor any inconspicuous weed preserved merely because it is scarce. The flower-gardener should have a small nursery, or reserve garden, for the propagation of finer plants, to be transferred into the borders as often as is required.

We shall enumerate merely the names of a few of the most showy flowers, adapted to the British flower garden.

Vernal Herbaceous Plants.—Helleborus niger, lividus, olympicus, atrorubens; Eranthis hyemalis; Hepatica triloba var.; Primula vulgaris var., veris, elatior, marginata, helvetica, nivalis, viscosa, integrifolia, cortusoides; Cortusa Matthioli; Soldanella alpina, Clusii; Viola odorata, tricolor, biflora, altaica; Dodecatheon Meadia vars.; Orobus vernus; Adonis vernalis; Omphalodes verna; Corydalis lutea, longiflora; Sanguinaria canadensis; Iris pumila; Anemone apennina, Halleri, Pulsatilla.

Vernal Bulbous Plants.—Galanthus nivalis; Leucojum vernum; Crocus, species; Cyclamen coum, vernum; Corydalis bulbosa; Erythronium dens canis; Narcissus Pseudo-narcissus, moschatus, odorus, Jonquilla, &c.; Fritillaria imperialis, meleagris, persica;

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Gagea lutea; Tulipa sylvestris; Iris persica; Trillium grandiflorum, &c.; Scilla verna, præcox, bifolia, sibirica.

Herbaceous Plants flowering in May.—Anemone narcissiflora, sylvestris, dichotoma; Primula farinosa, scotica; Convallaria majalis; Uvularia grandiflora, perfoliata; Phlox verna, divaricata, subulata, setacea, &c.; Asphodelus luteus, ramosus; Draba aizoïdes; Viola cornuta, obliqua; Gentiana verna, acaulis; Lupinus polyphyllus; Gaillardia bicolor; Iris florentina, cristata, &c.—*Bulbs:* Leucojum æstivum; Scilla non-scripta, italica, &c; Hyacinthus monstrosus; Muscari moschatum, botryoides, comosum; Narcissus Bulbocodium, poëticus, &c.

June—Herbaceous Plants.—Pæonia officinalis, albiflora, corallina, Humei, &c.; Dianthus, species; Geranium sanguineum, Lancastriense, Wallichianum, striatum, &c.; Monarda didyma, Kalmiana; Papaver bracteatum; Saxifraga, species; Spiræa, species; Mimulus luteus, moschatus; Trollius americanus, europæus; Lysimachia verticillata; Veronica latifolia, &c.; Geum coccineum; Aconitum Napellus, &c.; Potentilla nepalensis, &c.—*Bulbs:* Allium Molle; Gladiolus byzantinus, communis; Lilium Pomponium, bulbiferum, aurantiacum, monadelphum, penduliflorum, concolor, &c.; Iris Xiphium, xiphioides, &c.

July—Herbaceous Plants.—Phlox intermedia, and many other species of that fine genus; Pentstemon, numerous species; Œnothera, various species; Campanula persicifolia, &c.; Asclepias amœna, syriaca; Iris fulva, pallida, variegata; Gentiana lutea, asclepiadea, cruciata, septemfida, &c.; Chelone obliqua, barbata, Lyoni.—*Bulbs:* Lilium Martagon, canadense, tigrinum, superbum, &c.; Gladiolus cardinalis; Tigridia pavonia; Commelina cœlestis; Cyclamen hederæfolium.

Autumnal Herbaceous Plants.—Phlox decussata, pyramidalis, tardiflora, &c.; Lobelia cardinalis, fulgens, splendens, &c.; Aster sibiricus, amellus, pulcher, &c.; Eschscholtzia californica; Solidago, several species; Aconitum japonicum, volubile, variegatum; Gentiana Saponaria: Pentstemon, several species.—*Bulbs:* Colchicum autumnale; Crocus nudiflorus, serotinus; Tritoma pallida, media, riparia, Burchellii.

It is with regret that we thus confine ourselves to a dry list of border flowers; but to do them any thing like justice, would require many pages. Within the last few years great accessions have been made to our stores. The Lupins and Pentstemons from the Columbia River, the Verbenas and Calceolarias from South America, and the Potentillas and Geraniums from Nepal, have in a great measure changed the face of our flower gardens, while the industrious florist has added an almost countless number of hybrid productions, combining every shade of colour and diversity of form. While thus our riches have increased, the difficulty, as well as the necessity, of making a selection has increased also.

Most herbaceous perennial plants are propagated by parting the roots, or by cuttings; but some most conveniently by the sowing of seed.

Biennial Plants—Plants whose existence is limited to two years, in the latter of which they flower and then decay, are called biennials. Many of them possess considerable beauty; and by their easy propagation and rapid growth, they afford a ready means of decorating borders. The following may be considered most worthy of notice:—Agrostemma coronaria; Antirrhinum majus; Hedysarum coronarium; Lunaria biennis; Campanula media; Œnothera sinuata, biennis; Verbascum formosum; Hesperis matronalis; Scabiosa atropurpurea; Matthiola simplicicaulis. When a very desirable variety is procured, such as the striped Antirrhinum majus, attention should be paid to the striking of cuttings during the summer, as the only means of continuance.

Biennials are sown in beds in the end of spring, and are generally transplanted in the course of the autumn, into the places where they are intended to stand, that they may be confirmed before winter, and shoot up readily into flower in the following summer.

Annual Plants.—Many of the annual species, though of fugitive duration, are possessed of much beauty of hue and elegance of form. They are further valuable from their pliability, so to speak, and the promptitude with which they may be used. They are besides of easy culture, many requiring nothing more than to have the seeds sown in the spot where they are to grow. Annuals may be divided into three classes, the *hardy*, the *half-hardy*, and the *tender*. The first class, as stated above, are sown at once in the ground which they are to occupy; the *half-hardy* succeed best when aided at first by a slight hotbed, and then transplanted into the open air; the tender are kept in pots, and treated as greenhouse or stove-plants, to which departments they properly belong. It is scarcely necessary to remark that the *hardy* and *half-hardy* sorts may be grown either in patches or in beds, and are subjected to all the rules which regulate the disposition of common border flowers.

Hardy Annuals.—Anagallis; Bartonia; Calliopsis; Iberis umbellata; Knautia orientalis; Alyssum, several species; Linaria, various species; Delphinium Ajacis, consolida; Silene Armeria; Campanula speculum, Lorei; Lavatera trimestris; Malope trifida, Hibiscus trionum, bifrons; Nolana, various species; Papaver somniferum, numerous varieties; P. Rhœas, varieties; Gilia capitata, tricolor; Collinsia grandiflora; Kaulfussia amelloides; Clarkia pulchella, elegans; Œnothera rosea, rosea-alba, tenella, Lindleyana, Romanzovii; Rudbeckia amplexicaulis; Senecio elegans; Matthiola annua; Lupinus, several species; Godetia; Nemophila; Lasthenia; Leptosiphon; Oxyura; Platystemon; Saponaria; Silene, &c.

Half-hardy Annuals.—Callistemma hortense; Lopezia racemosa; Tagetes patula, erecta, racemosa, &c.; Zinnia elegans, pauciflora; Xeranthemum annuum; Helichrysum fulgidum; Chrysanthemum carinatum; Amaranthus caudatus; Schizanthus pinnatus, porrigens, Grahami, Hookeri; Salpiglossis atropurpurea, straminea; Petunia nyctaginiflora; Mirabilis Jalapa; Ageratum; Argemone; Brachycoma; Chænostoma; Clintonia; Cuphea; Grammanthes; Hemimeris; Lotus; Phlox; Rhodanthe; Podolepis; Portulaca; Senecio; Talinum, &c.

Tender Annuals.—Impatiens Balsamina; Browallia elata; Celosia cristata; Gomphræna globosa; Solanum melongena; Mesembryanthemum crystallinum.

We have been able to enumerate only a small selection of species out of a multitude which is continually receiving accessions. Many of the sorts mentioned above have been introduced during the last few years; and we doubt not that, at no distant period from the present, many more will come into notice.

Before leaving this part of the subject, it may be proper to mention that it is now the practice to grow and treat as annuals, or rather as biennials, great quantities of the more hardy Pelargonia, Verbenæ, Salviæ, Calceolariæ, Fuchsiæ, Hemimeres, and other genera. Many gardeners every season propagate, by cuttings, or seeds, several thousands of these plants. Grown in moderate-sized pots, they are kept in cool pits, yet protected from frost during winter. About the end of May, or as soon as there is no longer any apprehension of injury from frost, the plants are taken out of the pots and planted in the open ground in the flower garden. Some cultivators shift their plants, particularly scarlet geraniums, into pots nine or ten inches in diameter, in spring, and plunge them into the parterres instead of planting them out, with a view to lessen the size of the foliage, and induce a disposition to a more profuse production of bloom. Towards the middle of July they begin to grow vigorously, and in August or September present, in luxuriance at least, if not in magnitude, a better representation of their native vegetation than we see elsewhere in our gardens. Upon the approach of frost, they are, with the exception of the Fuchsias, taken up and potted and placed in pits till the following season, at least the best grown plants are, and a supply is also secured by striking them for cuttings during July and August. These plants, with the fine new annuals, and the gorgeous Dahlias, give a splendour to the autumnal flower garden which in former times it did not possess.

Florists' Flowers.—This technical appellation has been restricted to certain flowers, which have been especial favourites with florists, and have consequently received a large share of their attention. Though possessed of great individual beauty, few of them are calculated to make a show at a distance, and the arrangements requisite for their culture do not harmonize well with the general disposition of a flower garden. It is, therefore, desirable, particularly when considerable refinement is aimed at, that a separate garden, or a separate section of the garden, should be set apart for their culture. The more robust or less valuable varieties, however, which are often as showy as the most esteemed, may be introduced into the general parterres. We shall notice the most considerable, in the order in which they naturally attract attention.

The *Hyacinth* (*Hyacinthus orientalis*), one of the most beautiful and fragrant of the spring flowers, is a native of the Levant, where it occurs abundantly, in form not unlike our common harebell. It has long been a favourite in the East; but it has been brought to its present artificial perfection in Holland, chiefly since the beginning of last century. The catalogues of the Haarlem florists used formerly to enumerate 2000 sorts, some of which sold as high as £200 a bulb; they are now less numerous, and much less expensive.

Hyacinths are either single, semidouble, or double, and exhibit a great variety of tint.

The criterion of a perfect flower of this sort is given by Mr Glenny, in his little work on the "The Properties of Flowers and Plants."

"Each pip or flower should be round, and not ragged. The petals should be broad, thick, blunt at the ends, not pointed, and reflex enough to threw up the centre well. The foot-stalk should be strong, and hold the flower out stiff in a vertical position, and by no means weak, to allow the pip to hang with the face sloping downward. The foot-stalk should be of a length to make the pips touch and no more. The pips should be large, and the flowers close on the stem. Double flowers should have the rows of petals above each other very regularly imbricated, so as to throw up the centre. The spike should be bold, round, compact, and pyramidal. The flower should be very strong, and diminishing to a single flower at top. The flower-stem should be very strong and upright, and no part of it should be seen in consequence of the closeness of the pips to each other. The colours should be bright, clear, and dense, whatever the shade, and any better approach to scarlet, blue, or yellow, than those shades we now possess, would be highly esteemed."

The hyacinth delights in a rich light sandy soil; and it is chiefly owing to the want of these qualities in his composts, that the British florist fails in the growth of this beautiful plant. The Dutch compost is the following:—One-third coarse sea or river sand; one-third rotten cow-dung without litter; and one-third leaf mould. The natural soil is removed at least two feet deep, and the vacant space filled up with compost, previously prepared and well mixed. These materials retain their qualities for six or seven years, but the Dutch do not plant hyacinths upon the same place for two years successively. In the alternate years they plant it with narcissus or crocus.

About the 25th of October is the best time to plant the bulbs. They are arranged in rows, eight inches asunder, there being four rows in each bed. The bulbs are sunk about three or four inches deep, and it is recommended to put a small quantity of clean sand below and all around them. As the roots are liable to be injured by frost, it is usual to cover the beds with decayed tan-bark, with litter, or with awnings. The first may be considered the neatest during winter, but an awning is indispensable in spring, when the lingering colds prove exceedingly hurtful to the young flower-stems. As the flower-stems appear, they are tied to little rods, to preserve them from accident. In order to perfect the colours, the rays of the sun are admitted in the morning or in the evening, but the glare of mid-day and the cold of the night, are both excluded. When the season of blossom is over, the awning is removed or only replaced to keep off heavy rains. Much of the success, in the culture of this flower, depends on the subsequent management of the bulbs. It is the practice in Holland, about a month after the bloom, or when the tips of the leaves assume a withered appearance, to take up the roots, and, cutting off the stem and the foliage within half an inch of the bulb, but leaving the fibres, to lay the bulbs sideways on the ground, covering them with half an inch of dry earth. After three weeks, they are again taken up, cleaned, and removed to the store-room. In the store-room the roots should be kept dry, well-aired, and apart from each other.

Where forcing is practised, a few bulbs may be forced in deep flower-pots filled with light earth, and when coming into flower, transferred to the greenhouse, which they enliven at the deadest season of the year. In chambers, they are grown in water-glasses made for the purpose; or, with still greater advantage, in boxes filled with damp hypnum moss.

New varieties of hyacinths are procured by sowing the seed; but this is a tedious process, and seldom followed in this country. The established sorts are propagated by offsets or small bulbs, which form at the base of the parent bulb. Almost all the hyacinths cultivated in this country are imported from Holland, and the quantity of roots annually introduced must be very considerable.

The *Tulip* (*Tulipa Gesneriana*), is a native of the East, whence it was introduced into Europe about the middle of the 16th century. Gaudy as it is, it has no proper corolla, but only a calyx of six coloured sepals. About the year 1635 the culture of the tulip was very engrossing; and, indeed, the rage for possessing rare sorts had become so great in Holland, as to give rise to a strange species of gambling, known to the collectors of literary and scientific anecdotes by the name of Tulipo-mania, which has tended to bring unmerited discredit on this fine flower. At present the finer tulips are mostly of moderate price, and, though not to be met with in every garden, have yet some ardent cultivators.

There are some varieties, such as the early Duc Van Thol, the Clarimond, the Parrots, and the Double Tulips, which belong, properly speaking, to the general cultivator. In this country, the florists' tulips are arranged under four classes. 1. The *Bizarres*, which have a yellow ground marked with purple or scarlet. 2. The *Byblœmens*, with a white ground marked with violet or purple. 3. The *Roses*, with a white ground marked with rose-colour. 4. The *Self* or *Plain-coloured* tulips, which are of one uniform colour, and are chiefly valued as breeders. The Byblœmen class includes most of those tulips which are held in highest esteem in this country.

The properties of a fine late tulip, as specified by Mr Glenny, are the following, somewhat abridged:—

The cup should form, when quite expanded, from half to a third of a hollow ball. To do this the petals must be six in number; broad at the ends, smooth at the edges, and the divisions between the petals scarcely to shew an indenture. The three inner petals should set close to the three outer ones, and all being so close as to shew no openings between them. The petals should be smooth; thick and stiff, and should keep their form well. The ground colour should be clear and distinct, whether white or yellow. The least stain, even at the lower end of the petal, would render a tulip comparatively valueless. Whatever be the disposition of colours or marks upon a tulip, all the six petals should be marked alike, and be therefore perfectly uniform. The feathered flowers should have an even close feathering forming an unbroken edging, all round. If the flower have any marking besides the feathering at the edge, it should be a beam, or bold mark down the centre, but not to reach the bottom of the cup; the mark or beam must be similar in all the six petals. Flowers not feathered, and with flame only, must have no marks on the edges. None of the colour must break through to the edge. The colour must be perfectly uniform in all the petals, and not to go too near the bottom. The colour, whatever it be, must be decided, distinct in outline, and neither shaded, flushed, or broken. The height should be from 18 to 36 inches, the former is right for the outside row in a bed, and the latter is right for the centre or highest row.

Tulips prosper in a light sandy soil, similar to that for hyacinths, and their season of planting and after-management is so much the same as to require no separate notice here. After the sepals have fallen, the seed-vessels are broken off close by the stem, to prevent the plant from exhausting itself in perfecting seed, and to direct its energies to the forming of the new bulb. When the leaves have withered, the bulbs are taken up, dried, and stored until the planting season come round.

Tulips are readily propagated by offsets, which are taken off from the parent bulbs, and nursed in separate beds till they be full grown. New varieties are raised from seed; they are from five to seven years old before they flower, and, if raised from promiscuous seed, they often turn out worthless. Seedling tulips, it may be remarked, present this anomaly for the first two or three years, that they form their new bulbs several inches below the old ones, so that an inexperienced cultivator is sometimes apt to miss them at the time of lifting.

The *Ranunculus* (*R. asiaticus*) is, like many of the other florists' flowers, a native of the Levant, where it is a favourite of the Turks. It has sported into innumerable varieties, and those now in cultivation in this country are mostly of British origin.

According to the canons of floral criticism, laid down by Glenny, the properties of a fine double ranunculus are the following :—

> The flower should be of the form of two-thirds of a ball, two inches in diameter, and the upper part of it square or horizontal. The outline of the bloom should form a perfect circle. The petals should be thick, smooth on the edges, and gently cupped; they should lie close, so that little but the edges should be seen. The flower should be symmetrical to the centre, which should be close, so as perfectly to conceal the seed vessel. The colour should be very dense, whatever be its hue; if an edged flower, the edging should be well defined, and the marking even and uniform; in no case should the ground colour break through the edging; but spotted flowers with one spot on each petal are allowable. The stem should be strong, and long enough to raise the flower clear six inches above the foliage. Striped flowers are not perfect, nor are flowers speckled at the edges; they ought not to exhibit a single break.

The ranunculus requires a stronger and moister soil than most other flowers. Maddock preferred a fresh, strong, rich loam. Hogg recommended a fresh loam, with a considerable portion of rotten cow or horse dung. The Rev. Mr Williamson (Hort. Trans. vol. iv.) uses a stiff clay loam, with a fourth of rotten dung, and this compost is still used by more modern florists. "The bed should be dug from eighteen inches to two feet deep, and not raised more than four inches above the level of the walks, to preserve the moisture more effectually: at about five inches below the surface should be placed a stratum of two-year-old rotten cow dung, mixed with earth, six or eight inches thick; but the earth above this stratum, where the roots are to be placed, should be perfectly free from dung, which would prove injurious if nearer. The fibres will draw sufficient nourishment at the depth above mentioned; but if the dung were placed deeper, it would not receive so much advantage from the action of the air." The principal object, however, is to maintain throughout the bed a genial moisture; and this is to be done by avoiding all hot gravelly earths, and particularly soils that are apt to cake. The tubers are planted late in autumn or early in spring, in rows five or six inches apart, and three or four inches separate in the rows. They should be so close that the foliage shall cover the surface of the bed, for in this way a salutary degree of shade and moisture is preserved. The autumn planted roots must be sheltered from frost by old tan or sifted coal-ashes. When in flower, the plants are covered with an awning. When the leaves wither, the roots are taken up, dried, and stored.

Scarcely any florists' flower is more readily propagated from seed, or sooner repays the care of the cultivator. The seed is obtained from semi-double sorts, which are often of themselves very beautiful flowers. It is generally sown in boxes in autumn or spring. We have often seen it committed with success to the open ground. The young plants thus raised flower often in the second, and always in the third year.

The *Anemone* of the flower garden includes two species, Anemone coronaria, a native of the Levant, and A. hortensis, a native of Italy. These have long shared the attention of the florist, and in his arrangements have generally been associated with the ranunculus, resembling it in its natural affinities and mode of culture. In a fine double anemone, the stem should be strong, erect, and not less than nine inches high. The flower should be at least two and a half inches in diameter, consisting of an exterior row of large well rounded petals, in the form of a broad shallow cup, the interior part of which should contain a number of small petals, mixed with stamens, imbricating each other. The colours should be clear and distinct when diversified in the same flower, or striking and brilliant when there is only one tint.

The soil and culture are so nearly the same as in the ranunculus, that it is needless to specify them. The plant continues longer in flower, and the leaves often remain so long green, that it is difficult to find a period of inaction in which to take up the roots. It has been recommended, that as soon as the bloom is over, the bed should be screened from rain by mattings until the leaves wither. As the roots are rather brittle, they require considerable care in handling. Anemones are easily raised from the seed. A bed of single anemones, it may be remarked, is a valuable addition to a flower garden, as it affords, in a warm situation, an abundance of handsome and often brilliant spring flowers, almost as early as the snowdrop or crocus.

The *Narcissus* is an extensive genus, including a great many interesting species and varieties. It belongs, however, rather to the botanico-florist than to the florist proper; but as it contains many plants of great elegance, it ought to receive more general attention. The Polyanthus Narcissus (*N. Tazetta*) affords the varieties which are chiefly cultivated by florists. These prosper in a rich light soil, containing a little dung. The roots should not be stirred more frequently than once in three years; and this remark applies also to Narcissus Jonquilla and odorus, the small and large jonquil, of which fragrant plants there should be beds in every flower garden. N. Tazetta, like the hyacinth, may be grown either in pots or in water-glasses.

The *Lily*. Of the genus Lilium there are many species, some of which have not been exhibited to the extent of their capabilities in the flower garden. The old white Lily (*L. candidum*, L.), after supplying the poets with so much imagery, has retired into the modest station of a common border flower. The flaunting Orange-Lily (*L. bulbiferum*) may be allowed, if it pleases, to follow its example. L. Martagon may occupy the same place. The scarlet Turk's Cap (*L. chalcedonicum*) is worthy of more care, as being more beautiful and more tender. It does not relish being disturbed, and it dislikes peat. On the contrary, the splendid Tiger Lily (*L. tigrinum*), which propagates rapidly by axillary bulbs, succeeds best in peaty soil. The same remark applies to the rarer L. canadense, and superbum (magnificent species), as well as to L. concolor, pennsylvanicum, and others, which ought to be more common in our gardens. L. japonicum and longiflorum, in which the genus attains its greatest magnificence, unfortunately require a finer climate than ours, and must therefore be grown in pots under glass.

The same may be said of L. eximium, and the more recently introduced L. lancifolium and its hybrid varieties.

The *Dahlia*, of which there are two species (*D. variabilis* and *D. coccinea*), is a native of Mexico, from which it was introduced in 1789, but afterwards lost by our cultivators. It was reintroduced in 1804; but it was not till ten years later than it was generally known in our gardens. At present the varieties are endless, each district of the country possessing suites of its own, and cultivators occasionally raising at one sowing a dozen or two of sorts, which they think worthy of preservation. The results have been most propitious to the flower garden, from which, indeed, the Dahlia could nearly as ill be spared as the potato from the kitchen garden.

A perfect Dahlia flower, according to Glenny, should be circled, the petals should be broad at the ends, smooth at the edges, thick in substance, perfectly free from indenture or point, it should cup a little, but not enough to show the under surface. The flower should form two-thirds of a ball when looked at sideways. The petals should rise above one another symetrically, each petal covering the joinings of the two under it. The centre should be perfect, the unbloomed petals lying with their points towards the centre, should form a button, and also the highest part of the flower. The petals should open boldly, without showing their under side, and should form circular rows, uniformly laid, evenly opened, and enlarging by degrees to the outer row of all. The flower should be very double. The petals should cover one another very nearly; not more should be seen in depth than half the breadth; the more they are covered so as to leave them distinct, the better in that respect; the petals, therefore, though cupped, must be shallow. The size of the flower should be four inches in diameter, and not more than six. The colour should be dense, whatever it be, whether tipped or edged, it must be free from splatches and blotches, or indefinite marks of any kind.

New varieties are, of course, procured from seed. If sown in flower-pots, and aided by a little heat, the seedlings, speedily planted out, will flower the first season. Established varieties are propagated by dividing the large tuberous roots, but in doing so, care must be taken to have an eye to each portion of tuber, otherwise it will not grow. Sometimes shoots of rare varieties are grafted on the roots of others.

They are best, and most generally propagated by cuttings, and for this purpose, the old tubers are placed in heat in January, and as the young shoots, which rise freely from them, attain the height of three inches, they are taken off and planted singly in small pots filled with fine white sand, and plunged in a moderate heat. They root speedily, and are then transferred to larger pots in light rich soil. Their growth is encouraged until the planting out season arrives, which is about the middle of June.

Dahlias succeed best in an open situation, and in rich deep loam; but there is scarcely any garden soil in which they will not thrive, with manure. They are, however, injured by being repeatedly planted on the same spot. They may stand singly like common border flowers; but have the most imposing appearance when seen in masses arranged according to their stature. Old roots often throw up a multitude of stems, which render thinning necessary. As the plants increase in height, they are furnished with strong stakes, to secure them from high winds. Dahlias generally flower till they are interrupted by frost in autumn. The roots are then taken up, dried, and stored in a cellar, or some other place, where they may be secured from frost and moisture.

The *Auricula* (*Primula Auricula*) is a native of the Alps and the Caucasus. It has long been an inmate of our gardens; and has generally been a favourite with those florists whose means and appliances are of a limited kind.

Besides the double varieties which have never been in much repute, Auriculas are classed under two divisions: the *selfs* or plain-coloured, and the *variegated* or *painted* sorts. Professed florists confine their attention to the latter: it must, however, be confessed, that their criteria of fine flowers are often arbitrary, and that although many of their favourites are examples of undoubted beauty, the eye of the uninitiated would generally prefer the simpler hues of the self-coloured flowers.

The auricula, though now almost wholly an artificial plant, and strangely transformed from its original appearance, still loves a moist soil and shady situation. The florists' varieties are grown in rich composts, for the preparation of which numberless receipts have been given. We quote that of Mr Hogg, an experienced grower, as stated in his Supplement, p. 166. "One barrow of rich yellow loam, or fresh earth from some meadow or pasture land or common, with the turf well-rotten; one barrow of leaf mould, one ditto of cow-dung, two years old at least; and one peck of river, not sea sand. For strong plants intended for exhibition, add to the same composition, as a stimulant, a barrowful of well decayed night soil, with the application of liquid manure before the top-dressing in February, and twice more, but not oftener, in March. A portion of light sandy peat-earth may be added, as a safe and useful ingredient, particularly for plants kept in low damp situations." The treatment of modern growers does not differ essentially from this.

Auriculas may be propagated from seed. It is to be sown in January or February in boxes, which are kept under cover, and exposed only to the rays of the morning sun. When seed has been saved from the finer sorts, the operation is one of considerable nicety, as it not unfrequently happens that the best seedlings are at first exceedingly weak. They generally flower in the second or third year; and the florist is fortunate who obtains three or four good sorts out of a large sowing. The established varieties are increased by dividing the roots, an operation which is performed in July or in the beginning of August.

Fine auriculas are grown in pots about six inches in diameter. These are kept in frames, or stages constructed for the purpose. For winter use, perhaps there is nothing better than a common hot-bed frame, as this admits of an exact adjustment of air and temperature, things to which attention is absolutely necessary when the plants approach the flowering season. After the bloom is over, the pots may be placed on stages slightly elevated, and facing the north. Though not absolutely necessary, it is useful to have the power of sheltering them from long continued rains. It is usual every year to shift the plants, shortening the roots, and giving them a large portion of new soil, soon after the flowers have decayed.

The *Polyanthus* is supposed to be a seminal variety of Primula vulgaris, and is much cultivated by some florists. Like the auricula, it has sported into many hundred varieties. It is not necessary to give a detailed account of its culture, as it scarcely differs from that of the auricula. The polyanthus, however, is the hardier of the two, and seldom perishes from cold. It may be mentioned that there are several beautiful double varieties of the common primrose, which are deserving of a place in every garden.

The *Carnation* (*Dianthus caryophyllus*) has long been a favourite flower, not only for the beauty, but for the delightful fragrance of its blossoms. It is a native of Germany, and is occasionally found in an apparently wild state in England. The cultivation of it, however, is by no means easy, and calls forth all the resources of the florist. The varieties, which are very numerous, have been arranged under three heads: *Flakes*, having two colours, with their stripes running quite through and along the petals; *Bizarres*, irregularly spotted, and striped with not fewer than three colours; *Picotees*, spotted, with serrated or fringed petals. Mr Hogg, who wrote a treatise expressly on this flower, has given a catalogue of nearly 350 sorts.

Carnations are propagated by layers or pipings: the former method is most practised, but with some weak sorts piping should be preferred. Layering is performed when the plant is in full bloom. Proper shoots are selected; a few of the lower leaves are then removed; an incision is made a little below a suitable joint passing up through it, and the shoot is then pegged down and covered with some fresh soil, the tip being left above ground. Layers are generally found to be rooted in about a month after the operation has been performed. Pipings are little cuttings, separated at a joint, and planted thickly under bell-glasses on a slight hotbed. They require great attention, and are precarious in their success, but form excellent plants.

Numerous directions have been given respecting composts for carnations. These differ more in words than in material. The following is that generally employed:—Take three barrows of loam, one-and-a-half of garden mould, two of horse-dung, and one of coarse sand; let these be mixed, and thrown into a heap, and turned over two or three times in the winter, particularly in frosty weather. Towards the end of November a barrow-load of lime is added, while hot, to aid in the decomposition of the soil, and to destroy worms. For the varieties which are liable to sport, a poorer compost may be recommended.

The more robust carnations are planted out in beds or singly in the flower garden; but the finer and tenderer sorts are grown in pots of about a foot in diameter. The time of potting is about the end of March. When the flower-stems shew themselves, they are furnished with rods, to which they are tied as they lengthen, to prevent their being broken by the wind or other accident. When the plants begin to expand their blossoms, they are removed to a stage calculated to exhibit their beauties. Some florists attach ligatures of matting to the flower-buds, in order to prevent irregular bursting, and even arrange the petals, by removing distortions with scissors.

New varieties are raised from seed. The seed of the hardier double or semi-double sorts often affords a very beautiful bed of flowers, and should not be neglected by those who have the command of extensive flower gardens.

The *Pink* is considered by botanists as merely a variety of the preceding. It is, however, very distinct in its character, and constant in its habits. It is one of the mechanics' flowers, and is cultivated most extensively in the neighbourhood of some of the manufacturing towns. Its simple elegance does credit to the taste of those who select it for their favourite; and it deserves a place in the garden of the highest as well as of the lowest of the land. Pinks are numerous, growers enumerating about three hundred varieties. Those are preferred which have the limb of the petals nearly entire, and are well marked in the centre with bright crimson or dark purple.

Pinks are mostly propagated by pipings in slight hotbeds or under hand-glasses; and when proper attention is given to the due admission of air, they generally succeed. Rare sorts, which are scantily furnished with grass, are occasionally propagated by layers. This flower does not require such elaborate composts as some others, but it likes fresh light soils, well manured with decayed cow dung. Not more than two years of blooms should be taken from the same bed, and it is the practice of most florists to have a new bed every year. The flower stalks are supported by small sticks. As in the carnation, ligatures of matting, or collars of card, are sometimes applied to the calyces of the flowers: but this practice, however it may be followed by those who judge according to the technical "criteria of a fine flower," will scarcely be adopted by any who have an eye for natural beauty.

It would lead us too much into detail to speak minutely of Calceolaria, Phlox, Chelone, Pentstemon, Œnothera, Roses, Pansies, Cinerarias, Chrysanthemums, Lobelias, Verbenas, Picotees, Hollyhocks, Fuchsia, Petunia, &c., for all these are now considered as florists' flowers. To have them in perfection, they should be kept in beds by themselves; and we are persuaded that, were a moiety of the care bestowed upon some of the preceding flowers, which are conventionally supposed to belong peculiarly to the florist, expended on them, they would amply repay the labour of the cultivator.

BOTANICAL STRUCTURES.

Under this denomination are included those glazed structures dedicated to the cultivation of exotic plants and the production of tropical fruits, which are now generally regarded as indispensable appendages of the flower garden. The former has been in use in this country for nearly two centuries; but the latter is comparatively of recent introduction. The earliest notice we have of either is given by Plato in his Phædon; and after him, Columella speaks of similar structures, as used in Italy in his day, for the cultivation of the plants and trees of India and Arabia. In Seneca we have a description of the application of hot water as a means of securing the necessary temperature. The earliest plant-houses in the north of Europe were those of the botanist Jungerman at Altorf in Saxony; while those of Loader, a London merchant, and the conservatory in the Apothecaries' Botanic Garden at Chelsea, may be noticed as the first structures of the kind in Britain.

The construction of these, however, was ill adapted to the end in view, as they consisted of little else than a huge chamber of masonry, having large windows in front, and the roof was invariably opaque. The next step was taken, when it became fashionable to have conservatories attached to mansions, instead of having them in the *wilderness*, as the pleasure grounds were then denominated. This arrangement brought them within the province of the house-architects, and for nearly a century, utility and fitness for the cultivation of plants was sacrificed, as it is in many cases still, to the unity of architectural expression between the conservatory and the mansion. In other words, the conservatory was made an appendage to the house, and so disguised by massive architectural details, as to form merely a part of it. The admission of light, which is the principal element in plant culture, was completely disregarded, and is so still, when the construction of such houses is extended to those who are destitute of a knowledge of the laws of vegetable physiology.

Garden architecture has now, however, undergone a complete revolution, and such structures are now erected on principles of their own, elegance of design being invariably combined with utility or practical fitness for the purpose of their erection. For this we are mainly indebted to the late Sir George M'Kenzie, and to Messrs T. A. Knight and Loudon, who directed their practical and theoretical skill to details of this subject. The abolition of the duty on glass has greatly aided in carrying out those views, and the improvement in that material has left us little more to wish for. Without going into the details of recent changes, we may briefly state that the smallest extent of opaque surface consistent with stability, and the largest extent of glass, and that of the best quality, are the principal things to be aimed at in such erections. To attain these ends, the early improvers of hothouse architecture dispensed with massive wooden rafters, and expensive framed sashes, and for the most part, with the costly and useless masses of back-walls. In their zeal, however, they unfortunately fell into an opposite error by the employment of metallic substances instead of timber for their roofs. With a greater amount of light thus secured, the conducting power of metal caused a great irregularity of temperature, which it was found difficult to control; and notwithstanding the great elegance of metallic houses, this circumstance, together with their greater cost, and it is feared their limited durability, has induced most recent authorities to give the preference to wood. The combination of the two, however, as in the Crystal Palace of 1851, and more recently in that at Sydenham, shews clearly that, without much variation of heat or loss of light, spaces to any extent may be covered, and houses of any degree of altitude may be constructed.

The next improvement on the curvilinear structures of the authorities above quoted, was the ridge and furrow form, first suggested by the late Mr Loudon, but brought into use by Sir Joseph Paxton. This form, besides presenting better angles to the sun's rays than the antiquated lean-to buildings, has the advantage of being capable of extension to an indefinite extent without side-walls, whereas the other could not be extended in breadth beyond twenty or thirty feet, and even then involved the construction of a back-wall of corresponding height, which often cost as much as the half of the rest of the structure. The span-roof is a modification of the ridge and furrow style, and adapted to small as well as large houses. Figs. 30 and 32 are cross-sections of this style in its simplest form. It is now extremely popular, not only for greenhouses and conservatories, but for fruit-producing houses also. In these it will be observed the superstructure stands on a basement or parapet only two feet and a half in height, and is broken up into panels, better seen in fig. 47, into which glass ventilators are placed for the supply of fresh air, as near the floor of the house as possible, thereby avoiding the evils of cold draughts of frosty or cold dry air blowing in upon the tender foliage. The escape of heated and impure air is through the lanthorn ventilation along the apex of the ridge, the whole of the rest of the structure being a fixture.

When such forms are used as greenhouses, and it is universally admitted that it is the best form for such a purpose, the plants are set on a centre stage or stages, and along the sides, as shewn in the cross-section of the conservatory, fig. 46. When it is desirable to have a perspective view along the centre of the house, the side stages are increased in breadth, leaving an open passage down the middle.

Fig. 44 exhibits a greenhouse upon the old or lean-to principle, the plants being set on a stage reclining towards the back of the house. Plants so situated present only one side to the light, and hence soon become unsightly and one-sided, which no care on the part of the cultivator can remedy, short of turning them round once a day, and even that is attended with great labour and a small amount of benefit.

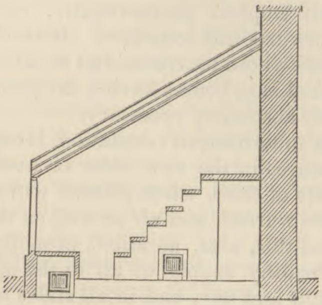
Fig. 44.

The conservatory may be, and often is, built in connection with the mansion, so as to be opened into from the drawing-room or boudoir. In many cases this arrangement has the defect of suffering from the shade of the building, and therefore, where circumstances will admit of it, it may be placed at a convenient distance from the house, and a connection formed by a glass corridor, so that a dry and comfortable communication may be at all times secured. It is also desirable that a conservatory connected with the mansion should be kept gay with flowering plants; and to accomplish this, the plants must be kept in a portable state, so that as they go out of bloom they may be removed to a subsidiary structure, and others brought in to replace them. Hence arises a vital objection to planting out flowers in beds of earth, as is so often done. There are also other objections to this, of a strictly cultural nature.

Conservatories are often with great propriety placed in the flower garden. Fig. 45 is offered as an example of this arrangement, and shews a conservatory constructed for Lord Overstone, in Northamptonshire, under the superintendence of Mr M'Intosh. Fig. 46 is a cross-section of the same. The plants are arranged in pots, placed on highly ornamental cast-iron stages, which occupy the centre, with a passage down the middle, and another crossing the house at right angles with the former, while a third passes round the centre stages, separating them from the elegant plant tables of elaborate casting, which surround the sides and ends of the house. Fig. 45 shews the structure placed upon an elevated terrace, and forming the termination of a long and spacious gravel walk. The basement is of highly polished Yorkshire ashler, richly moulded, panelled, and piered. Within the panels are placed plate-glass ventilators, opening three feet by twelve inches each, and extending all round the structure. The upright sides of the superstructure are constructed of open pilasters filled with plate-glass, one-fourth of an inch in thickness, and eighteen inches in breadth. The fan lights above, which are also moveable for extra ventilation during very warm weather, and the whole of the spaces between the pilasters, is glazed with the same material.

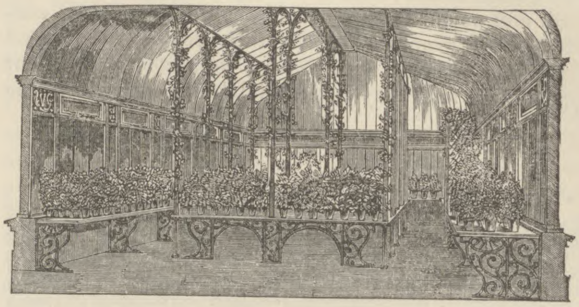
Fig. 46.

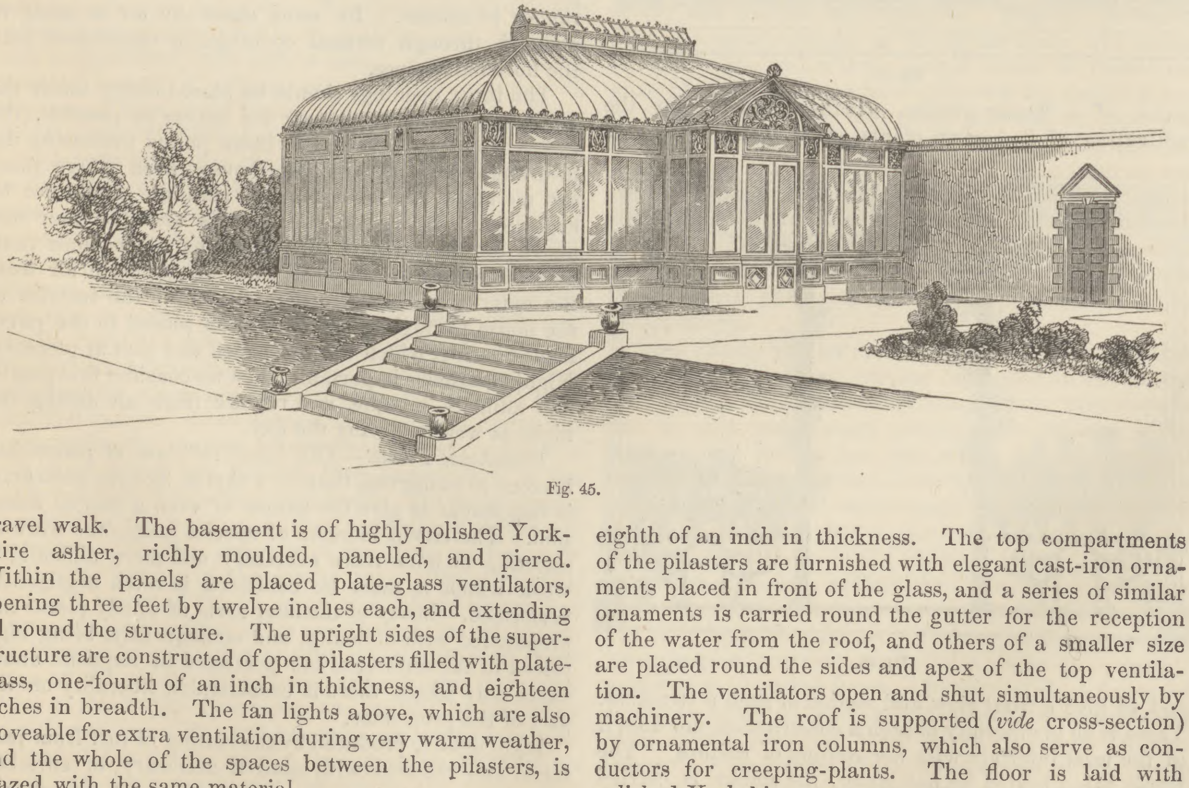
Fig. 45.

The roof is covered with Hartley's patent glass, one-eighth of an inch in thickness. The top compartments of the pilasters are furnished with elegant cast-iron ornaments placed in front of the glass, and a series of similar ornaments is carried round the gutter for the reception of the water from the roof, and others of a smaller size are placed round the sides and apex of the top ventilation. The ventilators open and shut simultaneously by machinery. The roof is supported (*vide* cross-section) by ornamental iron columns, which also serve as conductors for creeping-plants. The floor is laid with polished Yorkshire pavement, and is twelve inches above the level of the terrace walk, admitting of three steps at

Botanical Structures.

the entrance porch. The astragals of the roof are supported by a bar of T or angle iron, which goes round the house, and to it is connected the ornamental upright columns and the arches which spring from them. The columns are anchored to large stones placed below the pavement-floor, thus tying down the roof and supporting it at the same time.

Glass-houses, in any of the forms we have referred to, are infinitely superior to the old shed-looking forms, which have scarcely a redeeming quality. The former are cheaper in construction, in proportion to the accommodation they afford, better adapted to all the purposes of culture, and more elegant in appearance. Ranges of span-roofed houses, having their end or gables facing the south and north, and connected together by a glass corridor either running through their centres, or placed along their northern ends, have a connected and elegant appearance, and may appropriately be placed in the centre of a flower garden, whether intended for the cultivation of flowering plants or of fruits. Figs. 47 and 48 give a front view and section of such a structure. There is no incongruity in such a construction, nor does it in the least interfere with the routine of culture. The whole being heated by hot water, the smoke is carried away in an underground tunnel beyond the precincts of the garden, and the stoke holes, with the coals and ashes, are placed in vaults under ground. Such a range should be placed on an elevated terrace, from two or three feet above the surrounding ground line, and have a broad terrace walk and narrow flower parterre occupying the space between the houses and the extreme parapet wall.

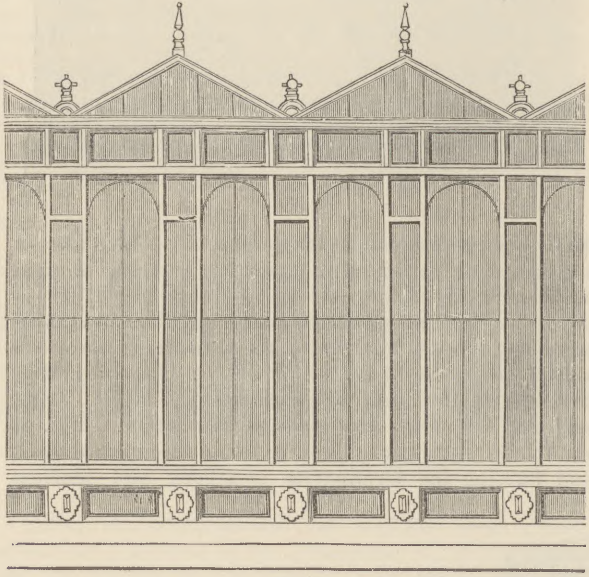

Fig. 47.

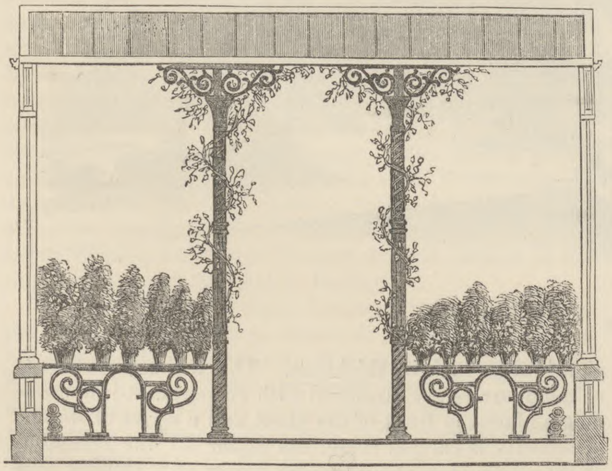

Fig. 48.

Green-house Plants.

The *Plant Stove* differs in no respect from those we have alluded to, except in having a greater extent of hot water pipes for the purpose of securing a greater degree of heat, which tropical plants require, compared with those from extra tropical countries. Indeed, to grow to perfection plants whose native habitat is under the brightness of a tropical sun, houses having the greatest amount of light become absolutely necessary.

Aëration, or subterranean ventilation, is one of the most important features in the new order of hothouse building. The roots of trees, when planted within our glass-houses, require warmth and air as well as the leaves and buds. Beyond this, also, aëration, properly conducted, brings in a healthy supply of air to the atmosphere of the house, night and day, and in all states of the external temperature. This is effected either by vaulting under the borders, or by laying down a system of four-inch drain-tiles, four feet apart, level with the foundations, and covering them, to the depth of eighteen inches, with rubble-stones, brick-bats, flints, &c., and upon these forming the soil borders. These vaults, or air-drains, have a connection with the external air, which, entering them, will diffuse itself through the drains or open joints of the pavement, and thus reach the roots. Vertical openings are also made upwards through the borders, to cause an *in-draught* of atmospheric air into the house, and air so procured has the advantage of being modified in temperature, and charged with humidity during its passage from the external orifice, and thus being in a state of all others the most beneficial to vegetation. The orifices of such air-drains are usually placed in the terrace wall which encloses the gravel walk and parterres, and which should in all cases surround such ranges of houses. In some cases the air is made to descend through vertical openings in connection with the horizontal pipes.

The inner openings should be placed either under the hot water pipes, or as near the boilers as possible, the difference of temperature at these points increasing the in-draught current. In plant-houses, even where there are no borders, this system of aëration should not be neglected. In fig. 45 the floor is elevated four feet above the foundations, thus affording a capacious vault beneath, which is supplied with atmospheric air from the exterior. This air is admitted into the interior of the house through brass ventilators placed in the pavement-flooring, which can be opened and shut at pleasure. Night aëration is important, when we consider that plants, like animals, breathe, and require fresh air during the night as well as during the day.

Greenhouse Plants.—This beautiful class of plants has become so numerous, that, in a sketch like the present, it is impossible to give the names of even a limited selection. The recent increase of species makes the work of selection at once more necessary and more difficult; a work which it must be confessed is often negligently performed. Many of the finer sorts of woody plants are propagated with difficulty, and consequently, being high priced in the nurseries, are possessed in requisite abundance only where there is considerable liberality on the part of the proprietor.

Light mould, produced by the rotting of turf from pastures, and reduced with sand if necessary, or enriched with leaf-mould, is well adapted for most greenhouse plants. Some require a mixture of peat earth; others

Green-house Plants.

thrive only in pure sandy peat. The common mode of propagation is by cuttings inserted in earth or sand, and covered, if necessary, with bell-glasses. A few sorts are increased by grafting or layers. Nearly all may be raised from seed, large quantities of which are annually imported from abroad; and, it may be added, many greenhouse plants ripen their seed in this country.

Many of these plants require shifting and fresh earth twice a year; all of them should be repotted once a year at least. It is the common practice to examine their roots in spring or the early part of summer, and, uncoiling or loosening the matted fibres, to put them into larger pots if necessary. As room is extremely valuable in limited greenhouses, it is desirable that the plants should be kept of a moderate size; and they are, therefore, rather to be under-potted than otherwise. Many of the free-growing plants require to be shifted again in August; at which period of the year it is considered preferable to repot those which require to be disturbed only once a year. During the summer months, a great proportion of the inmates of the greenhouse are placed in the open air, on a spot paved or laid with ashes, to prevent the entrance of earth-worms into the pots, and not too much exposed to winds. Meanwhile, their place in the greenhouse is occupied by balsams and other tender annuals of a showy character. On the approach of winter the plants are again placed under cover. All that is necessary in the management of the greenhouse in winter, is to keep up a steady but very moderate temperature, to preclude the access of damp by regular airing in mild dry weather, and to attend to moderate watering where it may be needed.

Of late years, particular genera of plants have come greatly into vogue, and it would be an omission not to notice some of them. Among the foremost may be mentioned the Pelargonium, with its affinities. This beautiful tribe has varied nearly as rapidly as the Dahlia; to the discomposure of some botanists, whose scientific logic has been brought into jeopardy. Pelargoniums are of easy culture, propagating readily by cuttings, and requiring only to be shifted from time to time. Equal to these in point of beauty of colour, and certainly superior in elegance of form, is the family of Cape heaths, the *Ericæ* of botanists. Of this genus there is said to be 600 species, considerably more than the half of which exist in our collections, and a very great number of hybrids have been raised in Britain, many of which are superior in beauty to the original parents. Many heaths may be raised from seed, which occasionally ripens in this country: the most common mode of propagation, however, is by cuttings, and this in some species is attended with difficulty. Heaths require a peaty soil, and attention in watering. For further information, we may refer to the excellent little treatise of the late Mr M‘Nab of the Botanic Garden, Edinburgh, whose success in this department was quite unrivalled, and in whose hands heaths attained a splendour which, we believe, they never reach in the environs of the Table Mountain itself. The superb genus Camellia is the only other that particularly claims our attention. To the elegance of the finest evergreen it unites the beauty of the fairest rose. The Camellia, though a native of Japan, is not particularly tender, but from some peculiarities in its constitution, its culture requires a considerable degree of attention and care. Cuttings of the single red variety strike freely, and upon these as stocks, the finer sorts are grafted by inarching or side-grafting. The soil generally employed is a mixture of peat and light loam. Care must be taken not to allow the roots to become matted in the pots. The young plants should be shifted at least once a year; when old, and in large tubs, once in two years will be sufficient. It is found beneficial to apply a certain degree of heat while the plants are growing, and till they form flower-buds for the following season. To have Camellias in perfection, a house with a span roof should be appropriated for their reception. There are some splendid collections of this noble plant in the nursery-gardens in the neighbourhood of London, and also in private gardens.

Conservatory and Stove Plants.

Conservatory Plants.—These are composed of a selection from the numerous inmates of the greenhouse. They should be naturally of an elegant form, capable in general of sustaining themselves, and somewhat hardy in their constitution. Many of the Australian plants, particularly the genera Acacia, Banksia, Dryandra, Chorozema, Corræa, Daviesia, Dillwynia, Epacris, Eutaxia, Gastrolobium, Goodia, Gompholobium, Hovea, &c., are well adapted for this purpose. The ascending Proteas of the Cape, and many others of a similar habit, may likewise take their place in this department. To these may be added a few of the hardier Heaths and Camellias, together with Azaleas from Japan, double-flowering Pomegranate, Camphor-laurel, Tea-tree, and some of the varieties of the magnificent and consecrated Rhododendron arboreum. Such climbing plants as Lonicera flexuosa, Passiflora, Cantua, Bignonia, Kennedya, Mandevilla suaveolens, Zichya, Tacsonia, and the trailing Pelargonium. In the management of the conservatory, abundant air should be admitted, and care should be taken not to *draw* the plants; that is, not to cause them to become too tall and spindle-formed by over-crowding. They should be so pruned as to keep them comparatively short and bushy; but after all pains have been taken, the sorrowful time at length arrives, when they either disfigure themselves by pressing against the glass, or must submit to the no less distorting process of a violent amputation. To meet such exigencies, it is recommended that, wherever there is also a greenhouse, a few plants should be kept in training for the conservatory, and substituted in the room of any that become unmanageable. After all, the fourth, fifth, and sixth summers of the conservatory will always be the finest; and when a longer series of years have gone by, and the plants have outgrown the space allotted to them, perhaps the best thing that can be done is to change the whole interior of the house, plants and all. If this operation be anticipated, and for a year or two prepared for, sufficiently large plants may be had in readiness, and the appearance of a well-furnished house be attained in one or two seasons. It is scarcely needful to add, that the neatness which is so desirable everywhere in the flower garden is absolutely indispensable in the conservatory.

Stove Plants.—There are many beautiful plants, natives of tropical regions, which are cultivated in our stoves, but which, from the elevated temperature they require, can be only occasionally visited with pleasure. This may account for the fact that stoves are seldom found except in first-rate gardens, even where the price of fuel is inconsiderable. It is unnecessary to be minute respecting their culture, which is precisely that of greenhouse plants, differing only in the degree of heat. Many stove plants are succulent, such as the Cactus, Aloe, and their congeners, and of course require an arid soil, composed of a little light loam mixed with lime-rubbish or shivers. The compost generally employed consists of 1 part of rotted dung, 1 rotted leaves, 1 heath mould, 1½ loam, and 1 coarse sand, all well mixed together; and the pot filled nearly one-third with shreds, so as to form an effectual drain. Some of the species, such as the Cactus speciosus and Cereus flagelliformis, are improved and made to flower more freely by being kept growing vigorously in the greenhouse during summer, and also by being grafted on the stronger growing species of the same genera. Stove plants thrive best in the tepid vapour peculiar to the equatorial climes. In order to furnish bottom-heat, a pit is prepared in form of a vault, through which hot water is made to circulate in pipes. Over this a bed of small stones or gravel is laid, and in it the pots are plunged, or set on the surface, according to circumstances. On the front shelves are occasionally placed the smaller and younger plants, that part being most accessible to light and air. Small cisterns too are introduced to contain tender aquatics. Along the roof some of the more elegant species of Passiflora, such as P. quadrangularis, may be trained; and through the branches of some of the woody plants, Cuscuta, Combretum, Quisqualis, and other tender climbers, may be allowed to twine themselves. In the pit may be plunged some of the Palms, those princes of plants. In short, there is no end of those numerous tribes, "the potent sons of moisture and of heat," with which the teeming regions of the equator are filled; and no suit of stoves in this country, however extensive, can come up to the wishes of the botanist. The management of this department of floriculture is laborious and trying to the constitution. A strong heat, both in the pit and in the atmosphere, must be maintained; the air must be kept charged with vapour, and the plants require frequent shifting and repotting. To these, if space allowed it, we ought to speak of such structures as are devoted to the cultivation of Orchids, the Camellia, the Geranium, Succulent-plants, and others, as well as of pits in which young plants are nursed and brought forward.

CALENDAR.

January.

Kitchen Garden.—Sow early frame and other early peas in the beginning of the month, and dwarf marrowfats about the end of the month; early mazagan and longpod beans during the first and last weeks; onions on very light soils; as also parsley, if not done in August, on a warm border; short-topped radish in two or three sowings, at a week's interval, in the same situation. In the last fortnight sow hardy green and brown Dutch lettuce.

Plant fruit-trees, if not done in autumn, which is the proper season, in open weather, mulching over the roots to protect them from the drought which may occur in spring. Plant shallot.

Prune all sorts of fruit-trees in mild weather or in moderate frosts, nailing only in fine weather; wash those trees infested with insects, with soap-suds and flowers of sulphur, and tobacco liquor.[1]

Forcing Department.—Prepare for making up hotbeds for early cucumbers and melons, at least where pits heated with hot water is not in use. Sow salads, carrots, and kidney-beans on slight hotbeds. Sow peas in cold frames for transplanting. Force asparagus, sea-kale, and rhubarb, in hotbeds, in pits, in the mushroom-house, or in the open garden by covers surrounded with litter. Give air in fine weather, and water sparingly, in the pinery and cucumber-pit, and to other forcing-houses, according to the progress of the trees. Attend to the forced kidney-beans and strawberries. Give abundance of air to the greenhouse, conservatory, and alpine frame, but little water. Begin to force roses, kalmias, rhododendrons, &c., and hardy flowers and bulbs.

Flower Garden.—Plant dried tubers and bulbs of bordered flowers, if not done in autumn; but roots of the finer florists' flowers ought to be deferred till next month.

Transplant herbaceous plants in light soils, if not done in autumn; also deciduous trees, shrubs, and hedges. Lay edgings in fine weather.

Sow mignonette, stocks, &c., in pots; sow sweet peas, and a few hardy annuals, on a warm border. Give stage auriculas and carnations abundance of air; but keep them rather dry, to prevent damping off.

February.

Kitchen Garden.—Sow beans and peas in the beginning and end of the month; a few early cabbages, to replace the last sowing in August; red cabbages and savoys in the last week. Sow also early horn carrot; Dutch turnip; onions for a full crop in light soils, with a few leeks. Sow chervil and fennel, and lettuce for succession, with radishes and round-leaved spinach, twice in the course of the month; small salads every fortnight.

Plant Jerusalem artichokes, garlic, horse-radish, and early potatoes. Strawberries may be planted about the end of the month. Transplant for seed, if not done before, all the brassica tribe, including cabbage, cauliflower, turnip, &c.; also carrots, onions, beet, celery, endive, leeks, and parsnips. Transplant to the bottom of a south wall a few of the peas sown in November for the first crop.

Prune apricots, peaches, nectarines, and plums, before the buds be much swelled; also apples, pears, cherries, gooseberries, currants, and raspberries, before the end of the month. Finish the dressing of vines, keep the fruit-room free from spoiled fruit, and shut it close.

Forcing Department.—Plant out melons and cucumbers on hotbeds and in pits, sowing more for succession. Sow carrots, turnips, and early celery; cauliflower, to be afterwards planted out. Plant early potatoes on slight hotbeds. Continue the forcing of asparagus, rhubarb, and sea-kale. Pine-apple plants require little water at this season; young plants in dung-frames ought to be kept free from damp. Shift fruiting plants by the middle of the month, if not done in August. Continue the forcing of all sorts of fruits. Those who have not commenced sooner will find this one of the best seasons to begin. Be careful to protect the stems of vines that are outside of the forcing houses.

Let the greenhouse and conservatory have plenty of air in mild weather. Put in an extra quantity, if not done in autumn, of cuttings of Pelargoniums, Fuchsias, Calceolarias, Heliotropes, and Salvias, &c., for the flower garden. Sow stocks, a few tender annuals, and dahlia seed, on a slight hotbed, or in pots.

Flower Garden.—In good weather plant dried roots, including most of the finer florists' flowers; continue the transplanting of hardy biennial flowers, and herbaceous plants.

Sow in the last week mignonette, and hardy annuals, in a warm border, for subsequent transplanting.

March.

Kitchen Garden.—Sow main crops of peas, beans, cabbages, onions, leeks, carrots, parsnips, Brussels sprouts, borecoles, lettuces, and spinach. In the beginning, and also in the end of the month, sow turnips and savoys. In the last fortnight sow asparagus, cauliflower, sea-kale, cardoons, celery, and most of the culinary aromatics, as dill, fennel, parsley. Small salads should be sown every ten days.

Plant early potatoes in the first week, and a main crop during the last fortnight. Jerusalem artichokes, sea-kale, asparagus, and peas, raised in frames, may now be planted. Full crops of cabbages should now be planted out, and cauliflowers under hand-glasses. Propagate by slips the various pot-herbs, as mint, sage, savoy, tansy, &c.

Fruit Garden.—Finish the pruning of fruit-trees before the middle of the month. Protect those coming into blossom. Begin grafting in the third week; dig and dress between the rows of gooseberries, currants, and other fruit-trees, if not already done. Kill wasps when they first appear, for the death of every individual now is equal to the destruction of a colony in autumn.

Forcing Garden.—Proceed with the forcing of melons and cucumbers, giving air, and maintaining the proper temperatures. Examine pine-suckers and crowns, potting those that are kept in tan during winter; repotting those that require large pots, and dressing the roots of such as are sickly; about the middle of the month, shift to the succession pit, and give a top-dressing to the fruiting plants; turn the tan, and add new bark to the pits, to keep up bottom-heat, where such is used. In the vinery and peach-house, attend to the keeping down of insects by watering; and promote the growth of the young shoots, by gentle steaming in the evenings. Sow the seeds of capsicum and tomato.

Greenhouse.—More water may be given than formerly. Sow seeds of greenhouse and hothouse plants; also the different sorts of tender annuals; pot off those sown last month; shift greenhouse and stove plants; plant tuberoses in pots for forcing. Begin to propagate greenhouse plants by cuttings.

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[1] We have deemed it unnecessary to treat separately, or at length, of the means of destroying insects; many of the nostrums recommended proving very inefficient. The wash here mentioned is perhaps the best and simplest for the stems and branches of wall fruit-trees. Some prefer making it of the consistence of paint, and laying it on with a brush. One advice we would tender to all gardeners,—not to be anxious to kill the smaller kinds of the feathered songsters, the soft-billed warblers of the garden, which are often suspected of attacking blossom or fruit, when they are only picking off caterpillars or aphides, their favourite food. In hothouses, the keeping of the walls and frame-work clean, by frequent white-washing and painting, is very important; and much benefit results from occasionally filling them with the smoke of tobacco paper, and then thoroughly syringing.

Flower Garden and Shrubbery.—In the last week, sow hardy annuals in the borders, with biennials that flower the first season; as also perennials. Plant anemone and ranunculus roots. Transplant from the nursery to their final sites annuals sown in autumn, with biennials and herbaceous plants. Propagate perennials from root-slips and offsets. Protect tulips, hyacinths, and choice flowers, from severe weather. In the first week put into heat the finer sorts of dahlias, so as to spring them, and prepare them for propagation by cuttings and by division of the roots. Likewise finish the pruning of all deciduous trees and hedges as soon as possible. Attend to the dressing of shrubberies, laying of turf-edgings, and to the state of gravel walks.

April.

Kitchen Garden.—Sow asparagus, sea-kale, beet, salsify, scorzonera, skirret, carrots, and onions on heavy soils; also peas, beans, turnips, spinach, celery, cabbages, savoys, and German greens, for succession. Sow broccoli and kidney-beans both in the second and in the last week; and small salads should be sown twice or thrice during the month; also all sweet herbs, if not done last month.

Plant cauliflower, cabbages, sea-kale, lettuce; and finish the planting of the main crops of potatoes. Propagate all sorts of pot-herbs, and attend to the hoeing and thinning of spinach, onions, turnips, &c. Earth up cabbages, cauliflower, peas, beans, and early potatoes. Stake up peas; blanch sea-kale and rhubarb in the open air, by covering with straw or leaves.

Fruit-Trees.—No pruning ought to be left undone till this period; stone fruits, in particular, are much injured by spring pruning. If vines have been neglected, rubbing off the buds that are not wanted is safer than pruning. Protect the finer sorts of fruit-trees on the walls.

Forcing.—Continue the preparation of succession beds and pits for cucumbers and melons. Sow gourds and basil. Pot love-apples and capsicums. Attend to the routine culture of the pinery, giving water and air when necessary. In the forcing-houses, from the variable state of the weather, considerable vigilance is required in giving air. Keep down red spider (acarus) in the more advanced houses by frequent syringings. Continue the usual operations of disbudding and thinning of fruit, and take care to keep up the proper temperatures.

Greenhouse.—Still sow all sorts of tender annuals. Proceed with all necessary shiftings. Propagate rare and fine plants by cuttings or grafting. Pot off tender annuals, and cuttings of half-hardy greenhouse plants put in in February for the use of the flower garden.

Flower Garden and Shrubbery.—Sow main or succession crops of annuals of all sorts; half-hardy annuals in warm borders, or on slight hotbeds. Biennials and perennials should be sown before the middle of the month. Plant Tigridia pavonia and fine stocks. Finish the transplanting of herbaceous plants by the end of the first week. Protect stage auriculas and hyacinths from extremes of every description of weather; and tulips from hoar-frosts and heavy rains. Plant out tender deciduous trees and shrubs raised in pots. Remove part of the coverings of all tender shrubs and plants in the first week, and the remainder at the end of the month. Form and repair lawns and grass walks, by laying turf and sowing perennial grass-seeds. Plant evergreens.

May.

Kitchen Garden.—Sow small salads every week; radishes and lettuces thrice; spinach once a fortnight; carrots and onions for late drawing; kidney-beans in the first week and last fortnight. Peas and beans, cauliflowers, cabbages, Brussels sprouts, borecole, broccoli, savoys, and German greens, for late crops. Sow pumpkins and cucumbers on a warm border in the last week. Continue the various operations of hoeing and earthing up the different crops.

Fruit-Trees.—Disbud peaches, nectarines, and other early trees against the walls; also attend to the thinning of fruit. Give occasional washings with the engine to keep down insects. Pick caterpillars from gooseberries and wall trees on their first appearance. Mulch, if not done before, all newly planted fruit-trees, watering abundantly in dry weather. Remove from raspberries and strawberries all suckers and runners that are not wanted.

Forcing.—Plant melons, and cucumbers, and some basil, on the hotbeds prepared for vegetables in February, and now free. Plant out pumpkins on dung-ridges, under hand-glasses. Sow late crops of cucumbers and melons; attend to the various particulars in their culture, heat, air, water, shade, and insects. Go on with the usual culture of the pinery; give abundance of heat and water, keeping down all manner of insects.

Greenhouse.—Turn out hardy plants about the middle, and the more tender at the latter end of the month. Sow tender annuals for succession; potting and shifting those sown at an earlier period. Pot off likewise all rooted cuttings. Put in cuttings of the different desirable species which are now fit for that purpose. Sow a few hardy annuals and ten-week stock, &c., for late crops.

Flower Garden.—Sow annuals for succession; biennials in the last week, in the nursery compartment, for next year. Propagate by cuttings, dahlias, pansies, double wall-flowers, rockets, scarlet lychnis, and lobelias, by dividing the roots. Plant out, during the last week, dahlias, hardy pelargoniums, stocks, and calceolarias, protecting the dahlias from slight frosts. By the end of the month, masses of the following plants may be formed with safety in warm localities:—pelargonium, heliotropium, fuchsia, salpiglossis, nierembergia, salvia, verbena, bouvardia, and lobelia. Protect tulips, ranunculuses, and anemones, from the mid-day sun, from rains, and winds. Remove the coverings from all tender plants in the open air.

Shrubbery.—Transplant all kinds of evergreens this month and September, being the proper seasons. The rarer coniferæ should be planted now and in June, after they have commenced to grow. Proceed with the laying down of lawns and gravel-walks.

June.

Kitchen Garden.—Sow peas and beans for late crops. The kinds used for early crops are likewise best for this purpose. Sow salading every ten days; also carrots and onions for drawing young. In the beginning of the month sow endive for an early crop. In the first week sow turnips for succession; and in the third week for a full autumn crop. Scarlet and white runners for a late crop; cabbages for coleworts.

Plant full crops of broccoli, Brussels sprouts, savoys, German greens, and leeks; ridge out early celery, successional crops of cabbage and cauliflower. In the first fortnight of the month, plant cucumbers for pickling, in a warm border, placing hand-glasses over them. Pull and store winter onions, if ripe.

Fruit Trees.—Train and prune the summer shoots of all descriptions of wall and trellis trees. Standards do not require this, except those are trained *en pyramide* or *en quénouille*. Mulch and water fruit-trees and strawberries in dry weather, desisting from watering as soon as the fruit begins to ripen. Net over cherry-trees, to protect the fruit from birds. Destroy insects by frequent washings, and directing tobacco-smoke against them, or by strewing snuff (or the fine powder of tobacco) over them. In the first week, plant out love-apples in vacant spaces along the bottom of a south wall.

Forcing and Greenhouse Department. Hotbeds and Pits.—Proceed with planting melons and cucumbers raised from seeds and cuttings, for late crops. Keep up the necessary temperatures for ripening of the fruits. Continue the operations in the pinery stated under last month; but, if very large sized fruit be desired, remove the whole suckers from the stem and roots, and apply heat and water in abundance. Shift suckers and succession plants in the beginning and middle of the month, as the state of the plants may require.

Forcing-houses may have the same treatment as stated last month. Little water and abundance of air must be given to those houses where the fruit is beginning to ripen. Those in which the fruit is past, ought to be constantly under a system of thorough ventilation.

The *Greenhouse* will now be occupied with tender greenhouse plants and annuals, and the more hardy plants from the stove, for here they will remain longer in flower. Shift, re-pot, and propagate all plants, fine perennials, biennials, or annuals, and cuttings of all sorts that are desirable. Sow fragrant or showy annuals, to flower in pots during winter.

Flower Garden.—Take up bulbs and tuberous roots, and dry them in the shade before you remove them to the store-room. Fill up with annuals and greenhouse plants those beds from which the bulbs and roots have been raised. After this season, keep always a reserve of annuals in pots, or planted on beds of thin layers of fibrous matter, from which they are easily removed with balls, to fill up any blanks which may occur in the border or parterre. Sow perennials, if neglected last month, to be planted out in the spring. Lay and pipe carnations and pinks in the end of the month.

July.

Kitchen Garden.—In the first week, sow peas for the last crop of the season. In the last week, sow yellow turnip for a full winter crop, and spinach for an early winter supply. Endive, for autumn and winter use, in the beginning and end of the month; also successional crops of lettuce and small salads.

Plant full crops of celery, celeriac, endive, about the middle and end of the month; late crops of broccoli, cauliflower, and coleworts, in the last week. Gather and dry medical and pot herbs; also propagate such by slips and cuttings.

Fruit-Trees.—Continue the summer pruning and training of all wall and espalier-rail trees, with the destruction of insects. Plant strawberries in pots, for forcing next winter. Propagate different sorts of fine fruit-trees, by budding on other trees, or on prepared stocks.

Forcing.—Attend to the pruning of melons and cucumbers, giving air and water, and maintaining heat, &c. Go on with the usual cultivation of the pinery, but withhold water from the plants when the fruit begins to ripen. Have the old plants with suckers on them put into a brisk bottom-heat, giving proper supplies of water: this will increase their size very much, and materially shorten the period of their coming into fruit. The forcing-houses ought to have the same treatment as stated for last month.

In the *Greenhouse*, little alteration will take place in the culture and management from that given for last month; necessary attention being paid to potting, shifting, and putting in cuttings, and giving abundance of water to the potted plants, both in the house and out of doors.

Flower Garden and Shrubbery.—Take up the remainder of tuberous roots, such as anemone, ranunculus, &c., finishing by the end of the first week; fill up their places, and any vacancies that may have occurred, with annuals from the reserve ground. Propagate herbaceous and other plants that have gone out of flower, by means of cuttings and slips; also roses and American shrubs, by laying, budding, or cuttings. Go on with the laying and piping of carnations and pinks; attend to the staking and tying up of dahlias and strong herbaceous plants.

August.

In the *Kitchen Garden*, sow winter and spring spinach in the beginning and about the end of the month; parsley and winter onions, for a full crop, in the first week; cabbages, cauliflower, savoys, and German greens, about the middle of the month, for planting out in spring; lettuce in the first and last week; small salads occasionally; black, Spanish, red and white queen radish, for winter crops.

Plant and earth up celery and endive. A few coleworts may still be planted.

In the *Fruit Garden*, proceed in the training and regulation of summer shoots of all fruit-trees as directed for the three last months. Net up, in dry weather, gooseberry and currant bushes, to preserve the fruit till late in the autumn. Every exertion must now be used by the gardener to preserve the ripening fruits on the walls from insects, and to destroy wasp nests.

Forcing.—The same routine of cultivation in hotbeds and pits may be proceeded in as stated for last month. Sow, and propagate by cuttings, in the beginning of the month, cucumbers, to be afterwards grown in hot water pits, or in boxes in the front of the pinestove, for a winter crop. In the pinery most of the fruit will be cut by the middle of the month, when a general shifting of succession plants will take place; as also a potting of suckers; but these will be strengthened by being allowed to remain on the old plants until the end of this month. In the forcing-houses where the crops are past, part of the sashes may be removed, so as to permit thorough ventilation.

Greenhouse.—Attend to the propagation of all sorts of greenhouse plants by cuttings, and to the replacing in the greenhouse and stoves the more tender species, by the end of the month in ordinary seasons, but in wet weather in the second week. Sow half-hardy annuals, as Clarkia, Schizanthus, Coreopsis, &c., to flower during winter.

Flower Garden and Shrubbery.—Sow in the second and the last week, on a warm border of a light sandy soil, with an east aspect, for planting in spring, Clarkia pulchella and elegans, Coreopsis tinctorea, Œnothera Lindleyana and roseo-alba, Collinsia grandiflora, Schizanthus pinnatus, &c. Auricula and Primula seeds in pots and boxes. Propagate all sorts of herbaceous plants by rooted slips; lay chrysanthemums; take off layers of carnations, pinks, and pansies. Transplant evergreens in moist weather, about the end of the month: and propagate them by layers and cuttings.

September.

Garden.—Sow a few small salads for late crops; lettuce and spinach, if not done last month, for spring crops. Plant endive and lettuce. If broccoli be too strong or tall to withstand the winter, lift them and lay them nearly up to the neck in the earth. Lift onions, and lay them out to win on a dry border or gravel walk. Lift potatoes and store them.

Fruit-Trees, &c.—Finish the summer pruning and training. Assist the maturing of the fruit, and, what is equally important, the ripening of the young wood for next year, of peaches and nectarines on hot walls, with fires during the day. Gather and lay up in the fruit-room with care the autumnal sorts of apples and pears. Plant strawberries for a main crop.

Forcing.—Take care that late crops of melons and cucumbers be not injured by damping, from getting too much water and too little air. In the pinery the usual routine of cultivation may be carried on; in the first week take off and pot all strong suckers, if not done in the middle of last month; the remainder may be taken off at the end of the month, and planted in old tan in a frame or pit prepared for that purpose. In this way they will be found to keep much better over the winter, and to be better supplied with roots than if they had been potted, which ought never to be done after this season. Expel damp, and assist the ripening of late crops of grapes and peaches, with fires during the day. Prune early vines and peaches.

Flower Garden, &c.—Sow in the beginning of this month all half-hardy annuals stated for last month, if not done at that time. Sow also the different species of primula; and the seeds of all such plants as, if sown in spring, seldom come up the same season, but if sown in September and October, vegetate readily the succeeding spring. Continue the propagation of herbaceous plants, taking off the layers of carnations, pinks, pansies, and chrysanthemums, by the end of the month. Plant evergreens; lay and put in cuttings of most of the hard-wooded sorts of shrubby plants.

October.

Kitchen Garden.—Sow small salads and radishes in the first week; mazagan beans and early frame peas in the last week. If the winter prove mild they will be somewhat earlier than those sown next month or in January.

Plant cabbages in beds or close rows till wanted in spring. Cauliflowers in the last week, to receive the protection of frames, or, at any rate, at the bottom of a high wall or hedge in a sheltered situation.

Store potatoes, beet, salsify, scorzonera, skirret, carrots, parsnips, by the end of the month.

Fruit Garden.—Such fruit-trees as have dropped their leaves may be transplanted, for which this is the best season, whether the leaves have fallen or not. Protect fig-trees, if the weather prove frosty, as soon as they have cast their leaves. Cover late crops of grapes on hot walls with woollen nets or mats, to prevent injury from frost. Store and lay up very carefully during the month all sorts of apples and pears, the longest keeping sorts not before the end of the month, if the weather be mild. A part of them may be placed in a close cellar.

Forcing.—Assist hotbeds and pits with fresh linings, to keep up the declining heat of such beds as have not ripened off their crops. Give abundance of air in good weather. Gradually lower the heat of the pinery.

Dress vines and peaches; clean and repair the forcing houses and their flues.

Greenhouse.—Replace all sorts of greenhouse plants. Fill the pits with pots of stocks, mignonette, and hardy annuals for planting out in spring, along with many of the hardy sorts of greenhouse plants. The whole ought to be thoroughly ventilated, except in frosty weather. Begin to force roses, hyacinths, and a few other bulbs, for winter and early spring decoration.

Flower Garden.—Sow a few pots of hardy annuals in a frame, or on a sheltered border, for spring use, as directed for August.

Plant the greater part of the common border bulbs about the end of the month, with a few anemones for early flowering. Transplant strong plants of biennials and perennials to their final situations.

Protect alpine plants, stage auriculas, and carnations, with glass frames; half-hardy greenhouse plants, such as fuchsias, &c., about the end of the month, with coverings of broom or spruce-fir, preferring the latter. Take up, dry, and store dahlias and all tender tubers in the end of the month; pot lobelias and similar half-hardy plants from the open borders.

Transplant all sorts of hardy evergreens and shrubs, especially in dry soils, giving abundance of water. Put in cuttings of all sorts of evergreens, &c.

November.

Kitchen Garden.—Sow early frame peas and mazagan beans, in the second week, for an early crop. Protect endive, celery, artichoke, sea-kale, with stable-litter or ferns; mulch asparagus with hotbed dung; take up endive, late cauliflower, early broccoli, and lettuces, and lay them in an open shed, or in old cucumber and melon pits, which will protect them from frost, and afford a supply during winter. But pits constructed for the express purpose are much better. They should be placed behind a north wall. Force rhubarb and sea-kale in the open border, under boxes or cases, surrounded and covered with well-fermented stable dung. Plant all sorts of fruit-trees in fine weather—the earlier in the month the better. Commence and carry on the various operations of pruning and nailing when the weather may permit. Take off such late sorts of apples and pears as may remain on the trees, and lay them carefully past in the fruit-room; which place will require frequent examination, and the removal of all decayed fruit.

Forcing and Greenhouse.—In hotbeds and pits keep up the requisite degree of heat. Cucumbers and pines, on hotbeds, will require more than ordinary attention, to prevent them damping off from too much moisture. Where a circulation of hot water in pipes is employed for heating, the necessary temperature and dryness are much more under the control of the gardener. Force asparagus, rhubarb, and sea-kale, in the mushroom-house or pits.

In the forcing-houses prune and train the trees; fork over and dress the borders of such houses as have not been already done. Continue the forcing of roses, hyacinths, &c. The directions for the greenhouse and conservatory in January apply also to this month generally.

Flower Garden, &c.—Plant dried tubers of border flowers, but the finer sorts had better be deferred till spring. Protect such half-hardy plants as were not sheltered last month. Plant deciduous trees and shrubs as long as the weather continues favourable, and before the soil has parted with the solar heat absorbed during summer. This is the reason why early autumn planting is so strongly recommended. Dig and dress such flower borders and shrubberies as may now be cleared of annuals and the stems of herbaceous plants.

December.

Kitchen and Fruit Garden.—Sow a few peas and beans, as in November. Very few operations can be carried on during this month, with the exception of trenching and digging in dry weather, operations which should by all means be attended to. The advantages of deep cultivation are now sufficiently acknowledged.

Plant all sorts of fruit-trees in mild weather. Proceed with pruning and nailing wall-trees, whenever an opportunity occurs. Examine the fruit-room every week, removing the fruit found in a state of decay.

Forcing, &c.—The same degree of attention to hotbeds and pits will be necessary as in the last month. Continue the forcing of asparagus, rhubarb, and sea-kale, in pits and in the mushroom-house.

Proceed with the usual routine of culture commenced last month, making the necessary preparations to begin forcing by the last week of this, or the first of next month.

Flower Garden, &c.—The directions for last month will be found equally applicable to this. Rake and sweep leaves from lawns and gravel-walks, repairing the latter as occasion may require.

(P. N.) (C. M'I.)

HOSANNA, a Hebrew word, meaning *Save, we pray.* At the Feast of Tabernacles the Jews carried branches of the palm and myrtle tree, repeating verses 25 and 26 of Psalm cxviii., which begins with Hosanna. The expression became a term of acclamation, and was applied to the prayers of the several days during which the feast lasted. The feast itself was called the Great Hosanna, and more specially the seventh day of the feast.

HOSEA, Book of, a canonical book of the Old Testament, occupying the first place among the twelve minor prophets in the Hebrew, Alexandrian, and Vulgate Scriptures. This position has been vindicated by some from the opening verse, in which are found the words, "The beginning of the word of the Lord;" but it is more probable that it was assigned to Hosea from the greater extent, and perhaps the peculiar national character, of his book. The tribe to which the author belonged has been matter of question. Maurer pleads for Judah, and—(1.) takes the case of Amos, as showing that a Jewish prophet might be sent to Israel; (2.) appeals to the mention by Hosea of Uzziah, Jotham, Ahaz, and Hezekiah, kings of Judah, as showing that he regarded these as his sovereigns, and must therefore have belonged to Judah. It is replied (1.) by Credner, that the case of Amos is peculiar, and was regarded as such (*Amos* vii. 12), and cannot therefore be made the ground of an argument in the present case; and (2.) by Hengstenberg, that the separation of Israel from Judah during the theocracy could not have been regarded by the inspired prophet as anything but rebellion against the House of David, to whom the promises were made; that, accordingly, in the sight of God, Israel and Judah (the twelve tribes) were regarded as one religious confederation by Hosea, as they were by Elijah, when he took the *twelve* stones, one for each tribe; (3.) also, by Hengstenberg, that, in a chronological point of view, it was important to make the reference to the successors of Uzziah, because confusion existed at this time in the Israelitish chronology owing to interregna. The majority of commentators—such as Rosenmüller, De Wette, Eichhorn, Hengstenberg, and Uhland—adopt the opinion that Hosea was an Israelite. The probable period of his prophetical career has been made out as follows:—

During Uzziah's reign	26 years.
... Jotham's	16
... Ahaz's	16
... Hezekiah's	2
	60

Some, however (as Horsley), make the period longer; others (as Rosenmüller) make it shorter. The style of Hosea is abrupt, and often obscure; abounding in idiomatic and anomalous expressions and phraseology. His prophecies are mainly directed against Israel, whose history during his career was one dark tissue of robbery, assassination, and usurpation amongst the higher, and very general degradation amongst the lower ranks of the people. The command of God to the prophet to take to himself a wife of whoredoms, and beget children of whoredoms, has given rise to much difference of opinion:—(1.) Was it real? Cyril, Theodoret, Basil, Augustine, Grotius, Houbigant, Horsley, and Stuck, believed it to be so. (2.) Was it an allegory? It was so considered by the Chaldee paraphrast, Jerome, Drusius, Bauer, Rosenmüller, and South. Or, (3.) Was it a vision? So thought Maimonides, and some others. In any case, it is allowed that the transactions were of a typical character. Hengstenberg's explanation is substantially that the transactions are allegorical. The leading objection to the literal interpretation is, that the events must have spread over a period of several years, which would have been fatal to the impressiveness of the lessons intended to be taught.

HOSPITAL, Hospitale, in cloisters, the place of shelter for strangers, whether rich or poor; thus equivalent to our hotel, the *Xenodocheion* of the Greeks, the *Hospitium* of the Romans. The *hospitalia* of the Romans correspond with our inns. They were small erections on the right and left of the main house. In Greece, a person who had done any great public service might be rewarded with money and provisions, but he required to look after a place of abode himself. Bearing some resemblance to our present hospitals were the public buildings for the aged women of Delos, built on the island called Rhene; and those buildings which, at a later period, were erected near the temple of Æsculapius, for sick persons coming in search of health. It was possibly a similar institution which Antoninus built at Epidaurus. Another appears to have existed on the island of the Tiber at Rome, to which sick slaves were brought to be healed. *Bethesda* (house of mercy), with five porches, was a place in Jerusalem to which the sick were brought to await the moving of the waters. Also the *Taberna Meritorum* at Rome appears to have been an hospital for invalids.

Hospitals for the poor and sick are prominently characteristic of Christianity. So early as the Council of Nice, A.D. 325, they are spoken of as commonly known. The first celebrated hospital was that of Cæsarea, A.D. 370–380, richly endowed by the Emperor Valens. It was of immense dimensions. After it followed the hospital of Chrysostom, at Constantinople. In the ninth century there were 24 hospitals in Rome alone. A foundling hospital was first established at Milan, A.D. 787; a lazaretto about the same time in Constantinople; and an orphan hospital in the same city, A.D. 1090, by Alexius I.

Hospitals are now universally established in all parts of Christendom, and appropriated for all classes of the community, and for all kinds of diseases. The great hospitals of London, Edinburgh, Dublin, Paris, &c., are described under these towns respectively.

HOSPITALLERS, or Knights of Malta. See Knighthood, *Orders of*.

HOSPODAR, a title borne by the governors of Wallachia and Moldavia. Although nominated by the Porte, they possessed absolute power within their own dominions. Formerly they were chosen from the Greeks of Phanar, but lately they have been taken from amongst the native boyards or nobles. By the treaty of Adrianople in 1829, the Principalities were placed under Russian protection, and from that time till the treaty of Paris 1856, the Hospodars were virtually the nominees of Russia.

HOST, from *hostia*, a victim offered in sacrifice. In the service of the Church of Rome, the consecrated wafer is called the host. See Sacrifice.

HOTTENTOTS. See Africa.

HOTTINGER, Johann Heinrich, an eminent Swiss orientalist and biblical scholar, was born at Zurich in 1620. At the gymnasium of his native town, he distinguished himself so much that the curators determined to supply him with the means of pursuing his studies at the best foreign universities. He first settled at Groningen, and afterwards at Leyden, where he became assistant to Golius, the best orientalist of that age. He also took lessons in Arabic and Turkish from Ahmed Jon Ali, a Mohammedan, from Morocco, of whom he often speaks in his works. Golius had hoped to take his pupil with him to the East, but the senate of Zurich interfered, and Hottinger, after visiting France and England, returned home. In 1653, the chairs of rhetoric, logic, and scriptural theology were offered him, and he had only filled them for two years, when, at the urgent request of the Elector Palatine, he was allowed to remove to Heidelberg for three years. He there taught the Eastern tongues and biblical criticism with such success and distinction, as to revive and spread the fame of the university. Prolonging his stay in the Palatinate till 1661, he returned to Zurich in that year, and was made rector of the university. His reputation still continued to increase, and in 1667 he received such flattering offers from Leyden, that he resolved to accept them. Before setting out for this new sphere of labour, he went to visit a small property which he possessed a few miles from Zurich. In crossing the Limath, the boat in which he was seated, with his wife and family, was upset, and Hottinger, who might have preserved his own life, was drowned in attempting to save that of his wife.

Hottinger's principal works are,—*Exercitationes Anti-Morinianæ de Pentateucho Samaritano*, Zurich, 1644, in 4to; *Erotematum Linguæ Sanctæ libri duo, cum Appendice Aphorismorum*, ibid. 1647; *Thesaurus Philologicus, seu Clavis Scripturæ qua quidquid fere Orientalium, Hebræorum maxime et Arabum habent monumenta de Religione ejusque variis speciebus, Judaïsmo, Samaritanismo, Muhamedismo, Gentilismo*, &c., ibid. 1649; *Historia Ecclesiastica Novi Testamenti*, in nine parts, 1651–1667; *Historia Orientalis ex variis Monumentis Collecta*, ibid. 1651, in 4to; *Grammaticæ Chaldæo-Syriacæ libri duo*, ibid. 1652; *Analecta Historico-Theologica, octo Dissertationibus proposita; Dissertationum miscellanearum Pentas*, ibid. 1654, in 8vo; *Dissertatio de Subsidiis Analyseos Sacræ, ubi prolixe de Sensu Verborum Institutionis Cœnæ Dominicæ*, ibid. 1654, in 8vo; *Juris Hebræorum leges* 261, *juxta Legis Mosaïcæ ordinem ac seriem depromptæ; Smegma Orientale sordibus barbarismi contemptui præsertim Linguarum Orientalium appositum*, Heidelberg, 1657, in 4to; *Grammatica Ling. Hebr. Chald. Syr. et Arabicæ Harmonica*, ibid. 1657; *Cippi Hebraïci*, ibid. 1659, in 8vo; *Primitiæ Heidelbergenses*, ibid. 1659; *Dissert. Theolog. Philolog. fasciculus*, ibid. 1660; *Etymologicon Orientale, sive Lexicon Harmonicon Heptaglotton*, 1661, in 4to; *Epitome utriusque Juris Judaïci, Aphorismis Maimonides exhibita*, ibid. 1661; *Compendium Theologiæ Christianæ Ecclesiarum Orientalium, Syrorum cum primis, Æthiopum, Arabum, et Ægyptiorum; Compendium Theatri Ismaelitici sive Saracenici*, ibid. 1662, in 8vo; *Bibliothecarius tripartitus*, Zurich, 1664, in 4to.

HOUBRAKEN, Jacob, an eminent engraver, was the son of Arnold Houbraken, a native of Holland, and was born Dec. 25, 1698. For some time he worked in obscurity, and had attained the meridian of life before he engaged in the undertaking by which he is best known; a work founded on a plan of George Vertue, who proposed a series of engravings of the greatest men of ancient and modern times. The persons who brought out this great national work were the Knaptons, who employed both Vertue and Houbraken, but chiefly the latter. Some of Houbraken's heads were carelessly executed, especially those of the moderns; but others display a wonderful union of softness and freedom, with good drawing, and a masterly determination of the features, such as are shown in the works of Nanteuil, Edelink, and Drevet. In his desire to avoid the appearance of an outline, he frequently neglected the little sharpnesses of light and shadow which appear in nature, and please, like the accidental semitones in music, in proportion as the variation is judiciously managed. For want of attention to this essential beauty, many of his prints have a hazy appearance, and do not strike the eye with the force which might be expected from the excellence of the engraving. Houbraken lived to a good old age, and died at Amsterdam in 1780. No complete set of Houbraken's prints is now extant, in this country at least. The last that was known to exist was the property of the Duke of Buckingham, but it was broken up and dispersed at the great sale at Stowe in 1848.

HOUGHTON-LE-SPRING, a market-town of England in the county of Durham, and 6 miles N.E. of the town of that name. The inhabitants are chiefly employed in the coal-mines and iron-works. The parish church is a cruciform edifice in the early English style. There is a free grammar-school founded in 1574. Pop. (1851) 3224.

HOUND.

From the combination of various causes, the history of no animal is more interesting than that of the dog. First, his intimate association with man, not only as his valuable servant and protector, but as his constant and faithful companion throughout all the vicissitudes of life. Secondly, from his natural endowments, not consisting solely in the exquisite delicacy of one individual sense, that fineness of olfactory nerve which enables him to follow his master or to track his victim; not merely combining memory with reflection that soars above instinctive preservation or self-enjoyment; but qualities of the mind that absolutely stagger us in the contemplation of them, and which we can alone account for in the gradation existing in that wonderful system which (by different links of one vast chain, extending from the first to the last of all things, till it forms a perfect whole) is placed, as Professor Harwood elegantly expresses it, "in the doubtful confines of the material and spiritual worlds." It might have been instinct that enabled Ulysses' dog to recognise him on his re-landing in Ithaca, after an absence which must have set the powers of memory at defiance; and he recognised him with all the acuteness and affection which instinct boasts; *but what caused him to expire at his feet on the sudden dawn of unexpected happiness?* The heart of man could go no further than this; and although perhaps the poet's fiction is only present to us in this instance, by what name can we call those tender affections, those sincere attachments, those personal considerations, which we ourselves have witnessed in these faithful creatures towards human kind? Virtue alone is too cold a term, as almost every good quality to be found in animated nature is to be found here; and when we reflect upon the miserable existence so often the lot of this kind-hearted animal in this world, and the more than uncertainty that, as Byron says, he will be

> "Denied in heaven the soul he held on earth,"

we cannot but feel regret that he should be without his reward. But yet this is a point not exactly decided upon by man; at least it has been considered as a fit subject for speculation by deep and able thinkers. Locke, for example, doubted whether brutes survive the grave, because there is no hint given of it in revelation; but Dr Priestley thought, if the resurrection of the dead be within the proper course of nature, and there be something remaining of every organized body that death does not destroy, there will be reason to conclude that they will be benefited by it as well as ourselves. "The misery," says this forcible writer, and great moral philosopher, "some animals are exposed to in this life, may induce us to think that a merciful and just God will make them some recompense hereafter."

But no animal has met with more variety of respect shown towards him than the dog has. By the law of Moses he was declared unclean, and was held in great contempt by the Jews, as also by the Turks, and kept by both merely for the purposes of scavenging their streets. In every part of the sacred writings, as also in those of Greece and Rome, not only are images introduced from the works of nature, and metaphors drawn from the manners and economy of animals, but the names of them are applied to persons supposed to possess any of their respective qualities. Thus our Saviour, adopting this concise method, applies the word "dog" to men of odious character and violent temper; and, as with us at present, the term of reproach, "he was a son of a dog," was in common use among the Jews. The wife, Abigail (1 Samuel xxv. 3), "was a woman of good understanding, and of a beautiful countenance; but the man (Nabal) was churlish and evil in his doings, and *was of the house of Caleb.*" Literally it is, "he was the son of a dog." The Egyptians, however, held the dog sacred, and were reproached with worshipping him in their god Anubis, as Juvenal complains in his fifteenth satire:

> "Oppida tota Canem venerantur, nemo Dianam,"

—although hieroglyphic researches now show the head of this deity to have been that of a jackal, not that of a dog. Anubis, says Strabo, is also the city of dogs, the capital of the Cynopolitan prefecture. "Those animals," says he, "are fed there on sacred aliments, and religion has decreed them a worship." This absurd adoration is confirmed by Diodorus Siculus and Herodotus; and Rome having adopted the ceremonies of Egypt, the Emperor Commodus, when celebrating the Isiac feasts, shaved his head, and himself carried the dog Anubis.

We have good reason to believe that England (in a great measure from the congeniality of its climate) has long been famous for dogs, which, on the authority of Strabo (lib. iv., p. 199), were much sought after by all the surrounding nations. So high indeed in repute were British dogs amongst the Romans after the reduction of our island, not only for excellence in the chase, but fierceness in the combat, that an officer from that country was appointed to reside in the city of Winchester, for the express purpose of collecting and breeding them to supply the amphitheatre, as well as the imperial kennel, at Rome. Nor was this all. As a kind of earnest of our present celebrity in the various sports of the field, all the neighbouring countries, as Dr Campbell remarks, "have done justice to our dogs, adopted our terms and names into their language, received them thankfully as presents, and, when they have an opportunity, purchased them at a dear rate."[1] Thus we find, that when King Alfred requested Fulco, archbishop of Rheims, to send some learned ecclesiastics into England, he accompanied his letter with a present of several dogs, being the most valuable he could, in those times, bestow. The congeniality of our climate has contributed much to this excellence, as our dogs, hounds especially, are found to degenerate in most others; which Somerville alludes to in his poem of the *Chase.*

> "In thee alone, fair land of liberty,
> Is bred the perfect hound, in scent and speed
> As yet unrivall'd, while in other climes
> Their virtue fails, a weak degen'rate race."

We do not benefit much by research into ancient authors on the subject of dogs; for although they have been much written upon, and immortalized in song by Oppian, Claudian, Gratius, and others (Virgil says little about them), yet, from our ignorance of the sort of animal bred in their time, and the use they made of them, *as sportsmen*, we can draw no parallel between them and our own that would tend to a good purpose. No doubt the "canis *vestigator*" of Collumella, and the "canis *odorus*" of Claudian, were of what we term a low-scenting sort, as the epithets applied to them signify; but it would be difficult to pronounce an opinion upon the καστόριαι, or the ἀλωπεκίδες, of Xenophon, although the characteristic properties of good hunting hounds are very well and accurately laid down by him in the third chapter of his Κυνηγετικος, as well as their defects in form, &c., equally clearly exposed; and his observations on these points might be perused with advantage by huntsmen of the present day.

Great encouragement has been given to the breeding of hounds in England by the various monarchs who have reigned over it. Henry II. was perhaps the first who made himself conspicuous in this department of the sportsman's occupation, being, as one of his historians says of him, "particularly curious in his hounds, that they should be fleet, well-tongued, and consonous." The last epithet is in reference to a property not only little regarded, but nearly lost now, namely, the deep tongue of the old English bloodhound, which Shakspeare alludes to in his celebrated description of those "of the Spartan kind"—

> "So flewed, so sanded, and their heads are hung
> With ears that sweep away the morning dew.
> Crook-knee'd, and dewlapt, like Thessalian bulls;
> Slow in pursuit; but match'd in mouth like bells,
> Each under each:"

which would now be considered a disgrace to any man's kennel, and we believe nowhere to be found bearing the faintest resemblance to the picture drawn of them by this master-hand.

In Queen Elizabeth's time a classification was made by Dr Caius, physician to the queen, in his treatise *De Canibus Britannicis*, of the different kinds of dogs peculiar to Great Britain; but many of the names (the sleute or sleuth hound of the Scotch, for example) having since become obsolete, they were again classed by Mr Daniel, in his *Rural Sports*, which work contains a full and satisfactory historical account of their origin, different crosses, &c., under the following genealogical heads:—Shepherd's Dog, Iceland Dog, Lapland Dog, Siberian Dog, Hound, Terrier, Large Spaniel, Small Spaniel, Water Dog, Small Water Dog, Bull Dog, Large Danish Dog, Irish Greyhound, English Greyhound, and Mastiff. Taplin, in his *Sporting Dictionary*, expresses his surprise that the Pointer is omitted; but we consider the Pointer as a dog of foreign extraction, and to our early ancestors certainly unknown.

The original stock from which English hounds have been bred would be very difficult to determine upon; but one thing is certain—namely, that the several sorts with which the country once abounded have been becoming fewer and fewer in the course of the last hundred years, and now centre in three varieties,—namely, the fox-hound, the harrier, and the beagle. The stag-hound is gone, at least there is no pack of stag-hounds now kept in Great Britain, the last having been disposed of and sent abroad soon after the stag-hunting establishment in Devonshire was broken up, a few years ago. The beagle is also become rare; and otter-hounds, such as we may conclude the καστόριαι of Xenophon to have been, never existed in this country, the dog used in hunting the otter being the common harrier; and perhaps the parent of all, the majestic blood-hound, whose

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[1] Campbell's *Political Survey*, vol. ii., p. 205, note D.

> "Nostrils oft, if ancient fame sings true,
> Trace the sly felon through the tainted dew,"

is at present very thinly scattered, here and there only, at keepers' lodges in some of our royal forests. But we more than doubt whether a true specimen of the original English blood-hound exists in England at all at the present day; nor is this a matter of regret, as, unlike the rest of his species, his character is said to be that of decided enmity to man. Strabo describes an attack upon the Gauls by these animals, and likewise says they were purchased in Britain by the Celtæ for the purposes of war, as well as those of the chase; but it is doubtful whether the most savage of this race would devour man without being trained to it, which we know that they were on a late horrible occasion, when, as stated in Rainsford's *History of St Domingo*, they were fed upon blood; and a figure representing a negro, containing blood and entrails of beasts, was the object they were led to pursue. In the West Indies the blood-hound was reared and kept solely for following the track of runaway negroes, as the sleuth-hound of the Scotch was early applied to discover the haunts of robbers; and to the same purpose also on the confines of England and Wales, where the borderers preyed on the flocks and herds of their neighbours whenever an opportunity offered. Of deer-stealers, who were so numerous a century or two ago, they were likewise the terror; and well might they have been so, for when once fairly laid upon the foot of one, they seldom failed to hunt up to him. But it is in the civil wars of our own country that blood-hounds are placed in the most conspicuous light, when used to reveal the hiding-places of Wallace and Bruce; and the poetical historians of the two heroes allude to their services to their masters, as well as to the escapes they had from those of their various enemies.

The distinguishing features of the English blood-hound are long, smooth, and pendulous ears, of from eight to nine inches in length, with a wide forehead, obtuse nose, expansive nostrils, and deep flewed, with an awfully deep but highly sonorous tongue. The prevailing colour is a reddish tan, darkening to the upper part, often with a mixture of black upon the back, and extending over. In short, the deep-flewed southern hare-hound, now almost extinct in England, very nearly resembles the English blood-hound in form and colour; and a person may picture to himself the latter, by supposing an animal considerably larger than the old southern hound. In height he is from twenty-six to twenty-eight inches, and sometimes more; but he is very seldom to be found except in the neighbourhood of a deer-park, where he is kept to track venison stealers. "Associations for the prosecution of felons" also keep them to assist in sheep-stealing cases. The Duke of Bedford has some fine specimens of this kind of dog, whose pedigree can, it is affirmed, be traced back for 300 years. Lord Yarborough's breed is also very famous, and it was very much improved about 1840 by a cross with Lord Fitzwilliam's "Bellman," who was considered to be to blood-hounds what "Furrier" and "Trogan" were to fox-hounds. Modern blood-hounds are rather deficient in the head, lips, and ears, but still they are very handsome, and swifter of foot than their ancestors. The blood-hound of the West Indies is also about the same height, but differs much in form. He has small, erect ears, the nose more pointed, and the hair and skin hard. His countenance is ill-featured and ferocious; and although not so heavy as the English blood-hound, he is quite as muscular, and very active. The distinguishing property of the blood-hound consists in his never changing from the scent on which he is first laid; and he will hunt by the shed blood of a wounded animal as truly as he will by the foot.

The Stag-Hound.

The English stag-hound, now nearly gone, is little more than a mongrel blood-hound; at least it is reasonable to conclude, that the cross which produced him was directly from the English blood-hound with some lighter animal of a similar species (perhaps a greyhound, or lurcher) approximating his form, to which conjecture his figure and disposition, as well as his *comparative* inferiority of scent, appear to add strength. It is asserted in the *Sportsman's Cabinet*, that the stag-hound "was originally an improved cross between the old English deep-tongued southern hound and the fleeter fox-hound, grafted upon the basis of what was formerly called, and better known by the appellation of blood-hound." But this assertion must have been made without proper reflection; for, in the first place, a cross between the deep-tongued southern and the fox-hound will not produce an animal nearly so large or so strong as the stag-hound; and, secondly, the stag-hound was known in England long before the fox-hound was made use of, or, indeed, before there was an animal at all resembling the one which is now known by that term.

We confess we regret the prospect of the total extinction of the English stag-hound, which, although his form possessed little of that symmetry we now see in the English fox-hound, was a majestic animal of his kind, and possessed the property peculiar alone to the blood-hound and himself, of unerringly tracing the scent he was laid upon, amongst a hundred others; which evinces a superiority, at all events a peculiarity, of nose entirely unknown to our lighter hounds of any breed. The want of being able to distinguish the hunted fox from a fresh-found one is the bane of English fox-hunting; and there are not wanting those who think, that in the breeding of the modern fox-hound, the minor points of high form and blood are more frequently considered than they should be, in preference of a regard to nose.

The Fox-Hound.

The English fox-hound of the present day is a perfect living model; but how he has become such, it is in no one's power to determine. Although we do not like to apply the term of mongrel to an animal we so highly respect, yet

there can be no doubt of his being one of a spurious race, engrafted with care on the parent stock, namely, *the old English blood-hound.* There is, we believe also, no doubt that a century and a half ago there was no animal in the world resembling the present breed of fox-hounds; and that the fox, when hunted at all in Great Britain, was hunted by a dog much resembling what is now known as the Welsh harrier, rough-haired and strong, but of very far from sightly appearance. As all animals, however, improve under the care and guidance of man, until at length they assume the character of a distinct breed; such has evidently been the case with hounds, the breeders of which have, by going from better to better in their choice of the animals from which they have bred, progressively arrived at the perfection we see in them. And such has been the case with all our domestic animals, the breeders of which have alone attained their ends by the choice of individuals of the highest excellence in their kind, and by a judicious selection of size, form, and qualities likely to produce the result. There can be no doubt, then, but that by pursuing this course throughout a number of generations with the hound, an animal has been produced of what may be called quite a new variety in the canine race, answering the description and purposes of our present fox-hound. But the questions may be asked, Whence the necessity for this change, and forcing, as it were, nature from her usual course? Why not be content with the low-scenting, plodding hounds of our forefathers, which, from the superiority of their nose, not only displayed *hunting*, in the strict acceptation of that term, to the highest advantage, but very rarely missed the game they pursued? These questions are satisfactorily answered in a few words; first, as the fox is not now found by the drag, and the number of those animals is so greatly increased, the necessity for this extreme tenderness of nose does not exist; and, secondly, by reason of the blood of the race-horse having gradually mixed with that of our hunters, the sort of hound we have been alluding to was not found to be adapted to their increased speed; and particularly as, in proportion as nature lavished this fine sense of smelling on the old-fashioned hound, was he given to "hang" or dwell upon the scent, thereby rendering the length of a chase (which, to please the present taste, should, like Chatham's battle, be "sharp, short, and decisive") beyond the endurance of a modern sportsman. It is true Mr Beckford, in his *Thoughts upon Hunting*, gives an instance of a pack of old-fashioned hounds, which ran in a string, as it were, one following the other, and yet killing twenty-nine foxes in twenty-nine successive runs, each fault being hit off by an old southern hound. But what would our hard-riding, modern sportsmen think of this as pastime? Nevertheless, all who witnessed, as we have done, the style of hunting of the Devonshire stag-hounds, will remember that there was a close similarity between them in chase, and the pack Mr Beckford speaks of. But, as the same eminent author afterwards observes, it is the dash of the fox-hound of the present day that distinguishes him from all others of his genus, and hounds must now "carry a head."

The breeding a pack of fox-hounds to a pitch bordering on perfection is a task of no ordinary difficulty; the best proof of which is to be found in the few sportsmen who have succeeded in it. Not only is every good quality to be regarded, and if possible obtained, but every fault or imperfection to be avoided; and although the good qualities of hounds are very soon reckoned, their faults in shape and performance present a longer catalogue. Independently of shape, which combines strength with beauty, the highest virtue in a fox-hound is not in the exquisiteness of his nose, but in his being true to the line his game has gone, and a stout runner to the end of a chase. But he must not only thus signalize himself in chase; he must also be a patient hunter, with a cold scent, or with the pack at fault. In short, to be a hard runner and a good hunter, and steady on the line, which "a good hunter" implies, constitutes a perfect hound, when combined with good form.

The faults of hounds, too often innate, can only be cured by education. The greatest of all are, skirting, or not being true on the line, and throwing the tongue improperly; first, without a scent, which is known by the term babbling; secondly, not throwing it at all, or running mute; and, thirdly, on a wrong scent, which is called running riot. The latter, however, is the least vice of the two, because generally curable by the lash; but the fault of skirting is too often innate; at all events, too often incurable. Thus has the breeder of the hound to guard against propensities as well as faults; and a late accredited writer on the subject says, "In modern times, the system of hunting is so much improved, so much more attention is paid to the condition of hounds and their style of work, that in this enlightened age a master of hounds thinks it a reflection on his judgment if *one* hound in his pack is detected in a fault."[1]

The selection of dog and bitch to breed from is a nice point for a master of hounds, or his huntsman, to decide upon; but if he aim at excellence, he must keep his eye on perfection. In no animal is perfect symmetry so desirable as in a fox-hound, for without it there is no dependence on his services, however good may be his nature. We will first describe him in the words of a very old writer, and afterwards in those of Mr Beckford, when it will appear that there is a strong resemblance in the portraits drawn by each. "His head," says the former, "ought to be of middle proportion, rather long than round; his nostrils wide; his ears large; his back bowed; the fillets great; the haunches large; the thighs well trussed; the ham straight; the tail big near the reins, and the rest slender to the end; the leg big; the sole of the foot dry, and formed like a fox's, with the claws great." The latter says, "There are necessary points in the shape of a hound which ought always to be attended to; for if he be not of perfect symmetry, he will neither run fast nor bear much work; he has much to undergo, and should have strength proportioned to it. Let his legs be straight as arrows; his feet round, and not too large; his shoulders back; his breast rather wide than narrow; his chest deep; his back broad; his head small; his neck thin; his tail thick and brushy; if he carry it well so much the better." Now the hound that would answer to either of these descriptions would disgrace no man's kennel, and one resembling the latter would be an ornament to it; but with regard to the former, it must be borne in mind, that it is from the pen of a sportsman who wrote a century and a half ago, when, as has been before observed, there is reason to believe no animal in the perfect form of the modern fox-hound was to be found in this or in any other country. Judges of the animal, however, will be disposed to think with us, that there is much of the real character of the *hound* in the sentence we have quoted from this old writer; such as the long rather than round head; the wide nostrils (Pliny says they should be flat, solid, and blunt); and the dry fox's foot. But the "bowed back" appears to spoil all, unless by it is meant that gentle rise in the loins which the judge of hounds admires, and without which the late Mr Chute of the Vine, in Hampshire, who hunted that country for more than thirty years, gave it as his opinion, no hound was able to maintain his speed for an hour over hilly and *ploughed* countries when "it carries;"—a technical term for the earth clinging to the foot, which it will do after a slight frost on the preceding night; necessarily adding much to the natural weight of the hound. Beckford gives us the modern fox-hound, and perfect, with the exception of the mention of one or two material points. "His chest should be deep," says he, "and his back broad;" but he has omitted a point much thought of by the modern sportsman, namely, *the back ribs*, which should also be deep, as in a strong-bodied horse, of which we say, when so formed, that he has a good "spur-place," a point highly esteemed in him. Nor is either of these writers sufficiently descriptive of the hinder legs of the hound; for although the "large haunch and well-trussed thigh" of the former denote power and muscle, nevertheless there is a length of thigh discernible in first-rate hounds, which, like the "well let-down hock" of the horse, gives them much superiority of speed, and is also a great security against laming themselves in leaping fences, which they are more apt to do when they become blown, and consequently weak. The fore legs "*straight as arrows*" is an admirable illustration of perfection in those parts, by Beckford; for, as in a bow or bandy legged man, nothing is so disfiguring to a hound as his having his elbows out, which is likewise a great check to speed. In some countries the round, cat-like foot is indispensable, and agreeable to the eye in all; but we would not reject a well-shapen puppy in other respects for somewhat of an open foot, provided his ancles or fetlocks were good, *a point we consider of the greatest consequence to all quadruped animals.* The shoulders of the fox-hound should resemble those of the horse—oblique, but at the same time strong; for a narrow-chested hound is almost certain to get shaken by hard work, and consequently unlikely to endure beyond his third season.

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[1] Colonel Cook's *Observations on Fox-hunting*, &c.

As Beckford recommends the small head, we may presume the form and fashion of this point began to be changed in his time, and has, we think, been carried to too great an excess in the fox-hound of the present day, particularly in one or two kennels (the Belvoir, for example), where very short, as well as small heads, were a leading characteristic. For ourselves, we like some length of head in the fox-hound, not being able to divest ourselves of the idea of a cross with the pointer when we see him with a short head and a snubbed nose. Beckford also says the neck should be thin. We would add, *moderately thin.* We dislike a thin neck in any animal but the cow or the stag; at the same time we dislike a short, thick neck in a hound. His neck should be moderately long and moderately thick, with the muscles clearly developed; it should rise gracefully out of his shoulders, with a slight curve or crest, and, completely to satisfy the eye, should be quite free from exuberances of flesh and hair on the lower side of it, called by huntsmen "chitterlings" or ruffles, the hound having them being termed "throaty;" although there are numerous exceptions to this rule, as some of the best hounds England ever saw have been throaty; and although we are aware that one individual instance will prove neither the rule nor its exception, we can go as far back as to Mr Meynell's famous stallion hound *Gusman*, for as throaty, and yet as good a fox-hound as we ever remember to have seen. We agree with Beckford that the "tail," now called stern, of a hound, should be "thick," and moderately "brushy;" and if well carried, it is a great ornament to a fox-hound. But there is one part of it which the master of a pack likes to see nearly deprived of its covering, and that is its tip, which, when in that state, is an infallible proof of a hound being a good, and not a slack, drawer of covers.

But to return to breeding the fox-hound. In the breeding of some animals, beauty of shape is often dependent on the caprice of fashion, or the taste of the breeder; but in the breeding of hounds no such latitude can be given, for here beauty, or symmetry of shape, is alone in reference to utility, and adaptation of parts to the purposes to which they are to be applied. Yet the breeder of fox-hounds has one point further to go; he must, as we before remarked, guard against *propensities*, which run in the blood of these animals perhaps stronger than their good qualities, and will sooner or later break out in their work. In the election then of a dog for a bitch, or a bitch for a dog, these matters must be attentively considered: and no man should breed from hounds of either sex that come under any of the following denominations, viz., not of a docile sort, but very difficult to enter to their game; given to run mute; to hang on a scent; or to be skirters; not only not true to the line, but given to run riot either in cover or in chase; and, above all things, if found evidently deficient in nose, and not able to run at head. Good constitution should likewise be looked to; but we would not reject a stallion hound, or a brood bitch, merely for being slack drawers, or for not being always at the head in chase, provided they were well bred, of good form, and true to the line, in cover, and out.

As to the proper combination of form, that must be self-evident to the breeder of hounds. If a bitch is a little high on her leg, or light, she should be put to a short-legged, strong dog, and of course *vice versa;* if rather light in her tongue, that defect may be remedied by an opposite property in a dog. The defects in legs and feet can only be remedied by such means; and fortunate is it for the owner of an otherwise perfect and excellent bitch, that such remedies are at hand. Length and shortness of frame, as well as coarse points, are all to be obviated and altered in the same way, making allowance for the fact, that the laws of nature are not *always* certain. Constitution can likewise be mended by having recourse to that which is good (and none so easily detected as the dog's); and colour changed if required. In fact, as Beckford says, "It is the judicious cross that makes the complete pack;" and it was the remark of this practical writer, therefore high authority amongst sportsmen, that "he saw no reason why the breeding of hounds may not improve till improvement can go no further." The question may be asked, is not his prediction verified?

But the act of crossing hounds, as indeed all other animals, although never thoroughly divested of chance, is one of more difficulty than most people would imagine, and one indeed which, by its results, would often baffle, if not puzzle, the profoundest of our modern physiologists. Our space will not admit of our going at length into this intricate subject, but great mistakes, we conceive, have been made by masters of fox-hounds, in breeding too much in-and-in, from nearest affinities, instead of having recourse to an alien cross. This was peculiarly apparent in the packs of two very celebrated masters of fox-hounds, the late Sir Thomas Mostyn, Bart., and the late John Corbet, Esq., of Sundorne Castle, Shropshire (the former of whom hunted

Oxfordshire, and the latter Warwickshire, each for upwards of thirty years), who bred in-and-in—Sir Thomas from a bitch called *Lady*, and her produce; and Mr Corbet from a hound called *Trojan*, and his produce—to the great injury of their respective packs. We are aware it is asserted that a pack of fox-hounds should have the appearance and character of being of one family; but this expression is not to be taken in its literal construction. It is in the conformity of their character and appearance that they should bear a close resemblance to each other, and not in their close consanguinity. It is true, the celebrated pack of Mr Warde, the present father of the field, and a master of fox-hounds for the unparalleled period of fifty-seven years, which sold for 2000 guineas, only contained, in 1825, three couples of hounds not of his own blood, and those the produce of one stallion hound, Mr Assheton Smith's *Reubens*. But we have no proof of Mr Warde's hounds being better for adhering so closely to his own sort; on the contrary, it is the opinion, we believe, of the sporting world, reluctantly admitted, in consideration of the well-merited celebrity of of their owner, that, latterly, the slackness of this renowned pack, unrivalled in fine form, was to be attributed to that circumstance. On the other hand, the rare but valuable combination of dash and nose, a match for the cold and ungenial Oxfordshire hills, for which the Duke of Beaufort's pack has been so long conspicuous, has been traced to his grace's late huntsman, Philip Payne (said by Colonel Cook, in his *Observations on Fox-Hunting*, "to be the best judge of breeding hounds in the kingdom"), going from home for his blood, and sending his bitches to the celebrated stallion hounds of the best kennels within his reach. This, however, it must be remembered, is not within the command of every man's purse, the expenses attending sending bitches to a distance, under any circumstances, being heavy; as not only must they be placed under the care of a trusty servant on their journey, but there are other occult expenses attending them, which none but masters of hounds are aware of. It is, however, a notorious fact, that the produce of some stallion hounds, if they have a fair chance by the bitches, seldom fail in turning out well; and, perhaps, the most signal instance of "like begetting like" in this species of animal is that of Mr Osbaldeston's *Furrier* having been the sire of an entire pack in that gentleman's kennel when he hunted the Quorndon country in Leicestershire, which he would occasionally take to the field, amounting to more than thirty-five couples, although, as may be supposed, they were generally mingled with the rest of his kennel, which at that period contained a hundred couples of hounds. These Furrier hounds gave little trouble in the entering of them, and proved very true line-hunters, and everything that fox-hounds should be. The annals of fox-hunting likewise record similar instances of the peculiar properties of stallion hounds transmitting their virtues to many succeeding generations, especially in the instances of the Pychley Abelard, the Beaufort, and the New Forest Justice, Mr Ward's *Senator*, Mr Meynell's *Gusman*, Mr Muster's *Collier*, Mr Corbet's *Trojan*, Lord Yarborough's *Ranter*, with many others of more recent days, but too numerous to mention here. Perhaps at present the Yarborough and Fitzhardinge kennel blood is in the highest repute, and they generally run about twenty-three inches.

The size, or, we should rather say, the height of a fox-hound, is a point upon which there has been much difference of opinion. The long-established pack of the late Mr Chute were at least three inches below the standard of his neighbour Mr Villebois's large pack; also as much below that of his Grace the Duke of Cleveland, who had for many years also a large and a small pack; and at least four inches lower than Mr Warde's, in whose kennel were hounds full twenty-six inches high. Various arguments are made use of by the advocates of large and small hounds. Those of the former assert that they get better across a deep and strongly fenced country than smaller ones; whilst the admirers of the latter insist upon their being better climbers of hills, more active in cover, and quicker out of it when their fox is gone; and are oftener found to be perfect in form and shape. As to uniformity in size, how pleasing soever it may be to the eye, it is by no means essential to the well-doing of hounds in the field, and has been disregarded by some of our first sportsmen, the great Mr Meynell for one, who never drafted a good hound for being over or under size; neither did Mr Assheton Smith, when he succeeded to his, Mr Meynell's, country. The great object of both was to breed them with muscular power and bone, combined with as much symmetry as could be obtained; and to be equal in speed and good qualities, rather than equal in height.

We consider the proper standard of height in fox-hounds to be from twenty-one to twenty-two inches for bitches, and from twenty-three to twenty-four for dog hounds; but some masters of hounds consider that the perfection of breeding is to get the bitches to twenty-three. The late Sir Richard Sutton had once several twenty-five inch Fife dogs in his kennel, but he eventually preferred them smaller. The minimum and maximum size of the last seventy years would have been found in the kennels of Mr Chute and Mr Warde; the Duke of Cleveland and Mr Villebois coming next to Mr Warde in what may be called the maximum class. Mr Chute's motto over his kennel door was "multum in parvo;" and although full of power, and neat, his hounds did not more than average twenty-one inches. On the other hand, many of Mr Warde's bitches, the most splendid animals of their kind and sex, were better than twenty-three, and some of his dog hounds twenty-six, inches high, which was about the standard of the original Devonshire stag-hounds. It may be said of hounds, however, as has been said of horses, that their height has little to do with their size, as far at least as their powers of action are concerned; and doubtless in all animals that labour, a medium height is the best.

The amount of hounds bred annually will depend on the strength of the kennel, and the number of days' hunting in the week which the country they are intended for requires. From sixty to eighty couples are about the complement for a four-days-a-week country, which will require the breeding of a hundred couples of puppies every year, allowing the usual diminution of the entry by malconformation, under size, and that bane to the kennel, the distemper, which often takes off a moiety of them. As the period of gestation in the female dog is somewhat over two calendar months, the fox-hound bitch should, if she can be spared, be put to dog in January, as then she will litter in the spring, when the weather is comparatively mild (cold being destructive of young animals of this sort), and the puppies will then come early into kennel, generally be of good size, and powerful; and be entered without loss of time. The tips of their sterns being pinched off, and their dew-claws cut, whelps should be taken to their walks at about two months old; and if to one where there is plenty of milk or whey, they will be the better for it. Whelps walked at butchers' houses grow to a great size, but they are apt to be heavy-shouldered and throaty, and otherwise out of shape. If possible to avoid it, puppies should never be tied up, as perpetually drawing at the collar-chain throws their elbows out, and otherwise damages their legs, particularly by spreading their feet, and altering the form of their ancles, although it is sometimes almost impossible to avoid it, from their proneness to do mischief. If old bitches are bred from, they should be put to young dogs, and of course, *vice versa*; and a bitch should not be worked for at least the last month of her time; and immediately on her whelps being taken from her, a dose of physic should be given her.

It is said that the dog in a state of nature is subject to few diseases, and for these he finds his cure by an instinctive faculty; in a domesticated state, however, he is subject to many, and some of an awful nature, which may be classed among the *opprobria medicorum*, no certain remedy being discovered for them. Amongst these is one called the distemper, not known by our forefathers, but at present become a sort of periodical disorder in kennels, to the destruction of thousands of young hounds annually. The first symptoms of this disease are, generally, a dry husky cough; want of appetite, and consequent loss of flesh; extreme dulness, and a running from the nose and eyes. As the disease advances, it is attended with twitchings of the head, while the animal becomes excessively weak in the loins and hinder extremities; is greatly emaciated; runs at the eyes and nose, and smells very offensively. At length the twitchings assume the appearance of convulsive fits, accompanied with giddiness, which cause the dog to turn round; he has a constant inclination to dung, with obstinate costiveness at one time, or incessant purging at another. Finally, the stomach becomes extremely irritable; everything swallowed is instantly thrown up; and the dog generally dies in a spasmodic fit.

For the cure of this disorder many remedies have been prescribed; but as none of them can be relied upon as specific, we decline giving them,[1] and prefer transcribing the following observations of an intelligent and experienced huntsman in the service of a noble duke, accompanied by a comment upon it by a noble lord, also a practical sportsman, hunting his own fox-hounds.

"As soon," says the former, "as the young hounds come in from quarters, a sharp look-out is kept for the distemper; and as soon as any of its symptoms appear, a dose of cold-drawn castor-oil is given, and the following morning a dose of calomel and jalap. About seven grains of the former and twenty of the latter made into a bolus, and put over their throats before they have tasted anything, and their heads coupled up above the level of their bodies for two hours, so as to prevent them from vomiting up the medicine, which they are certain to do if this is not carefully attended to. They are then to have their broth and their meat. The oil and bolus to be repeated in a day or two as symptoms require; that is to say, if the fever runs high, repeat the bolus, and, if only to keep the bowels open, the oil in small quantities. Indeed the great thing is attending to circumstances, and acting accordingly; as, for instance, nothing can be more different than when flux attends the distemper, and when fits and obstinate costiveness is the case. I believe, however, that at first a good scouring in both cases is of service. In flux, of course, don't repeat the calomel, but take moderate means to stop it, as flux in a minor degree tends to keep off both fever and fits. To allay the flux, arrow-root, or boiled milk and flour porridge. There is no doubt that laudanum is the surest method to stop it, but then it is sure to end with fits. Fits at the beginning are no bad sign, and at the end nothing can be worse. I never either approved of bleeding or vomiting in the distemper; the first weakening too much, the latter creating and adding to the irritableness of their stomachs."

"With the foregoing plain, sensible, and simple treatment," says the noble lord in his comment on the foregoing observations, "my junior experience perfectly agrees with the opinion of ———; but I revert to what he justly adds about 'circumstances,' and differ with him about the bleeding, as I think a good scouring out, and bleeding, before anything symptomatic of the disease has fairly begun, highly commendable. But, *vice versa*, for instance, if you bleed, after the disease has fairly taken root, the lungs, nine cases in ten, being affected, it is ten to one you kill the dog; but if done early in the day, I cannot but think it is of much service, prevents fever, and in many cases makes the disease less violent. I think perhaps the treatment of whelps, after they come in from their healthy walks to the close confinement of sometimes an ill-kept kennel, is the cause of the distemper taking more violent hold of them than it otherwise would do; and amongst the hundred pretended receipts of many huntsmen, the remark is a justly correct one, of what *may* cure one dog will kill another. But here ——— and his 'circumstances' put you right. What might be advisable would be this:—As soon as your puppies come in, look them attentively over; divide the well-walked whelps from those that have been ill-walked; bleed and scour well out the fat lot, paying of course attention to their diet, cleanliness, and exercise; and cherish the poor lot by the best food, giving them the castor-oil without the calomel or the lancet. But a lot of well-bred fox-hound whelps are not to be left to the care of a whipper-in or a boiler, unless he is a perfectly sober, attentive, and experienced man; for in this disease in the animal, as in the human species, the patient must be most attentively and closely watched."

Kennel Management.

The management of hounds in kennel has undergone great changes for the better since Mr Beckford's day; and, divesting the mind of the inferiority of horse flesh over cow or bullock flesh, the food of hounds, both in its nature and the cooking of it, is such as man might not only not reject, if necessity compelled him to have recourse to it, but such as he would thrive and do well upon. It is a common expression, that "anything will do for dogs," and experience informs us they will exist upon very miserable fare; but hounds, *to be in condition*, must have everything good of its kind, and also well cooked. Were a master of hounds, or huntsman, of the present day, to follow Beckford's advice, of putting his hounds to a horse fresh killed after a hard day, his brother sportsmen would think him mad; nor is there scarcely anything now used in our first-rate kennels but the best oatmeal (Scotch or Irish is the best) one year old, and well-boiled horse flesh, quite free from taint. The meal is put into the copper when the water boils, and should be boiled up a second time, and, in all, for at least two hours; for nothing is worse for the wind of hounds than meal not thoroughly boiled. When taken out of the boiler, it forms a substance resembling coarse rice pudding; and when the fresh flesh, which is shredded, and the broth in which it is boiled, are added to it in the trough, and very well mixed, it forms the best and highest food that can be given to hounds. In some kennels, after the example of that famous huntsman the late Thomas Oldacre, the meal and flesh are boiled up together, with the idea that more of the virtue of the flesh is then imparted to the meal than when it is merely mixed with the broth; but the practice is not general. But such is the difference of constitution in hounds, and the aptitude of some, over others, to gain flesh, or become foul, that persons who are particular as to the condition of their pack have troughs filled accordingly, that is, one with thinner food than another for hounds of the former description. No animal in the world is so soon up and down in his condition as the dog; and, strange as it may appear, the effect of two or three extra mouthfuls of thick meat will be visible on some hounds on the second day after they have eaten them. Nevertheless, the dog being strictly a carnivorous animal, cannot stand hard work without flesh, which he should have a fair allowance of once a-day, according as his constitution may require it. Some masters of hounds, however (the justly celebrated Mr Ralph Lambton one of them), do not feed with flesh on the day before hunting, giving only meal and broth; and this on the supposition that the faculty of scent is more delicately susceptible without it. Young hounds lately come from walks should be fed twice in the day, as they do not always, at first, take to kennel food.

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[1] Colonel Cook says he has "sometimes" found the following efficacious:—Calomel three grains, cathartic ext. seven ditto, soap seven ditto, emetic tartar one-half grain. Make three pills, and give one every other day. Vaccination was tried in some kennels as a preventive, but it failed, and was abandoned.

Colonel Cook is thus explicit and correct on the subject of feeding hounds, and their condition, the result of many years' experience and great attention to the kennel. "It is quite certain," says he, "a hound too high in condition cannot run a burst, neither can a poor half-starved one kill an afternoon fox; a hound, therefore, cannot be considered as fit to be brought out, if he is either too high or too low. I like to see their ribs, but their loins should be well filled up, and they should be hollow in their flanks: he that is full in the flanks is sure to be fat in the inside, and consequently not fit for work. The feeding of hounds, and the bringing them to cover, able to run a burst, or kill an afternoon fox, is not altogether a thing so easy as some people imagine; in fact, it requires nearly as much trouble to get a hound into condition as it does a horse; and if the greatest attention is not paid to this particular, you cannot expect to catch many foxes. It is the condition of a hound which gives him the advantage over the animal he hunts. Nevertheless their constitutions differ as much as those of the human species; some require thick food, others thin; the same quantity which may be requisite for Ranter, if given to Rallywood, would render him unable to run a yard. Some time before hunting (say about three weeks), they should have plenty of walking exercise, and salts given them once a-week. If a hound is at any time very foul, the following receipt is very efficacious:—Three grains of Æthiops mineral, five grains of calomel, made into a ball: the hound must of course be carefully kept from cold water."

In the summer time, when hounds are out of work, they do not require flesh more than twice a-week, and succulent vegetables in their food are at this time useful. They are also physicked and bled at the close of one season, and before the commencement of the next; and, if necessary, dressed over with a sulphurous mixture during the idle months. But some owners of hounds, and huntsmen, object to dressing them, conceiving that it opens their pores too much, and subjects them to rheumatic affections.

One recent and great improvement in kennel discipline is a small reservoir of water within the walls, of sufficient depth to cleanse the legs of hounds, but not to wet their bodies, which they are made to walk through immediately on their coming home. Upon being turned into their lodging room, they commence licking themselves dry, which, as a dog's tongue is proverbially called his "doctor," is most beneficial to their feet by clearing them of sand or gravel, as well as healing any trifling wounds which they may have received. In the Duke of Cleveland's kennel, this reservoir is filled with broth, which, in addition to its healing properties, induces hounds to lick their feet still more than water does. In flinty countries, the feet of hounds are very frequently wounded, which is a great disadvantage to those a little inclined to do wrong, as they are compelled to miss their turn, and so get above themselves. It also obliges a gentlemen to keep a larger number of hounds than this country would otherwise require.

Hounds are fed on the day before hunting about eleven o'clock A.M., but some delicate feeders require to be let into the troughs a second time. After hunting, they are fed as soon as they have licked themselves dry, which, by the warmth that arises from their bodies when shut up, is very soon effected; and in the summer time it is reckoned safer to feed them in the evening, as they then rest quieter throughout the night, and are less disposed to quarrel.

Colour of Hounds.

In no animal is variety of colours more conspicuous than in hounds, and it adds greatly to their appearance when we see them in a body in the kennel, but still more so in the field. The prevailing ones with the fox-hound are these: Tan (not common); black (not common); black and white and tan (the most common); milk white (not common); red (very rare); blue (the same). Next come the blended, or mixed colours, known in the kennel as "pies." There is the red pie; the blue pie; the yellow pie; the gray pie; the lemon pie (very handsome); the hare pie; and the badger pie, which last is very characteristic of the fox-hound. The fox-hound is sometimes ticked, that is, his coat is dotted with small white specks on a dark ground, but he is rarely what is called "mottled" (motley): and, we believe, what is known by "a blue mottled hound" is not to be found among fox-hounds, being peculiar to harriers and beagles. There was for many years a pack of "blue mottled" harriers kept near Croydon, in Surrey.

It is asserted that the original colour of the English fox-hound was fallow, or pale yellow (Shakspeare speaks of a fallow *greyhound*); and we are inclined to this opinion from its being spoken of in several old works upon hunting, as the "best colour for hounds that hunt the hart or roe;" and there can be no doubt of our fox-hounds being originally descended from that breed of dog, be it what it may. As we know that a recurrence to original colour frequently takes place in animals and birds, after its disappearance throughout several generations, this may probably account for the various pied hounds we see in kennels, the produce of hounds of distinct colours, perhaps merely black and white, and often of those nearly black. Moreover, at Ashdown Park, in Berkshire, an old seat of the Craven family, there is a picture of a pack of fox-hounds, above a hundred years old, in which every hound is either fallow-coloured or red.

The Tongue, or Cry of Hounds.

The cry of hounds, melodious and heart-cheering as it even now is, has lost much of its poetical interest, from the change man has made in the natural organization of the animal from which it proceeds: and we shall never again hear of a master of a pack, after the manner of Addison's knight, returning a hound that had been given to him as an "excellent bass," whereas the note he wanted was a "counter-tenor." The acute Beckford, however, was something of the worthy knight's opinion; for he says, in his *Thoughts upon Hunting*, "If we attended more to the variety of the notes frequently to be met with in the tongues of hounds, it might greatly add to the harmony of the pack." This is well in theory. The natural organization of the dog is musical: he is, in fact, a victim to musical sensibility; and we may reasonably suppose that the notes of his companions in the chase may be as pleasing to himself as to the huntsman; but we more than doubt whether a huntsman of this day would draft a highly-bred and beautiful young bitch, as good too as she looks to be, merely because her light, fox-hunting tongue might be somewhat drowned, and now and then lost, in the general chorus of the pack. He would rather say, "*Let every tongue be a fox*,[1] and I'll leave the rest to chance." But, on a good day for hearing it, what *natural* sound is more delightful and animating than that of hounds in full cry, in the deep recesses of an echo-giving wood?

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[1] "Every tongue a fox," is a well-known sporting phrase.

The Age of Hounds.

The dog exhibits no exact criteria of age after the first two years, during which time the whiteness and evenness of his teeth are a pretty certain test of his not exceeding that period. An old hound, however, cannot be mistaken if only looked in the face, where he shows old age nearly as distinctly as man. As to the length of services of hounds, that depends upon circumstances. Few are found in a kennel after their eighth year, and *very few* after their ninth; and not many hard-working hounds can "run up," or keep pace with the rest, after their fifth season at most. Hounds are in their prime in the third and fourth years; and although there are a few instances, such as the late Sir Richard Sutton's Lucifer, the Beaufort Nector, and the Cheshire Villager, of their hunting in their twelfth, eleventh, and tenth year, the average of their work cannot, we fear, be placed beyond four seasons. Old hounds are useful in the field, but when they cannot run up with the pack, they should be drafted. The perfection of a pack consists in the great body of it being composed of hounds *quite in their prime.*

Separation of the Sexes.

The separation of the sexes in the kennel *and in the field* is one of the late innovations in the sporting world, and generally considered as a good one. In the first place, it pleases the eye to see a pack of hounds nearly all of a size, which cannot be the case when it is composed of dogs and bitches mixed; and the character of the animal is likewise more uniformly displayed when confined to one individual sex. Secondly, by the total separation of dogs and bitches in the kennel and in the field, the former are less inclined to quarrel, and the latter are more at their ease, than when subject to the constant, and, at times, importunate solicitations, of the male sex. Of their performances in the field, however, when taken into it separately, some difference of opinion exists; and each sex has its advocates. With a good fox before them, and a warm scent, bitches are decidedly quicker, and more off-hand in their work, than dog hounds; but with a colder scent, or at fault, the general opinion is, that they are not so patient, and more given to over-run it. That they are superior in "*dash*," which, Beckford says, is the distinctive characteristic of a fox-hound, we believe is universally acknowledged; and a celebrated master of hounds,[1] who hunted them himself several seasons in Leicestershire, has been heard frequently to say, that if his kennel would have afforded it, he would never have taken a dog hound into the field. That, in the canine race, the female has more of elegance and symmetry of form, consequently more of speed, than the male, is evident to a common observer; but there is nothing to lead us to the conclusion, that, in the natural endowment of the senses, any superiority exists. It is however remarkable, that the Latins, when speaking of hunting, or "sporting dogs," as we call them, generally use the feminine gender, one instance of which is to be found in the second ode of the fifth book of *Horace* (*multâ cane*), which ode every sportsman ought to read, as it gives so pleasing a picture of a country life.

Names.

The naming of hounds and horses has nearly exhausted human invention, as well as classical research. Beckford furnishes a list of more than eight hundred names for hounds, alphabetically arranged. But the naming of hounds is somewhat under metrical control; for it is not only confined to words of two and three syllables, but their quantity, or rather their time, must be consulted. For example, a dactyl, as *Lucifer*, answers well for the latter; but who could holloa to *Aurora?* a trochee, or an iambus, is necessary for the former, the spondee dwelling too long on the tongue to be applied smartly to a hound. But there ought to be a nomenclature, as of old, at every kennel door; for it is but few persons unconnected with a pack that can recollect their names until after a rather long acquaintance with them, from the great similarity of form, character, as well as sometimes of colour, in old-established kennels. "How is it possible," said a young master of fox-hounds a few years ago, "that I should distinguish every hound in my kennel by his name, when I find *three* spots on one side of their body, and *five* perhaps on the other?" There have been, however, and still are, persons who can see a large kennel of hounds *once* drawn to their feeding troughs, and call them all by their names afterwards, the result alone of a keen and practised eye.

The price of hounds is strangely altered within the space of half a century, or less; and on this subject we cannot do better than quote Colonel Cook. "Hounds," says he (p. 6), "have always been much undervalued; we sometimes hear of eight hundred or even a thousand guineas as the price of a hunter, and the sum of three or four hundred is often considered as a mere trifle; whereas a pack of hounds, *on which everything depends*, was only considered worth a a few hundreds. Yet Shakspeare himself appears to have known the value of a hound; for in his "Induction" to the *Taming of the Shrew*, a nobleman returned from hunting thus speaks of his hounds with delight to his huntsman:—

> *Nobleman.* Huntsman, I charge thee, tender well my hounds;
> Brach Merriman,—the poor cur is imboss'd,
> And couple Clowder with the deep-mouth'd brach.
> Saw'st thou not, boy, how Silver made it good,
> At the hedge-corner, in the coldest fault?
> I would not lose the dog for *twenty pound.*
> *Huntsman.* Why, Belman is as good as he, my lord;
> He cried upon it at the meerest loss,
> And twice to-day pick'd out the dullest scent;
> Trust me, I take him for the better dog.

"The sum of twenty pounds for a single hound in Shakspeare's time," continues the colonel, "and that not the best in the pack either, was no inconsiderable price. I am not alluding to 'a lot of curs;' but surely a well-bred, established pack of fox-hounds including brood bitches, and puppies at walk, must be cheap at a thousand or twelve hundred pounds."

How far an established pack of fox-hounds is cheap at a thousand or twelve hundred pounds, is a matter of consideration with reference to concomitant circumstances. We should put the average price at something less than the highest of the above sums, although several packs have been sold for the former sum; and the justly renowned one of Mr Warde fetched two thousand guineas. When blindness unhappily compelled Mr Folgambe to lay aside the scarlet in 1845, his pack was sold for three thousand guineas. The late Lord Middleton gave Mr Osbaldeston two thousand guineas for ten couples of hounds out of his kennel, and the Earl of Stamford gave four hundred and seventy guineas for four couples of Mr Richard Sutton's hounds!

The Harrier.

The modern harrier bears no greater resemblance to the one in use fifty years back, than the hunter of the present day to that ridden by our grandfathers. In fact, he is now nothing less than the fox-hound in miniature, which it is the endeavour of all breeders to have him. Their qualities also are as opposite as their form, the one delighting to dwell upon the scent, the other a little inclined, perhaps, to the other extreme. But the taste of the day for all sports of the field would not endure the tedious exactness of the old psalm-singing harrier; and not only in point of diversion, but on the score of the *pot*, the balance is greatly in favour of the improved variety. Before the old-fashioned harrier, the hare had time to play all sorts of tricks, to double on her foil, and so stain the ground that she often escaped by such means; whereas the modern hound, if the scent be tolerably good, forces her from her foil to fly the country, and very often beyond her knowledge, when a good straightforward run is the almost invariable result. The observation of Mr Beckford holds good here. He could not, he said, imagine a hound too *well* bred to show sport, and kill his game; but he could readily conceive the reverse, when the game ran stout and well.

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[1] "Sir Bellingham Graham, Bart. of Norton Conyers, Yorkshire.

To the late Sir John Dashwood King, Bart. of West Wycombe Park, Bucks, is the credit due for what may be termed the living model of the present improved harrier; and so characteristically stamped is his sort of hound, now widely spread, that they are recognised by a sportsman at the first glance. Their standard height did not exceed eighteen inches, and therefore, in that respect, they were not an overmatch for their game; but from the great equality of their size and speed, combined with rare hunting qualities, they killed more hares, with good runs, than any other pack in the kingdom, and for many, many years in succession certainly "bore the bell." Sir John kept them more than thirty years, at Bourton-on-the-Hill, Gloucestershire, near the four-shire stone on the Oxford and Worcester road, where his father kept them before him; hunting partly in the vales of Warwickshire and Worcestershire, and partly over the Cotswold Hills, which latter country is famous for the stoutness of its hares, frequently standing an hour before this celebrated pack, after having been driven beyond their knowledge by their *pressing* method of hunting up to them, a method quite unpractised by the old long-eared harrier. The parent stock of this pack was a small fox-hound from the Duke of Grafton's kennel, called Tyrant, whose blood, form, and character, were strikingly apparent throughout; and so great was its celebrity, that it fetched the highest price ever known to be given for harriers, namely, seven hundred guineas, by Lord Sondes of Rockingham Castle, Northamptonshire. Sir John, however, deserved success. He bred upwards of seventy couples of hounds every year, and had an establishment of horses, &c., nearly equal to fox-hounds. The hare-hounds bred for many years by Mr Yeatman of Stock House, Dorsetshire (who lately resigned the Blackmore vale country, in which he hunted foxes), came next to Sir John's in the true form and character of the modern harrier.

The Beagle.

This variety of the dog is now nearly extinct, and for the same cause as the stag-hound. Time is at present considered as too precious to afford an hour at least, and perhaps two, to the hunting down one hare, which is now accomplished in a more off-hand manner, in twenty minutes. To an admirer of nature, however, and of the endowments given to inferior animals, the busy, intelligent, and highly-gifted beagle certainly affords a treat. His form, also, when not out at his elbows, is handsome in the extreme, and his perseverance in chase is exceeded by none. But he has one of the greatest faults that hounds can possess; he is noisy, and dwells upon the scent, whilst his game is flying the country before him. In fact, his only use or value now is (independently of being looked at and admired, for he is a perfect animal of his kind), to accompany a brace of greyhounds when a hare is wanted, and not ready at hand. There is, however, one pack of beagles kept in Dorsetshire, known as the Mountain Harriers, whose performances are much spoken of in the sporting world. Mr Honeywood of Essex had also a most famous pack, averaging from 9 to 10 inches in height, and 9 lbs. in weight, which he sold to Prince Albert; and the celebrated O'Connell used to beguile his winter leisure with a dozen of these tiny favourites, such as have never been surpassed for breed in Ireland.

The Greyhound.

The greyhound has now lost his place in the catalogue of the dogs used in chase, neither can be classed as such, since man has deprived him of the necessary faculty of smell; but he was held in such high estimation in the middle ages, as to be considered as the peculiar companion of a gentleman. He never went abroad without these dogs; the hawk which he bore upon his fist, and the greyhounds which ran before him, were certain testimonies of his rank; and in the ancient pipe rolls, payments appear to have been often made in these valuable animals. But at no period of his existence was the greyhound the symmetrically elegant animal we now see him, nor possessed of nearly so much speed; neither was the diversion of the leash at any time carried on with so much spirit as within the space of the last thirty years, in various parts of Great Britain. But the necessity for, or rather the cause of, the change in the form of the greyhound, may be traced to his being no longer, as formerly, made use of to course and pull down deer, but chiefly to exhibit his speed at our different spirited coursing meetings, for the various prizes contended for, as also in private matches.

The *Courser's Manual or Stud-Book*, by Thomas Goodlake, Esq. (1828), has the following interesting passages on the alteration effected in this species of dog. "In the days of Elizabeth," says the author, "the greyhound seems to have been a fine and effective animal, but approaching more to the bony, wire-haired make of the Highland greyhound represented in the pictures of Edwin Landseer, and deficient in the symmetry and fine glossy coat which mark a high-bred kennel of modern times. It is probable, that during the early part of the seventeenth century, judicious crosses were made, partly from the beautiful Italian greyhounds, which we often see in family pictures, accompanying our fair ancestresses in their parks and plaisances, and partly from the stouter breed of dogs represented in Flemish hunting-pieces; and that even Persia and Arabia, whose greyhounds are not to be despised in point of form and speed, contributed their quota of blood; as it is shown by the history of Cromwell's Coffin Nail, that the wealthier gentry of that period spared no expense or pains in improving the more highly-prized breeds of sporting animals. If we mistake not, some of the pictures of Charles the First contain portraits of greyhounds approaching nearly in point of coat and shape to the present breed."

Speaking of the late Lord Orford, who established the first coursing club that we read of, at Swaffham in Norfolk, in the year 1776, the same writer says, "He could command such an immensity of private quarters, or walks as they are generally called, for greyhounds, that he bred largely, and few possessed the same advantages of selection. He is recorded as having at one time fifty brace of greyhounds; and it was his fixed rule never to part with a single whelp till he had had a fair trial of his speed; consequently he had chances beyond almost any other individual, of having a collection of very superior dogs. Intent on obtaining as much perfection in the breed as possible, he introduced every experimental cross, from the English lurcher to the Italian greyhound. He it was that first thought of the cross with the English bull-dog, in which he persevered in opposition to every opinion, until, after breeding on for seven removes, he found himself in possession of the best greyhounds at the time ever known; and he considered that this cross produced the small ear, the rat-tail, the fine, thin, silky coat, together with that quiet, innate courage which the high-bred greyhound should possess, preferring death to relinquishing the chase." There is something curiously analogous to the sense conveyed by the concluding words of this extract. His lordship fell dead from his horse immediately after witnessing the triumph of his famous bitch Czarina, in a match at Swaffham, having been in vain admonished on the impropriety of taking the field in his then indifferent state of health; and his memory is introduced as a toast at most coursing meetings, as father and patron of the sport. Earls Craven and Stradbroke, and the late Earl Sefton, have always been great patrons of the leash; and on the whole the blood of Figaro is the most uniformly successful that we now possess.

It would be hopeless to speak with any degree of certainty as to the relative running forms of dogs, as nearly every great courser has his *beau ideal* among cracks, past or present, and his own notion as to the best blood. In old times, Snowball stood pre-eminent; and King Cob is said by many to have been the most perfect of greyhounds in his shape. The far-famed litter of six by Figaro out of Bessy Bedlam, produced seven hundred and eighty-two guineas at Mr Brown's sale at Doncaster in 1854. This gives an average of fifty-six guineas for five, while Bedlamite was bought in for five hundred guineas, a price which has, we believe, never been exceeded for a dog. Bessy Bedlam "the invincible" was never led to her hare, and never beaten, winning the twenty-two courses she ran in public. In fact, she and her "Bedlamite litter" won twenty-five first-class cup or stakes, divided eight, and ran up for six, in which 944 dogs were engaged. Cerito and Mocking Bird were also wonderfully successful bitches; and perhaps one of the best "workers" ever out was Lady Harkaway, the property of Father Tom Macguire. The Emperor, Bugle, and Dusty Miller, strains rank very high; and Mr Webb's "War Eagle litter," which owned Foremost as their sire, was "a great fact" in its day.

Stonehenge, who is by far the greatest living authority on the greyhound, considers that there are six varieties of it, and all with different characteristics. The principal of these is the Newmarket greyhound, which is the oldest, and was brought to the highest perfection in the days of Lords Rivers and Orford. They combine stoutness with very high speed, but are seldom first-rate workers with their hare. They require, in fact, a very fast hare to show themselves to advantage, and are often beaten in working by dogs, which but for them, would never have reached the hare at all. The Lancashire greyhound is very like his Newmarket ancestor, but does not show so much "quality" about the head and neck, and is generally rather larger; and some of the best of them have measured 28 inches, and weighed 70 lbs. Their stride is very great, and so is their power of jumping ditches, which are so rife at Lytham and Altcar. Bedlamite, who forms the subject of our plate, is half Lancashire and half Newmarket, and so is Sackcloth, who travelled nearly 3000 miles by the rail in 1853–54 to meetings the season but one before his noble owner died. Yorkshire greyhounds are quite as speedy as either their Lancashire or Newmarket rivals, and are generally of a great size, and rather coarse. No dogs are "cleverer," but this talent sometimes degenerates into a tendency to lurch. The smooth Scotch greyhound has been very much crossed with English blood, and the principal strains are Jason's, Heather Jock's, Waterloo's, and Mr A. Graham's kennel, which has a great deal of the Emperor and Bugle blood in it. A great majority of them run remarkably well in puppy produce stakes, and though their tempers have a degree of uncertainty, and they are not so fast as the Newmarket dogs, they work much more close with a bad hare. The speed of the rough Scotch greyhound is not very great, and they are slow at their turns, but they are exceedingly hardy, and stay well in a long severe stretch with a straight-backed hare. The sixth section, or the Wiltshire dog, is especially bred for stoutness, to cope with the extraordinary hares which are generally met with at Amesbury, Marlborough Downs, and sometimes at Ashdown Park; and his power of stopping himself and getting away at his turns is something marvellous. Modern Wiltshire greyhounds are rather small, stout, and terrier-like, but many of the best old Wiltshire blood, like Billy-go-by-'em, were much larger.

The Terrier.

The terrier is no longer the accompaniment to a pack of fox-hounds, and for the best of all reasons—foxes are not nearly so often digged for as formerly; and his only use was, by his bay, to inform the diggers whereabouts the fox lay; and we suppose he took his name from his being so eager to get under ground. There is also a second reason why he is better left at home. He was seldom steady from *wing*, if he was from *foot*, and thus often the cause of riot. It was, however, a matter of astonishment to behold those which were very highly bred, making their way, as they did, to the end of the longest chases, over strong and wet countries, as well as through the thickest covers, and so often making their appearance at the end of them. At all events, if left behind, they were sure to find their way home in the course of the night, whatever the distance might be. One peculiarity of form was essential to their being sure of getting up to their fox, viz., not too full in the shoulder; and those whose colour was pure white, and who were broken-haired, were generally most esteemed by huntsmen. It was often their lot to lose their life, by scratching up the earth behind them, and cutting off their means of retreat; and they were now and then killed by a fox, the latter a rare occurrence. They were commonly entered to a badger, whose bite is more dangerous than that of a fox. Rough Scotch terriers are considered rather softer in the mouth than they used to be; and the best English terriers are now bred out of a bull-bitch by a smooth English terrier, and run from 11 to 12 lbs. Mr Collier has a good breed of them, and the Duke of Beaufort's are also especially famed. (C. A.) (W. H. L—Y.)

HOUSEHOLD, The Royal. In the preface to the *Liber Niger Domus Regis Edw. IV.*, we are told that King Edward III. was "the first setter of certainty among his domesticks upon a grounded rule. He appointed duties to his offices and officers by a formal and more convenient custumate, more certain than was used before his time; he framed his new statutes, commandments, and charges, upon every officer inward and outward." Upon this work King Edward IV., with the advice of his great council, founded his *Household Book*. The table of the king, and the daily allowance of provisions, fuel, and lights to peers of each rank when in attendance upon the king, and to all his chief officers, attendants, and servants of every degree, on ordinary and on festival occasions, are carefully particularized; as are also the king's alms and gifts, the wages of every class of his servants, and the robes and liveries for his knights, officers, and domestics.

Henry VII. ordained new articles for the government of his household. Henry VIII. found it necessary to make still further regulations, particularly to prevent the court from being overrun by idlers and the retainers of the officers. In the ordinances made in the 31st Hen. VIII., the porters at the gate are enjoined "not only to exclude servants, vagabonds, and rascalls, but alsoe that they doe not suffer any vagabonds, rascalls, or boyes to enter in at the gate at any time, and that one of them shall, three or four times in the day, make due search throughout the house, in case that negligently at any time any boyes or rascalls have escaped by them, and entred the gates, that thereby they may find them out and put them out againe."

In the royal household in feudal times the lowest offices were filled by persons of consideration, unfitted both by their rank and incapacity to perform the duties attaching to them. The supplies for the extensive establishment were made on the system of *purveyance* and *receipt in kind;* and the royal purveyors seized provisions wherever they could find them, paid for them only in such manner, and at such prices as the household officers thought proper to fix, and deposited them in the king's magazines.

This system of purveyance, after many previous attempts by statute to moderate its obnoxious uses, was abolished in 12th Chas. II. In 1780 Mr Burke introduced his plan of economical reform, in which the royal household formed a conspicuous part. He represented it as formed upon manners and customs which had long since expired, and as retaining ancient officers whose duties had long since ceased. He succeeded, two years later, in obtaining an act (22 Geo. III., c. 82) by which the following offices were suppressed:—Principal officer of the great wardrobe, principal officer of the jewel office, treasurer of the chamber, cofferer of the household, offices of the six clerks of the board of green cloth, paymaster of the pensions, master of the harriers and fox-hounds, and master of the stag-hounds.

The household expenses must have been very great. *Madox* remarks upon the magnificence of the Norman kings; and Stow, in his *Annals*, relates that "the person of King Richard II. was guarded wheresoever he lay by 200 men; that he had about him thirteen bishops, besides barons, knights, esquires, and others, inasmuch that to the household came every day to meat 10,000 people." The charge for King Edward IV.'s household was L.13,000 yearly. The statutes of Eltham, 7th Hen. VIII., give particular articles of diet, wine, &c., to be served to every person of the household, and the quantity and price of every article, the expenses of the stables, and the salaries of all the members and servants of the establishment. In the *Household Book* of King William and Queen Mary, 1689, the diet of the household is computed at L.15,000 yearly, and the total charge at L.76,038. Since the reign of King William III., parliament at the commencement of each reign has appropriated a fixed sum for the civil list of the sovereign. Thus—

To William III.	L.700,000	a-year.
... Anne	700,000	...
... George I.	700,000	...
... George II.	800,000	...
... George III.	800,000	...
Increased in 17th year of reign ...	900,000	...
... George IV.	1,050,000	...
... William IV.	510,000	...
... Victoria	385,000	...

Of this last the application is thus limited:—Privy purse, L.60,000; household salaries, and retired allowances, L.131,260; household expenses, L.172,500; royal bounty, alms, and special services, L.13,200; leaving an unappropriated balance of L.8040, which may be applied in discharge of any of the other classes of charge.

But these sums throw little light upon the comparative grants for the sovereign's household and personal expenses. Prior to the Revolution the sums granted were voted without any specification as to whether they should be applied to the maintenance of the army, the navy, the civil government, or the household. From that time the expenses of the army and navy were at once separately voted, and charges of civil government have from time to time been removed from the civil list, until, on the accession of William IV., by the separation of the salaries of the judges, the lord-lieutenant of Ireland, the diplomatic salaries and pensions, and the civil-list pensions of previous reigns, the civil-list charge has been properly reduced to the personal and household expenses of the sovereign.

The internal regulations of the royal household may be described under the names of the officers by whose authority they are maintained—the Lord Steward and his Court of Household, and the Lord Chamberlain; two great officers who, from the earliest times, have divided the authority over two distinct branches of the establishment.

The Lord Steward is the chief officer of the household. His authority extends over the offices of treasurer, comptroller, and master of the household, the two former of whom act as his deputies; and all the household officers and servants are subject to his authority, except those of the chapel, the chamber, and the stable. The first two are subject to the Lord Chamberlain, and the latter to the Master of the Horse. The duties of these three high officers are thus described in the *Liber Niger*, Edw. IV.:—*The Steward of the Household* receives his charge and staff from the king himself,—"Seneschall tenez la baton du notre hostiell,"—and by these words is at once constituted Steward of the whole Court of Marshalsea. The secondary estate and rule of the household, under the king, is wholly committed to his charge, and his orders are to be obeyed and observed. Out of the king's presence he is always to be served covered, whatever other great estate may be present. He may permit such to depart as he thinks pleasing to the king. While he is present in court, no new commandments or orders to officers or other persons should be given without his orders first had. In all the household rules and judgments he represents the king; and his staff is taken for his commission.—*The Treasurer of the Household* takes his charge and oath before the king, or his council. He is second estate next to the steward, whose office he represents, and whose privileges he enjoys in his absence. He has the chief charge of the policy and economy of the household, which depend upon his sober and diligent purveyance. It belongs to the treasurer, with the steward and comptroller, to remind the king of his dispositions and purposes, and to make, from time to time provision for the household. To declare what the treasurer's duties are is to say that he should know and overlook every office and officer.—*The Comptroller* takes his charge in the king's presence. He is third in estate in the household after the steward, and by his supervision the treasurer is relieved of many details and accounts of things dispensed, of which he takes the charge. He sees that all goods purveyed for the household are sound and wholesome, and of reasonable price; also that the servants are diligent in their duties, and that their allowances do not exceed their receipts, which are returned into the exchequer. Up to the present time, but little change has taken place in the authorities of these three officers. The treasurer's office appears to have been united with that of the comptroller, and to have been hereditary (stat. 33, Hen. VIII.).—*The Master of the Household* is now under the treasurer, and examines a portion of his accounts, as was formerly done by the cofferer. His chief duties, however, consist more particularly in superintending the selection, qualification, and conduct of the household servants. The three former are always sworn of the Privy Council. They fill political offices, which are held only during the continuance in power of the party to which they belong. The master of the household is appointed during pleasure, and his continuance in office is not dependent upon party. The yearly salaries of these officers at different periods have been as follows:—

					Yearly.		
Under Elizabeth, 1578—							
Lord Steward					L.200	0	0
Treasurer					123	14	0
Comptroller					167	14	0
Under William and Mary, 1689—							
Lord Steward	L.100	0	0	and board wages,	L.1360	0	0
Treasurer (and Cofferer)	223	14	8	...	1076	5	4
Comptroller	107	17	6	...	1092	2	6
Under Victoria, 1856—							
Lord Steward					L.2000	0	0
Treasurer					904	0	0
Comptroller					904	0	0
Master of the Household					1158	0	0

The Court of the Household is held under the Lord Steward and his officers. It is called—

The Court of Marshalsea or Green Cloth, and derived its power from the Common Law, confirmed by several statutes. It had exclusive jurisdiction in the palace of the king, and within the verge, which is defined to include a circuit of 12 miles around. The Court of Marshalsea and of Green Cloth, though exercising at different times very different powers, cannot be described as two separate courts. It is of very ancient constitution, for in the *Household Book* of Edw. IV., ordinances of Hen. I. are quoted as relating to it.

The Steward of the Household is described as "Steward of the whole Court of Marshalsea, of which he is judge of life and limb; and, except those causes, the treasurer, comptroller, cofferer, two clerks of the Green Cloth, and the chief clerk of the enrolment, for any matters else done within the household, or appertaining thereto, they sit with him at the board of doom within the household, that is, the board of Green Cloth in the counting-house, as recorders and witnesses to the truth." The court had, when sitting under the steward as a criminal court, the power to inflict the highest penalties. False compassings and confederacies to destroy the king, or any of the household officers, by the king's servants, was declared felony by 3d Hen. VII., and the trial and judgment were committed to this court. By the 33d Hen. VIII., c. 12, its powers were extended to all treasons, misprisions of treasons, murders, manslaughters, bloodsheds, and malicious strikings, by reason whereof blood is shed, done within any of the royal houses, or houses where the king may be residing, without limitation to offences committed by the servants of the household, with the penalty of death, and forfeiture of lands and goods for all the offences except the malicious striking. For this the penalty was to have the right hand stricken off; and the statute appoints the specific duties of each of twelve of the household servants who are to take a part in this execution, commencing with the chief surgeon, who is to "sear the stump."

Charles I., by letters patent of the sixth year of his reign, in order to remove doubts as to the civil jurisdiction of this household court, and to obviate its frequent removals—for it necessarily followed the court in all its progresses—erected a new court of record called the *Palace Court*, with jurisdiction over all manner of personal actions whatsoever arising between any parties within 12 miles of his palace at Whitehall. The Lord Steward, the Knight Marshal, and the Steward of the Marshalsea, were named as judges, but the Deputy of the Steward of the Marshalsea usually sat alone. Charles II., by a charter of the sixteenth year of his reign, reinstituted the court, which continued to be held under that charter till 1849, when it was abolished by stat. 12 & 13, Vict. cap. 101, on the general establishment of the new county courts for the recovery of small debts.

The extensive criminal jurisdiction of the Lord Steward's court gradually fell into disuse, and the statutes quoted of Henry VII. and Henry VIII. were repealed by 9th Geo. 4, cap. 31. The court became restricted in its functions to the control of the household affairs, and exercised the duties of a board, as it is now alone styled, and no longer those which belong to a court. It took account of all the expenses of the household. It made provision for the household, which in early times comprised the store and purveyance of large supplies of grain, meat, &c., and paid all such charges. It had the good government of the numerous servants and retainers. The steward, treasurer, or comptroller, were required of very special duty to be present daily at the audit of accounts, one or all of them, and to hear complaints, and to correct or appease them after due examination. It was their duty to keep the peace within the palace, and to punish the evil-doers; and for any wrong done to the king's officers or household servants in executing their office or commission, if the offender were the servant of the queen or prince, or any of the judges or lords, he was summoned to answer before the Green Cloth. The usual penalties were,—first, warning in fair manner at the counting-board openly; second, the loss of wages for one month; third, imprisonment for one month; fourth, to be put out of court, and to swear never knowingly to come near it again for ever.

The Lord Chamberlain is at the head of another great branch of the household. He is described (*Lib. Niger*, Edw. IV.), as sitting in the King's chamber, and when it requires for matters to be communed of in the King's Council, then in his own chamber. He was not, therefore, at that time, as has now long been the practice, a member of the Privy Council. "The chamberlain presenteth, chargeth, and dischargeth, all such persons as be of the King's chamber, except all such officers of household, as minister for any victuals for the king's mouth, or for his chamber; for all these take their charge at the *Green Cloth* in the counting-house. He hath the punishment of all those belonging to the chamber for any offence or outrage. The chamberlain taketh his oath and staff of the king, or of his council. He shall at no time within this court be covered in his service." He is "busily to search and oversee the King's chambers, and the estate made therein."

In the present day the duties of the Lord Chamberlain continue nearly those described above. He is an officer of great honour and trust. He is always sworn of the Privy Council. He has control over all the officers and servants of the royal chambers (except the bedchamber), and over the establishment of the chapel-royal, and the physicians, surgeons, and apothecaries of the household; also over the queen's band, and all comedians, trumpeters, and messengers, and all artificers in the queen's service. The performance of stage plays in the metropolis, and wherever there is a royal palace, is illegal, unless the premises in which the performance takes place are licensed by him; nor can any play, or part of a play, be legally acted in any part of Great Britain without his license. It is the Lord Chamberlain's duty to see that persons who wish to be presented to the sovereign at the drawing-rooms and levees are entitled by station and character to that distinction; also to issue, in the Queen's name, invitations to Her Majesty's balls, parties, &c.

The *Vice-Chamberlain* is an ancient officer of the household. The office is shown to have existed in the 13th Richard II. (1389). It is described as of high rank in the reign of Henry IV. The Vice-Chamberlain is now usually sworn a member of the Privy Council. He is the deputy and assistant of the Lord Chamberlain, in whose absence he conducts the Sovereign, and acts with full authority over all the officers and servants subject to his control. Like his principal, he quits office on a change of the government.

The yearly salaries of these officers under different reigns have been as follows:—

Under Elizabeth—							
Lord Chamberlain	200 marks.						
Vice-Chamberlain	100 ...						
Under William and Mary—							
Lord Chamberlain	L.100	0	0	Board wages	L.1100	0	0
Vice Chamberlain	66	13	4	...	492	15	0
Under Victoria—							
Lord Chamberlain					L.2000	0	0
Vice-Chamberlain					924	0	0

In the same book (*Lib. Niger*, Edw. IV.), and in the following order, are also described the officers who formed the chamberlain's branch of the household, with most particular accounts of their places in the house, their allowances, perquisites, and number of attendants. Four bannerets or bachelor knights, called knights of the chamber, twelve knights of the household, a secretary (origin of the secretary of state), with four clerks; four chaplains, four esquires of the body; server of meats, a surveyor of cooks for the king, a wardrober, four gentlemen ushers to pay special attention to strangers; twenty-four yeomen, the watchmen of the previous reign, four yeomen to make beds, an officer of wardrobe of robes, officer of wardrobe of beds, ten grooms of chamber, three pages of chamber; the keeper of the king's jewels, the doctor of physic, the master surgeon, the apothecary, the barber for the king, six henxmen (pages) and their master, and forty esquires of household of different counties, men of education, to give the king counsel.

All the foregoing officers, except the wardrober, either daily or during their rotation of attendance, have their stated allowances; those of higher degree, who take their meals in their own chambers, have livery of "messes of grete mete and roste," wine, torches, candles, faggots, &c.; and those of lesser rank have "etyng in the hall," and take allowances for their chamber at night of wine, ale, bread, candles, and firewood, the quantities being regulated according to the rank of their offices. The number of servants allowed to be brought into the household, and to have livery out of the household, and the allowances which these servants are entitled to receive daily, are also regulated with the same precision.

Then follow the kings of arms, heralds, and pursuivants, whose number is not given. Four serjeants of arms, thirteen minstrels, a wayte, four messengers, priests, dean of chapel, twenty-six chaplains, two yeomen of the chapel, eight children of the chapel, the clerk of the closet, the master of grammar, the officer of vestuary, and the clerk of the crown.

Of the foregoing officers of the Lord Chamberlain's department, the chief, who at present represent their duties, are—*The Lords-in-Waiting*, who attend in rotation, form part of the ordinary court of the Sovereign, and are present on all state occasions. Their appointments are deemed political, and depend upon the existence of the ministry. The *Grooms-in-Waiting* attend in a similar manner. *The Gentlemen Ushers of the Privy Chamber*, who are in constant attendance, and conduct the Sovereign in the absence of the higher officers. The *Gentlemen of the Privy Chamber.* This latter office has become a merely honorary appointment as, of late years, no services have been required. During the present female reign the office of *Groom of the Stole* is in abeyance. His authority in the last reign was exclusive in all matters relating to the bed-chamber. He had no fixed routine of duty, attending only on state occasions. Under his authority were twelve *Lords of the Bedchamber*, officers also in abeyance, and thirteen *Grooms of the Bedchamber.*

The *Yeomen of the Guard* and the *Gentlemen-at-Arms* are the ancient guards of the household. The former corps

Household Royal.

was established by Henry VII. as his body-guard in 1486, and as a royal guard a detachment is still mustered daily in the guard-chamber. The corps now consists of a captain, lieutenant, ensign, four exons, and one hundred yeomen. The yeomen are selected by the commander-in-chief from meritorious men who have served in the army. The captain is usually a peer and a privy councillor, and holds a political appointment dependent upon the government of the day, as does also the captain of the *Gentlemen-at-Arms*. This latter corps was established by Henry VIII. in 1509, and was called the *Band of Gentlemen-Pensioners*, until 1834 when it was re-modelled by William IV., and resumed its ancient title. The appointments are made by the crown on the recommendation of the commander-in-chief, and are restricted to officers of the British army or marines. The corps consists of the captain, lieutenant, standard-bearer, and forty gentlemen, who form the guard to the Queen's person: but their duties now chiefly consist in attendance at drawing-rooms, levees, and state ceremonials.

The *Master of the Horse* is the third great officer of the household, and his office is always described as of great antiquity and trust; but no mention is made of it in the *Household Books* of Hen. VI. or Edw. IV. He is appointed by letters-patent, and has the government and direction of the royal stables, and of all horses and breeds of horses belonging to the crown. His authority extends over all the equerries and pages, grooms, coachmen, saddlers and farriers —and he has the appointment and control of all artificers working for the royal stables. He has the disbursement of the money assigned for the expenses of this department of the household, and exhibits his accounts for the audit of the Green Cloth. He alone is privileged to use the royal horses and carriages, and upon state occasions he rides next to the Sovereign. The *Clerk-Marshal and Chief Equerry* has authority next to the Master of the Horse, and has power to act for him in all matters when absent. He attends the Queen on her rides and upon all state occasions. The four equerries, and four pages of honour, are the remaining head officers. They are the personal attendants upon the Queen, and form part of the state of her court. On attaining a suitable age the pages receive a commission in the Guards without purchase. The *Master of the Buckhounds* is another ancient office connected with this part of the household. His duties seem now to be restricted to the management of the royal hunt. The offices of the Master of the Horse, the Chief Equerry and the Master of the Buckhounds, are dependent upon the duration of the political party in power.

The yearly salary of the Master of the Horse under different reigns has been as follows:—

Under Queen Elizabeth	1000 marks
Under William and Mary	L.1200
Under Victoria	2500

The *Ladies of the Household* fill a more important rank in the court of a female sovereign. The *Mistress of the Robes* is at the head of this part of the household. Her office is ancient and of high dignity. She has the superintendence of all duties belonging to the bedchamber, within which the Lord Chamberlain has no authority. She regulates the rotation and times of attendance of all the ladies. She has the custody of the robes; and on state occasions sees that the ceremony of robing the Queen is properly performed. She rides in the same carriage with the Queen on state occasions. The *Ladies of the Bedchamber* are the personal attendants upon the Queen, and form part of her court on state occasions. There are now eight, and two extra. The *Bedchamber Women*, also eight, and one extra, are subordinate to them. The *Maids of Honour*, eight, are the immediate attendants upon the Queen. They are on duty in rotation, and accompany Her Majesty upon all occasions.

The yearly salaries attached to each of the foregoing offices are as follow:—

Lords-in-Waiting	L.703
Grooms-in-Waiting	335 10s.
Groom of the Stole (in abeyance)	2000
Lords of the Bedchamber (in abeyance)	1000
Grooms of the Bedchamber	500
Yeomen of the guard—	
Captain	1000
Lieutenant	500
Ensign	300
Exons	150
Yeomen	60
Gentlemen-at-arms—	
Captain	1000
Gentlemen-at-arms—	
Lieutenant	L.500
Standard-bearer	310
Clerk of the Cheque	120
Gentlemen	70
Master of the Horse	2500
Clerk-Marshal, &c.	1000
Equerries	700
Pages	200
Master of the Buckhounds	1700
Ladies of the Household—	
Mistress of the Robes	500
Ladies of the Bedchamber	500
Bedchamber Women	300
Maids of Honour	400

The household officers described in the foregoing are distinct from a class of hereditary officers of great consideration and rank, who on certain state ceremonies perform duties to the sovereign. (S. R.)

Houssa.

HOUSSA is the name of an extensive portion of Central Africa, which, along with Bornou, bears the general name of Soudan, or Land of the South. It consists of various petty kingdoms or states, which occupy territory stretching E. and W. from the upper course of the Yeou nearly to the Niger, the boundaries of which on the S. and N. and W. have now for the first time been determined by Dr Barth. This region appears in several respects to be superior to the countries on either side of it. It is less sultry, an advantage which it probably owes to its higher elevation. The face of the country bears marks of greater cultivation, the fields being covered with large crops of several kinds of Indian corn, two of which are annually produced; and, to prevent the grain from being destroyed by insects, it is secured in granaries raised on poles. The soil is well watered by the rivers Sokoto, Mariadi, Zyrmie, Bugga, Zoma, and others, which, with several tributaries, flows westward to join the Niger. On its eastern quarter it is traversed by the Yeou, and on its southern by the Benneh or Chadda. Besides these natural supplies of water, artificial irrigation is diligently practised.

The dominant people in Houssa are the Fellatas, this country forming, in fact, a considerable portion of the empire of Sokoto, which again comprises the eastern part of the Fellata dominions. The following provinces constituting Houssa are, according to Dr Barth—

1. Kano, with the governor or sultan of Osman Ben Ibrahim Dabo. Important on account of the market, which yields 10,000 cowries daily for the household of the great sultan at Sokoto. The military power consists of 7000 horse.
2. Boshi, or Bautschi, S.E. from Kano, with the capital Yakoba, the most powerful province after Kano. The sultan, Ibrahim Ben Yakúba, has a force of 2000 horse, and his troops of archers which are numberless, besides their being known as the best in Soudan.
3. Zegzeg, a province of great extent S. of Kano. The sultan, Mohammed Sani, resides at Zaria, and has about 2000 horse, as well as numbers of archers.
4. Khadedsha, or Hadija, a small province E. from Kano, with the sultan Kammedu, having a force of about 2000 horse.
5. Katagum, S.E. from Kano. The sultan, Abd-er-Rahmán, is said to bring 1500 horse into the field.
6. Katsena, N.W. of Kano, with the residence of the same name. Owing to its vicinity to the hostile countries of Mariadi and Gober, this province has greatly declined in power; the sultan, Mohammed Bello Ben Mallem Romáro, has a force of not much more than 1000 horse.
7. Daura, E. of Katsena, a province greatly devastated. The freebooting governor, Mohammed Bello, though he has but 400 horse, is feared by all his neighbours.
8. Zanfara, a large province W. from Katsena, with Ahmedu the sultan, who resides at Bakura, and has a force of 3000 to 4000 horse in command.

9. Gober, to the N.E. of Sokoto, and adjoining the Desert. The residence of the sultan Wurno belongs to this province, and forms the southernmost boundary.
10. Kebbi, the eastern portion of it, comprising the capital of the eastern Fellata empire, Sokoto.

Kano, the capital of a province of the same name, and the principal commercial city of Houssa, is situated in N. Lat. 12. 0. 19., and E. Long. 8. 30. It may contain between 30,000 and 40,000 inhabitants, of whom a great proportion are slaves. This number is exclusive of strangers, who crowd thither during the dry months from all parts of Africa. The city is of an irregular oval shape, about fifteen miles in circumference, and surrounded by a clay wall thirty feet in height, having a dry ditch on both sides of it. There are fourteen gates made of wood, and covered with sheet iron, and these are regularly opened and shut at sunrise and sunset. A platform inside, with two guardhouses below it, serves to defend each entrance. The houses within the walls do not occupy more than one fourth of the ground inclosed, the remaining space being laid out in fields and gardens. The city is almost divided into two parts by a large morass, which stretches from E. to W. This swamp is crossed by a small neck of land, which is overflowed during the rainy season, but in the dry season the market is held upon it. On account of this morass, and also of the many pools of stagnant water made by digging clay for building houses, the city is rendered very unhealthy. Captain Clapperton thus describes the houses of Kano.

"They are built of clay, and are mostly of a square form, in the Moorish fashion, with a central room, the roof of which is supported by the trunks of palm-trees, where visitors and strangers are received. The apartments of the ground-floor open into this hall of audience, and are generally used as store-rooms. A staircase leads to an open gallery overlooking the hall, and serving as a passage to the chambers of the second story, which are lighted with small windows. In a back court-yard there is a well and other conveniences. Within the inclosure in which the house stands, there are also a few round huts of clay, roofed with the stalks of Indian corn, and thatched with long grass. These are usually very neat and clean, and of a much larger size than those of Bornou. The governor's residence covers a large space, and resembles a walled village. It even contains a mosque, and several towers three or four stories high, with windows in the European style, but without glass or framework. It is necessary to pass through two of these towers in order to gain the suite of inner apartments occupied by the governor."

The great market, as already observed, is held upon the neck of land which intersects the morass. Here streets consisting of sheds or stalls of bamboo are regularly arranged, different places being allotted to those who traffic in different commodities. The latter consist of cattle, vegetables, fruits, the fine cotton fabrics of the country, goora or kolla nuts, which are called African coffee, and crude antimony, with which every eyebrow in Houssa is dyed. The Arabs also dispose of sundry commodities, such as various dresses. The slaves, who constitute the staple article of trade, have a special market appropriated to them, consisting of two long ranges of sheds, one for males and the other for females. Here these poor creatures, drawn up in regular array, and dressed in attractive attire, are inspected and scrutinized by purchasers, in much the same manner as horses are in the cattle-markets of this country. The market of Kano is under the superintendence of a sheik, who regulates the police, and is said also to possess the exorbitant power of fixing the prices. The medium of exchange consists of the small shells called cowries, four hundred and eighty of which make a shilling, so that paying a large sum is here rather a tedious process. Kano is celebrated all over Central Africa for the dyeing of cloth, for which process there are numerous establishments. Some ingenuity is displayed in the manufacture of leathern jars, which are fashioned upon a clay mould out of the raw hide. The inhabitants are also acquainted with the art of tanning. The negroes here are very polite and ceremonious, especially to those advanced in years. A part of the city is appropriated to the use of those who are afflicted with blindness, which is a prevalent disease.

Adjoining the province of Kano on the E. there is a portion of territory called Katagum, which in Captain Clapperton's time was able to send into the field 4000 horse and 20,000 foot, armed with bows, swords, and spears. The city is built in the form of a square, the sides facing the cardinal points of the compass, with four corresponding gates, which are regularly opened and shut like those of Kano. It is defended by two walls, which have ditches on each side, and one between them. The governor and principal inhabitants have houses made entirely of clay. They are flat-roofed, and sometimes consist of two stories, with square or semi-circular openings for windows. The city may contain from 7000 to 8000 inhabitants. There are other towns comprised within the boundaries of this province, but none requiring particular description. Many parts of Katagum are highly cultivated, and laid out in plantations of cotton, tobacco, and indigo, which are separated from one another by rows of date-trees, and shaded by large umbrageous trees.

The next considerable town is Sokoto, situated nearly at the western extremity of Houssa. The country which lies between Kano and Sokoto is remarkably fine, and under high cultivation. It is diversified with forests of noble trees, and various rivers and streams, and traversed by picturesque ridges of granite, amongst which villages are romantically situated.

Sokoto stands in N. Lat. 13. 4. 52., and E. Long. 5. 20. "It occupies," says Captain Clapperton, "a long ridge which slopes gently towards the N., and appeared to me the most populous town I had visited in the interior of Africa; for, unlike most other towns in Houssa, where the houses are thinly scattered, it is laid out in regular well-built streets. The houses approach close to the walls, which were built by the present sultan in 1818, after the death of his father; the old walls being too confined for the increasing population. There are two large mosques, including the new one at present building by the Gadado, besides several other places for prayer. There is a spacious market-place in the centre of the city, and another large square in front of the sultan's residence. The dwellings of the principal people are surrounded with high walls, which inclose numerous coozees and flat-roofed houses, built in the Moorish style, whose large water-spouts of baked clay, projecting from the eaves, resemble at first sight a tier of guns. The inhabitants are principally Fellatas, possessing numerous slaves. Such of the latter as are not employed in domestic duties reside in houses by themselves, where they follow various trades; the master, of course, reaping the profit. Their usual employments are weaving, house-building, shoemaking, and iron work; many bring firewood to the market for sale. Those employed in raising grain and tending cattle, of which the Fellatas have immense herds, reside in villages without the city. It is customary for private individuals to free a number of slaves every year, according to their means, during the great feast after the Ramadan. The enfranchised seldom return to their native country, but continue to reside near their old masters, still acknowledging them as their superiors, and presenting them yearly with a portion of their earnings. The trade of Sokoto is at present inconsiderable, owing to the disturbed state of the surrounding country. The necessaries of life are very cheap; butcher-meat is in great plenty, and very good. The exports are principally civet and blue check *tobes* called *sharie*, which are manufactured by the slaves from Nyffi, of whom the men are considered as the most expert weavers in Soudan, and the women as the best spinners. The common imports are brought from the borders of Ashanti; and coarse calico and woollen cloth, in small quantities, with brass and pewter dishes, and some few spices, from Nyffi. The Arabs, from Tripoli and Ghadamis, bring unwrought silk, ottar of roses, spices, and beads. Slaves are both exported and imported. A great quantity of Guinea corn is taken every year by the Tuaricks, in exchange for salt. The market is extremely well supplied, and is held daily from sunrise to sunset. On the N. side of Sokoto there is a low marsh, with some stagnant pools of water, between the city and the river; this, perhaps, may be the cause of the great prevalence of ague, as the city stands in a fine airy situation."

Subsequently to the writing of the above description, nearly two-thirds of the city was destroyed by a conflagration; but when Clapperton visited it a second time, it had been rebuilt, in a manner so closely resembling what it had formerly been, that little alteration could be perceived. The palace, or house of the sultan, forms a sort of inclosed town, with an open quadrangle in front. A painted and ornamented cottage constitutes the hall of audience. Sokoto even then was on the decline, on account of the residence of the court having of late been transferred to Magaria.

According to the more recent information as supplied by Dr Barth, the town of Wurno, previously quite unknown, has become the capital instead of Magaria.

Wurno is situated 15 geographical miles N.E. from Sokoto, and is quite a new town, having been founded by Sultan Bello in 1831. It lies on a gentle eminence in a bend of the River Rima, which here flows towards Sokoto. It contains at present 12,000 to 13,000 inhabitants, among which are the most opulent inhabitants of Sokoto, who left that town when Wurno was founded. As to the market, however, that of Sokoto is still superior to that of Wurno, and forms one of the best provided markets in all Central Africa. Regarding the number of inhabitants, Sokoto is also much above Wurno,—still possessing, as it does, 20,000 to 22,000 souls. Dr Barth resided for upwards of a month at Wurno, where he was very kindly received.

Sokoto is described by Dr Barth as forming nearly a regular square, and having eight gates, not twelve, as formerly supposed. Dr Barth found the house of the gedádo, Clapperton's old friend, who died only two years previously, while that of the Sultan Bello was almost in ruins. The best inhabited quarter of the town, at present, is that round the large residence of Hammédu, the valiant son of Atíku, the brother and successor of Bello, during whose reign the roads were so safe that a single traveller could go from Sokoto to Kano without the least danger, whereas they have since become so insecure that almost all communications with Kassena and Kano have ceased, and the Arab traders have discontinued their visits, so much so, that at present not a single Arab lives either at Sokoto or Wurno; the commerce of those places with the Mediterranean shores is now in the hands of the people of Air and Ghat, who arrive annually with the large salt caravans of the Hésan and Kelgeres. Sokoto has a mixed population, the Zoromana forming the chief portion of the inhabitants. They are, unlike the tribes of pure Pullo or Fellan origin, very industrious, and are excellent workmen in leather, iron, and gebbega or cotton-stripes. The articles of iron made at Sokoto are the best in all Soudan; and Dr Barth purchased some specimens of beautiful workmanship. The Zoromana are the principal inhabitants of the town, while the Syllebana, a very interesting tribe, different from, but united with the Fellatas from time immemorial, inhabit the villages round the town. There are also a great many Nyffi (or Nufi), and Yariba (or Yoriba) people living in Sokoto.

The same recent traveller describes the country in the vicinity of Wurno and Sokoto as a tableland of sandstone formation, the more elevated portions being chiefly cultivated with dhurra, while the faddamas or valleys, which are greatly inundated during a portion of the year, form excellent ground for the cultivation of rice and cotton, besides which, *rogo*, a large palatable root, is extensively grown. The country in the immediate vicinity of Wurno is very bare of trees; but in other parts there are plenty of *doom* trees, *kurna*, tamarind, and *gonda*.

The countries of Guber and Zamfra or Zanfara are inhabited by a rude and warlike race, who have sometimes assumed authority over Houssa, and are at present, or were lately, in open rebellion against Sokoto. Coonia, the capital of Guber, was a strongly fortified place, and in 1829 repulsed the whole military force of Houssa, consisting of 50,000 or 60,000 men, but has been since, according to Dr Barth, entirely destroyed. Zirmie occupies a peninsula formed by a small river, which has here very high and steep banks covered with mimosas and prickly bushes, through which a narrow path winds to the gates. It is surrounded with a clay wall and a dry ditch. The governor of this stronghold bears the character of a freebooter, and the inhabitants, whom Clapperton represents as having a reckless independent look, are esteemed the greatest rogues in all Houssa. Runaway slaves from all quarters make Zirmie an asylum, where they are always well received.

To the N.N.W. of Kano lies the considerable province of Kashna or Kassina, which at one period held supreme sway over all Houssa, and which has recently shaken off the yoke of Sokoto. Kashna, the capital, is situated in N. Lat. 12. 59., on a ridge of sienite, one of a number of ridges of this rock which run from N.N.E. to S.S.W. The walls are of clay, and very extensive; but, as in the case of Kano, the houses do not occupy above one-tenth of the ground inclosed, the rest being laid out in fields, and covered with wood. The houses are mostly in ruins, the principal commerce of the country having been transferred to Kano since the Fellata power became predominant. Notwithstanding its abject state, it has nevertheless a considerable trade, which is carried on with the Tuaricks, or with caravans coming across the desert by the route of Ghadamis and Tuat. The manufactures of Kashna are chiefly of leather, such as water-skins, red or yellow cushions, bridles of goat-skin, and hides. There is likewise some trade in fruits, such as figs, melons, pomegranates, and limes.

To the S. of Sokoto and Kano lies the country of Zegzeg, one of the finest in all Africa, and the most extensive province in Houssa. It is bounded on the E. by Kano, on the S.E. by Boshi, on the S. by a mountainous tract inhabited by pagans, on the S.W. by Nyffi, and on the N. and W. by Guari and Kashna. Travellers represent Zegzeg as resembling in appearance the finest parts of England, being beautifully variegated with hill and dale, over which are spread rich pastures and extensive fields, yielding plentiful crops, particularly of rice. Zaria, the capital, is situated in N. Lat. 10. 59. and about E. Long. 8. 0. It occupies a great extent of ground, the houses being detached, or rather clustered together in small villages, which are separated from each other by corn fields, and even woods. The whole is surrounded with high clay walls, and the population has been estimated at about 50,000. To the S. of Zegzeg, the country, though diversified by rising grounds, is fertile and well cultivated, and contains a number of considerable towns. Lander describes Cuttup as consisting of "nearly 500 villages almost joining each other, occupying a vast and beautiful plain, adorned with the finest trees. Among these, the plantain, the palm, and the cocoa-nut tree were seen flourishing in great abundance, and the aspect of the country strikingly resembled some parts of Yariba. A considerable traffic is carried on here in slaves and bullocks, which are

Houssa.

alike exposed in the daily market. The bullocks are bred by the Fellatas, who reside here for no other purpose. Among the other articles brought here for sale, are red cloth, gum, salt, goora-nuts, trona, beads, tobacco, native cloth, rings, needles, cutlery, honey, rice, and milk; people from the most distant parts resorting hither in vast numbers." To the south of this place stretch a range of hills, which, Lander was told, were inhabited by a ferocious race of *yam-yams* or cannibals, who a short time previously had killed and eaten a whole caravan of people. In a country fertile, but rocky, is situated Dunrora, a town containing about 4000 inhabitants.

In the western tracts of Houssa there are few towns of any importance: some were visited, and have been described by Captain Clapperton. After leaving Boogawa, a small town in the province of Katagum, and passing first through a thickly-wooded tract, and then over an open, well cultivated country, this traveller reached Katungwa, a walled town. A range of low rocky hills was seen stretching nearly S.W., called *Dooshee* (the rocks), from which a large town takes its name. These were the first rocks that had occurred after leaving the southern borders of the Great Desert, the whole country thus far being alluvial clay. Near the extremity of the Dooshee Hills is situated Zangeia, within the walls of which town there is a ridge of loose blocks of stone connected with the range. These masses of rock are about 200 feet in height, and give a romantic appearance to the neat huts clustering round the base, and to the fine plantations of cotton, tobacco, and indigo, and the rows of date and other trees. From the extensive walls which remain, Zangeia must have once been a very large town. Now, however, it consists merely of a collection of thinly scattered hamlets. The country between this place and Kano is highly cultivated, and beautifully diversified by hill and dale. Captain Clapperton passed several walled towns, the principal of which was Girkwa. As in the other towns already described, the houses here are in groups, with large intervening vacancies. The disproportion in the size of the walls of towns and the number of houses, to the amount of inhabitants, which is exhibited in many parts of Houssa, is to be accounted for by the usurpation of the country by the Fellatas, who generally massacred the former occupants, or carried them away captives. To complete our description of Houssa, it will be necessary to give an account of this singular people, who are gradually extending their authority over Central Africa.

By the most correct accounts, it would appear that the Fellatas are an off-shoot from the Foolahs of Western Africa, and may be identified with them. They are a mixture of Moors, Arabs, Berbers, and probably other races of men. They are much superior to the native negroes, with whom they very rarely mix their blood. Captain Lyon, speaking of the Fellatas, observes, "their complexion being of a much lighter hue than that of the other tribes, they call themselves white; their colour resembles that of our gypsies in England. Many female slaves are brought to Mourzouk from their nation, and are very handsome women." Other observers describe their complexion as being very dark, and of a shade intermediate between that of the deepest African and the Moors. The fact seems to be, that their colour varies in a very remarkable manner, from being nearly white to nearly black. Both men and women pay considerable attention to their dress, which amongst the wealthy inhabitants is rather showy. In their domestic habits they are regular, orderly, and cleanly, and the slaves are generally well treated. The Mohammedan is the predominant religion, and considerable attention is paid to keeping up an appearance of it. Prayers are regularly said five times a day in the Arabic language, which both the male and female children of the better sort of Fellatas are taught to read and write. Their marriages are celebrated without any pomp or noise, and such contracts are of a less arbitrary nature than we find them to be amongst the inferior races of mankind. Captain Clapperton makes the following remarks regarding Houssa:—"The government of the Fellatas in Soudan is in its infancy. The governors of the different provinces are appointed during pleasure; and all their property, on their death or removal, falls to the sultan. The appointment to a vacancy is sold to the highest bidder, who is generally a near relation, provided that his property is sufficient to enable him to bid up to the mark. All the inferior offices in the towns are sold in like manner by the governors, who also succeed to the property of those petty officers at their death or removal. A great deal of marketable property is claimed by the governor, such as two-thirds of the produce of all the date-trees and other fruit-trees, the proprietor being allowed only the remaining third. A small duty is also levied on every article sold in the market; or, in lieu thereof, a certain rent is paid for the stall or shed. A duty is also fixed on every *tobe* that is dyed blue, and sold. On grain there is no duty. Kano produces the greatest revenue that the sultan receives; it is paid monthly, in horses, cloth, and cowries. Adamowa pays yearly in slaves; Yacoba in slaves and lead ore; Zegzeg in slaves and cowries; Zamfra the same; Hadeja and Katagum in horses, bullocks, and slaves; Cashna in slaves, cowries, and cloth; Ader, or Tadela, in bullocks, sheep, camels, and a coarse kind of cotton cloth, like what is called by us a counterpane." Of the number of negroes and Fellatas who inhabit the country of Houssa no correct idea can be formed. Much additional and more precise information on these countries may be expected from the pen of Dr Barth, that energetic traveller, who has so thoroughly explored these regions. (A. P.)

Houston
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Hoveden.

HOUSTON, a city of Texas, United States of North America, capital of Harris county, and the second commercial city in the state. It is situated on Buffalo Bayou, at the head of its steamboat navigation, and 45 miles above its mouth in Galveston Bay. It is the principal shipping port for the cotton, sugar, and maize of the adjacent counties. Pop. (1853) estimated at 6000.

HOVEDEN, ROGER DE, an ancient English chronicler, was a native of Yorkshire, and is believed to have been born in the town of Hoveden or Howden, from which he took his name. The dates of his birth and death are not known with certainty, but he seems to have been born about the middle of the twelfth century, and to have lived some years into the thirteenth. He was well acquainted with civil law, and his knowledge of canon law recommended him to Henry II., who employed him to inspect the houses of the religious orders, and keep watch over such of their revenues as fell in to the king on the death of any of the superiors. Taking up the narrative of his *History* at the year 732 (the point at which that of the venerable Bede comes to a close), Hoveden brings it down to 1202, the third year of the reign of King John. By far the largest portion of the work is occupied with the reigns of Henry II., Richard, and John. The historical details of this period are very fully given, and are illustrated by a large number of letters of kings, popes, and leading nobles. The writing itself is the most condensed to be found in any of our old chronicles, and is in fact carried to such an extreme, that the chronicler never stops the dusty march of his narration to indulge in a single reflection, or indicate his own opinion by a solitary adjective. His strict accuracy and fidelity, however, are unanimously attested by all the best antiquaries. So high, indeed, did his character for these qualities stand in his own times, that Edward I. is said to have sought out his history with a view of settling, on its authority, the justice of his claims to homage from the king of Scotland. Hoveden's *History* is published in Sir Henry Savile's collection of the *Scriptores post Bedam*, and was reprinted at Frankfort in 1601. A translation of it by H. F.

Riley, B.A., forms vols. xx. to xxiii. of Bohn's *Antiquarian Library*.

HOVELLERS, The, a hardy and useful race of boatmen residing principally at Deal, Dover, Ramsgate, and Margate. They are distinct from the ordinary maritime population, and annually save a large amount of property and many lives by their skill and seamanship. They have different kinds of boats, according as they have to land passengers or help ships in distress. An important part of their task is that of taking out anchors and chains to ships in stormy weather. A service of this kind done one day may be rewarded with L.50, and next day the same service with L.500. The reason of the difference is, that while in fair weather the hovellers are paid for their labour, they are paid, in bad weather, for the risk they run, according to a systematic principle introduced by the late Henry Dove, Esq., R.N. of Margate. The awards are determined by a commission of naval officers appointed for the purpose.

HOWARD, Charles, *Lord Howard of Effingham* was the son of Lord William Howard, and grandson of Thomas Howard, second duke of Norfolk. Under his father, who was lord-high-admiral of England, he served with much distinction both by land and sea; and when the Spanish Armada was approaching the shores of England in 1588, he was himself promoted to the office which his father had so ably filled. It was mainly owing to his valour and nautical skill that that mighty armament was foiled, and Elizabeth evinced her sense of his services, by granting him a life-pension. In 1596, he held the joint command along with Essex of the English expedition against Cadiz, and on returning home was again rewarded for his services by the queen, who created him Earl of Nottingham. This act of Elizabeth's is the more creditable to her, that Essex, piqued at not being entrusted with the supreme command, had ungenerously tried to poison her mind against one of her most able and faithful servants. In 1599, when danger again threatened on the side of Spain, and Essex's conduct in Ireland seemed to indicate rebellion, Howard was made lieutenant-general of the kingdom, with the command-in-chief of all the forces, naval and military. In the six weeks during which he held this office, he crushed his old rival and brother-in-arms, who had raised the standard of revolt in Ireland; but instead of trampling upon his fallen foe, he treated him with a noble generosity and forbearance, of which that foe had shown himself little worthy. Elizabeth's death made no change in Howard's position at court. Her successor frequently availed himself of his services in delicate and important affairs. Some years before his death, Howard resigned his office of lord-high-admiral in favour of Villiers Earl of Buckingham, receiving in exchange a pension of L.1000. He died, December 14, 1624, in the eighty-seventh year of his age, after one of the most useful and honourable careers that ever fell to the lot of an English seaman to pass through.

Howard, *Henry*, Earl of Surrey, one of the most gallant and accomplished of English nobles, and the first of our poets who composed in blank verse, was the eldest son of Thomas the third Duke of Norfolk. The exact date and place of his birth have not been ascertained, but the former is usually assigned to the year 1517. Of a family illustrious for rank, fortune, alliances, and public services, Surrey was early introduced to court, and he formed an intimacy, which soon ripened into a close and tender friendship with the king's natural son, Henry Fitzroy, Duke of Richmond. While yet a boy, we find Surrey in attendance at court as cup-bearer to the king. In 1532, along with his young friend Richmond, he accompanied the sovereign to Boulogne, and in the following year he assisted as one of the sword-bearers at the marriage of Henry with Anne Boleyn. About this period, or even earlier, Surrey was affianced to the Lady Francis Vere, daughter of the Earl of Oxford, while Richmond was in like manner contracted to the Lady Mary Howard, Surrey's sister. The actual marriage of Surrey did not take place till 1535, and that of Richmond was prevented by his premature death, in July 1536. Previous to this time Surrey seems to have been enamoured of a certain Lady Geraldine, who has puzzled his biographers, and served as the groundwork of a series of romantic fictions. Some of the love sonnets of the noble poet may be purely fanciful imitations of Petrarch, in accordance with the taste and chivalrous gallantry of the age, but in one he gives a minute account of the lady of his affections:—

> "From Tuscane came my lady's worthy race;
> Fair Florence was some time her ancient seat:
> The Western Isle whose pleasant shore doth face
> Wild Camber's cliffs first gave her lively heat;
> Fostered she was with milk of Irish breast;
> Her sire an earl, her dame of prince's blood,
> From tender years in Britain did she rest
> With king's child, where she tasteth costly food.
> Hunsdon did first present her to mine eyen,
> Bright is her hue, and Geraldine she hight.
> Hampton me taught to wish her first for mine,
> And Windsor, alas! doth chace me from her sight."

This array of biographical particulars indicates a real personage, and Horace Walpole set himself to prove that the lady was a daughter of Gerald Fitzgerald, Earl of Kildare, whose family is said to have been descended from one of the Dukes of Tuscany. Various circumstances concur to establish this theory, but the lady could only have been a child when Surrey wrote his sonnet, unless we suppose that his attachment had, contrary to good faith and true knighthood, taken place after his marriage. Founding upon this sonnet, Tom Nash, one of the most lively and unscrupulous satirists and miscellaneous writers of the reign of Elizabeth, put forth a singular romance, the pretended journey and adventures of Surrey in Italy on a visit to Florence, the assumed birth-place of his Geraldine. Nash's invention imposed upon Drayton, and being adopted by Anthony à Wood in his *Athenæ* (with sundry additions, and Nash's authorship concealed), was continued as a genuine narrative by Walpole, Warton, and others. According to this historical romance, Surrey travelled like an Amadis, proclaiming the charms of his mistress, and prepared to defend her beauty in the spirit of knight errantry. On his way to Florence he passed a few days at the emperor's court, and there met Cornelius Agrippa, a celebrated adept in natural magic, who, in his mirror of glass, showed him the lively image of his Geraldine, "weeping on her bed, and resolved all into devout religion for the absence of her lord." Inflamed by the spectacle, Surrey hastened to Florence, and published a defiance to all knights and lovers, whether Christian, Jew, Turk, Saracen, or cannibal, who should presume to dispute the superiority of his Geraldine's beauty. The challenge was accepted, the Grand Duke permitting the combat, and opening the lists to all nations, and Surrey, of course, proved victorious. The shield which he presented to the duke before the tournament began, being preserved by the Norfolk family, and engraved by Vertue! The whole of this story—the continental journey, magic mirror, and tournament, was the invention of Nash, and is related in his *Life of Jack Wilton*, published in 1594. The literary fraud remained undiscovered till 1810, when Alexander Chalmers, in his edition of the *English Poets*, partially separated the truth of Surrey's history from the fable that had been blended with it, and Dr Nott, in his *Memoir of Surrey*, completed the detection. At the time of the pretended journey, the noble poet was in England anticipating the birth of his son, who was born on the 10th of March 1536. In May, of this year, the trial of Anne Boleyn took place, and Surrey was present as Earl Marshal, in the room of his father, who presided as Lord Treasurer. In October he obtained the honour of knighthood from the king. At all the pageants and tournaments of the court, he was a conspicuous actor, and when war with France was threatened, we find him no less prominent in important public service. In 1540 he was joined in a commission with Lord Russell and the Earl of Southampton to visit the English Pale at Guisnes, and place the defences in proper order. He returned before Christmas. In the following year an incident is related, which, though involved, like other events in his career, in some obscurity, seems to illustrate at once his personal influence and magnanimity of character. Sir Edward Knyvett, a person high in court favour, assaulted Surrey's friend and attendant, Thomas Clere, having struck him within the precincts of the palace. The indignity would probably have been passed over as inflicted only on a subordinate, but Surrey took it up warmly, and succeeded in bringing Knyvett to trial, the result of which was, that the knight was convicted and sentenced to lose his right hand. At this point Surrey again interposed. The public trial and conviction he deemed sufficient punishment, and at his intercession the sentence was remitted. In 1542, the king conferred upon Surrey the distinction of the order of the garter. He seems, however, to have fallen into temporary disgrace the same year, in consequence of having quarrelled with, and challenged a certain John-à-Leigh of Middlesex. His conduct in this matter must have been violent and blameable, for he was committed to the Fleet, and only obtained his release after making a humble supplication to the privy council (in which he speaks of the "fury of reckless youth," and promises to "bridle in his heady will"), and by entering into recognizances to keep the peace to John-à-Leigh and his friends. A better field for his impetuosity and courage was soon opened up. War with Scotland was declared. Henry, indignant at his nephew, James V., who had failed to meet him at a conference appointed to be held at York, and who had otherwise offended the imperious monarch, ordered the Duke of Norfolk to proceed to the borders with a force of 40,000 men to chastise and lay waste the country. Surrey, attended by Thomas Clere, accompanied his father on this expedition, and the English army unresisted, ravaged the border districts, burning two towns and twenty villages on the banks of the Tweed. What part Surrey took in this affair, or what command he held, is not stated, but in his epitaph on Clere, he mentions that his follower, tracing the steps of his lord, "saw Kelsal [Kelso] blaze." The short and destructive *raid* was over by the end of November 1542. On the 1st of April following, Surrey is ascertained to have been in London, the records of the privy council of that date furnishing another instance of his "heady will." It appears that with two companions, Wyatt and Pickering, he was summoned to the council on a complaint by the mayor, recorder, and aldermen, of the city, charging him with having, "in a lewd and unseemly manner," walked in the night about the streets, breaking the windows of the citizens with his stone-bow; and farther, that he had been guilty of eating flesh during the time of Lent. The first and most serious of these offences he did not attempt to deny: he acknowledged that he had "very evil doings therein;" but touching the eating of flesh, he alleged a license, "albeit he had not so secretly used the same as appertained." He was sent to the Fleet for a month; and he took revenge on the citizens, by inditing a poetical satire against them, in which he gravely alleges, that he woke the sluggards with his bow as a reproof to them for their dissolute life and sins—

"The which by words since preachers know
What hope is left for to redress,
By unknown means it liked me,
My hidden burthen to express."

This must be taken as ironical; but throughout the whole satire Surrey appears in the character of a devout and indignant denouncer of the vices of "false Babylon," on which he says the martyrs' blood calls for justice, and the Lord would hear their desire! We cannot but think that there was something more in this case than mere riotous excess and youthful folly. But Surrey was soon called off by military service from any further display of his unruly piety. War had been declared against France, and Surrey joined the auxiliary army under Sir John Wallop, encamped before Landrecy. He applied himself diligently to the study of military fortifications and tactics, and one day, when visiting the trenches, he made a narrow escape from a piece of ordnance shot towards him. On the approach of winter the siege of Landrecy was raised, the army went into quarters, and Surrey returned to England. Next summer he was again in the field, holding the important post of marshal of the vanguard commanded by his father. The troops under Norfolk and Surrey besieged Montreuil, but were inadequately supported, owing chiefly, it is said, to the jealousy and enmity of the Earl of Hertford, who kept back supplies; but there was no lack of military skill or bravery. Surrey distinguished himself by daring expeditions against the enemy, and on an attempt to storm the town he effected a lodgement within the gates, but was dangerously wounded and carried off by his attendant Clere. In this service Clere himself received a hurt which ultimately proved fatal.

"At Montreuil gates, hopeless of all recure,
Thine Earl, half dead, gave in thy hand his will,
Which cause did thee this pining death procure."

The English were compelled to raise the siege of Montreuil. The Dauphin was approaching with an army of 60,000 men, and Norfolk's vanguard, though strengthened by reinforcements, was unable to cope with such a force. A retreat was resolved upon, which was ably conducted by Surrey as marshal of the camp. Boulogne had capitulated to Henry in person, and it was necessary to guard and maintain an acquisition so dearly purchased and highly valued. In the summer of 1545 Surrey again sailed for France, as commander of a body of 5000 men raised and equipped for a new expedition. He was shortly afterwards appointed governor or king's lieutenant of Boulogne; and both in his plans of defence, and in operations in the field, he fully sustained his reputation. One great effort, however, unfortunately proved a failure. He attempted to intercept a convoy of provisions for the enemy near St Etienne, but the defence was obstinate, and one of Surrey's attacking columns of infantry fled back in a sudden panic, which threw the army into disorder, and the day was lost. This disastrous affair was seized upon by Lord Hertford to incense the king against Surrey, and within a few months he was recalled, his successful rival being appointed the king's lieutenant-general. Prudence was never one of the virtues of Surrey, and his indignation at the intrigues of Hertford was openly and fiercely manifested, accompanied by expressions importing that he would be revenged in the next king's reign. The jealousy of Henry was roused by these declarations, and Surrey was sent a prisoner to Windsor Castle. He succeeded, however, in softening if not removing the royal displeasure, and in August of the same year he is again seen in attendance at court. This glimpse of favour soon vanished never to be renewed. On the 12th of December Surrey was arrested and committed to the Tower, and on the same day his father was also consigned to the Tower, each being ignorant of the other's fate. There can be no doubt that it is to the Hertford faction that we must attribute this decisive step. The king was known to be dying, and Hertford, as uncle of the heir to the throne, aspired to be protector of the kingdom during the minority of his nephew. The family of Norfolk stood between him and his ambition. The Duke was head of the Roman Catholics, and the most opulent and powerful nobleman in the kingdom. His son, the Earl of Surrey, was likely to extend and perpetuate these advantages. Now, therefore, while Henry yet lived was the time to stimulate the natural cruelty and suspicion of the monarch, and secure to Hertford and the Protestant interest the removal of these dangerous and formidable rivals. They were aided by parties from whom no such help could have been expected. The Duchess of Norfolk, a passionate and revengeful woman, who had long been separated from her husband, and the Duchess of Richmond, Surrey's own sister, were brought forward as accusers. Their depositions only went to assert that Surrey was rash, and had spoken bitterly against Hertford; that the Duke of Norfolk had expressed dissatisfaction at the changes in the church (no such charge being preferred against his son); and that Surrey had persisted in quartering what seemed the royal arms on his escutcheon. A suspicion was thrown out that the earl also had a design upon the king's daughter, the Princess Mary, though the fact that Surrey's wife was in existence must have been known to all. In the mockery of a trial which ensued, the only legal charge brought against Surrey was that of his assumption of the royal arms. The indictment exists, and was published by Sir Francis Palgrave in 1842 in his *Calendar of the Baga de Secretis*, compiled from the public records. The indictment commences with a description of the royal arms before the Conquest, which description is proved to have been false and fabricated, and Surrey is then accused of having put up, painted, and joined to his own proper arms, "the said arms of the king, with the three labels silver, in order to deprive, destroy, annul, and scandalize, the title of the king to the crown of England." Surrey, it is stated, made a spirited and eloquent defence. He proved that his father had borne the same arms as himself; that their ancestor, Thomas Mowbray, had received a grant of these arms from Richard II.; that the heralds had formally decided on his right to wear them, and that he had worn them for years unchallenged even in the king's presence. Never was defence more complete or irresistible; but it was in vain. The jury pronounced him guilty, and the "flower of the English nobility" was beheaded on Tower Hill on the 21st of January 1547. Norfolk—who had meanly truckled for a pardon, and basely sought to inculpate his own son—was ordered for execution on the 28th, but the king dying the night previous, his life was spared.

The poetical works of Surrey were not printed until ten years after his death, but had been extensively circulated in manuscript. They were first published in 1557 in Tottel's *Miscellany*, a collection of poetical pieces, the earliest work of the kind in our language, and which was highly popular. Surrey attempted no great original composition. His poems consist of amatory verses, sonnets, elegies, and epitaphs—transcripts of his own feelings and fancies, but carefully and brilliantly polished. He paraphrased the first five chapters of the Book of *Ecclesiastes*, and translated the Second and Fourth Books of the *Æneid*. The latter was his most elaborate performance, and being in blank verse, is remarkable as a first attempt in a new and difficult style. The versification is regular, but wants flexibility and variety of pause, which our blank verse can scarcely be said to have attained before Shakspeare. The shorter poems of Surrey show a great advance in taste and in poetical diction. Between Chaucer and Surrey there is a long and dreary waste, in which only the name of Hawes is worthy of mention; but English poetry received an impulse and refinement from Surrey which was carried forward by a succession of elegant versifiers till it attained the glory of the Elizabethan period. The fulness, breadth, humour, and tenderness of Chaucer were never reached by his noble successor. The Italian poets were Surrey's models. But when we reflect that this gallant and unfortunate nobleman was cut off at the age of thirty, and that his life was chiefly spent at the court, or in public business—in scenes of pomp, love, war, and danger—we shall be disposed rather to wonder at the extent of his attainments as a scholar and poet, than to remark that he has left but few and slight memorials of his fine intellect and cultivated genius. (R. C—S.)

HOWARD, *John*. John Howard, the philanthropist, belongs to the rare order of men who have won from the world special titles of distinction. Many persons have earned the title of Great, from Macedonia's madman to the Swede; but mankind has endowed only one man with the appellative Just. In Howard's case the complimentary addition of the Philanthropist is not a mere figure of speech.

Howard was born at Enfield (*not* at Hackney, as the monument in St Paul's asserts), where his father, a retired London merchant, had a country house. He was born on the 2d of September 1726. His father was wealthy, and was elected to serve as sheriff; but the Test-Act being then in force, he paid the fine usually paid by Dissenters to escape that honour, a policy which his son afterwards, happily for the world, refused to follow. Howard was a sickly child, and country air was found necessary to his health. He was removed to Cardington, a village in Bedfordshire, near to Woburn, where his father had a small estate. The facts of his early life are few, and are soon told. He grew in years and strength, a quiet, simple, original boy; not bright, not vigorous, not ambitious. From his two schoolmasters, the Rev. John Horsley (author of a *Latin Grammar* and translator of a version of the *New Testament*), and Mr John Eames, F.R.S., he learned but little Latin and less Greek; yet even in his early years he acquired some knowledge of living languages, and a fair acquaintance with natural science, geography, and medicine. At sixteen he was apprenticed to a grocer in the city, paying L.700 as a premium. But his father now died, and he was his own master. He therefore bought off his apprenticeship, travelled into France and Italy, bought pictures, visited famous churches and cities, and, after an absence almost of two years' duration, during which he perfected himself in French, so as to speak the language like a native, he returned to England. Here he lodged at Stoke Newington, studied medicine and meteorology, put himself on a diet of bread and tea, fell seriously ill, and married his nurse, an old woman, who was also a confirmed invalid. He was twenty-five, she about fifty-three. He married her because he believed that she had saved his life, and that no other return for her motherly kindness was sufficient.

She lived three years as his wife, when her malady wore her out, and she was buried in the churchyard of St Mary's, Whitechapel. A plain tombstone marks the spot. At her death Howard broke up his house. The earthquake at Lisbon had just occurred; that earthquake, the effect of which on the minds of men Göethe has so powerfully described in his *Wahrheit und Dichtung*. The philanthropic impulse was stirred in Howard; he believed that he could help to alleviate the calamity, and he took a berth in the "Hanover." But the Seven Years' War was then raging. French, Austrian, and Prussian armies were fighting in various parts of Europe, and English and French cruisers swept the seas in every direction. Providence threw the "Hanover" in the way of a French privateer; she and her passengers were carried into Brest. The crew and passengers were treated with extreme cruelty, were hurried from place to place, starved, and cast into loathsome dungeons. Howard's heart almost broke with indignation at the treatment suffered by his gallant and unhappy countrymen. "I had evidence," he says, "of their being treated with such barbarity that many hundreds had perished, and that thirty-six were buried in a hole in Dinan in one day." When he obtained his release on parole he went to the government, described in powerful language the scenes he had witnessed, and compelled the Commissioners of Sick and Wounded Seamen to take measures for securing an exchange of prisoners. A naval officer replaced himself; and in a few days he had the satisfaction to hear of the release of his fellow captives in Britanny.

Howard still retreated from public life. His scientific studies were continued, and on May 13, 1756, he was elected a Fellow of the Royal Society, to the *Transactions* of which he contributed three papers. Two years later he married again. "My second wife was Henrietta Leeds, whom a good God gave me the 2d of May." Such are his own words. They lived together in the seclusion of a country house for nine years, when their only child, a son, was born, and the mother died in the exhaustion of nature. Howard's public career began after her death. During her life his energies were chiefly confined to the village of Cardington, in which he commenced a reform, then new and startling, but which has, since his age, and greatly through his example, received a happy development. He was the first builder of model cottages.

When Howard went to reside at Cardington that village was about as filthy, wretched, and unwholesome as any spot in England. The neighbouring gentry followed the hounds, and exacted their rents. The poor were idle, dirty, immoral; the men passed their days in the ale-house, and their nights in the preserves; the women were ill-used, the children ignorant and neglected. Howard's property was small in the district compared with that of his neighbours, and before he began his plan he wisely added to his estate by two purchases, at once to increase his influence in the place and to obtain a larger field for operations. He then built a school for boys and a school for girls, procured good teachers, and invited the villagers (not merely his own tenants) to send their children, his only conditions being regularity, cleanliness, and attendance at some place of worship on the Sunday. At the same time he pulled down the wretched hovels in which his poorer tenants lived—hovels of a single room in which father, mother, and grown-up children had to eat and sleep—and erected larger and more commodious cottages to replace them. With the sure instinct of a reformer he saw that such hovels were not, never could be, happy homes—residences in which men with any sense of shame, any feeling of self-respect, could live contentedly while the ale-house offered its cheerful lights and jovial company as a change. He therefore undertook to remove them. His model cottages were occupied as fast as they were raised. They cost more money, yet he did not raise the rent; for, in spite of his commercial training, he had scruples about putting out money at interest, and looked upon wealth as a sacred and moral deposit placed in his hands for the benefit of mankind, not for his own private use and pleasure. In a few years some of his rich friends and neighbours, especially Samuel Whitbread (the famous brewer, and father of the celebrated politician Whitbread), seeing the success of his scheme, lent a hand in the good work. The schools flourished; the children grew clean and rosy; poaching became rare; the chapels and churches were filled; little patches of garden rose at the cottage doors; ale-houses lost some of their strong attractions; and Cardington began to strike the stranger's eye as a pretty, clean, and prosperous village.

After his second wife's death Howard busied himself with his books, his schools, and cottages. He travelled into Holland. He went to France, to Switzerland, to Italy; but he found no rest for the sole of his foot. He returned as far as Holland (his favourite country, next to his own), and went back thence to Rome and Naples. He admired the Apollo and the Gladiator, and he felt the usual raptures before the paintings of Titian, Guido, and Raphael. He saw the Pope and the Pretender; the first, "a worthy good man;" the second, "a mere sot, very stupid, dull, and bending double." He went up the mountain to Vesuvius, and down the lagune to Venice. He came home through Munich, Augsburg, and the Rhine—came home to find himself unexpectedly named sheriff of Bedford, and to begin his public career. This was in 1773. He accepted the office of sheriff, though a Dissenter, resolved not to take the usual sacraments, but to brave a bad law, and, if prosecuted, defend himself in the courts. No one prosecuted him. When the assizes opened he sat in the court, and when the trials of the day were over he descended into the jail to see in what state the prisoners were. It was the prison in which Bunyan had been thrown, and in which he wrote his immortal *Pilgrim's Progress*. Howard found it, like all the jails of the time, dirty and close; without decent accommodation for the women, and with scarcely any practical separation of the two sexes. The air was bad, the food worse, the water intolerable. The fees were high, and rigorously exacted; the jailer and his subordinates living on the wretched wages they could wring from the misery of the poor prisoners. What most of all astonished his humane heart, and violated his sense of right, was the fact that some of the accused who had been freed by judge and jury, and who had left the court without a stain, were kept in the horrid jail (for longer or shorter periods, according to their circumstances, but in some cases for *years*) until they paid the fees of jail delivery. Howard instantly brought this monstrous form of wrong before the county magistrates, and proposed that an order should be issued for the discharge of these innocent sufferers, and that a rule should be adopted in future for the instant liberation in open court of all such persons as were found not guilty. The magistrates were startled at such bold reforms; the jailer protested against the loss of his fees, which were his income, his means of life, as he had no salary from the county. The clerk of assize put in a similar protest. Howard proposed to redeem these fees by paying regular salaries to these servants of the public; but the magistrates knew of no precedent for such a course, and without a precedent they could not act. Howard undertook to find it, if such existed in any neighbouring county. He went to Cambridge, to Huntingdon, to Northampton, to Leicester, and to Nottingham, and this journey gradually extended to every town in England where there was then a prison. The object of his search eluded inquiry. He could find no precedent for charging the county with the wages of its servants; but he discovered so many abuses in the management of prisons which imagination had never conceived, and so many sufferings of which the general public knew nothing, and of which the law took no account, that he determined to devote to the examination of these wrongs, and the reform of these abuses, whatever time and money might be needful. The task cost him a fortune, and the remaining years of his life.

The inquiry now attracted public attention. At the close of his first rapid survey of our prisons, the House of Commons resolved itself into a committee, and heard his report at the bar of the House. Popham, member for Taunton, had already forced the unwilling legislature to discuss the propriety of paying fixed salaries out of the county rates; but the House had dropped the bill. Howard's revelations completed Popham's arguments. Nearly fifty years before that time the House had appointed a committee to inquire into the state of Newgate, the Marshalsea, and other London jails, when abuses came to light which caused the House to order the arrest of several governors of jails, who were tried for high misdemeanours (*Reports of the Committee Appointed to Inquire into the State of the Gaols*, 1729). But the public, as well as the parliament, shrank from the investigation of scenes so horrid, so that after an explosion of virtue on the part of Mr Oglethorpe, magnificently rewarded by a couplet in Pope, the subject was allowed to die out of recollection until the researches of Howard and the zeal of Popham raised it in a more favourable age. When the House resumed, Sir Thomas Clavering, at the instance of the committee, moved "that John Howard, Esq., be called to the bar, and that Mr Speaker do acquaint him that the House are very sensible of the humanity and zeal which have led him to visit the several gaols of this kingdom, and to communicate to the House the interesting observations which he has made upon that subject." This vote put the seal of public sanction on his inquiries, so that his subsequent investigations had a sort of semi-official character, of vast use to him in dealing with morose jailers and impracticable magistrates of the very old school.

From St Stephen's, Howard went to the Marshalsea, afterwards to each of the London prisons, which he minutely examined. From London he passed to the north of England, whence he was recalled by the passing of two new bills, based on Popham's abandoned measure of the previous session and on his own communications to the House. The first bill provided for the liberation, free of all charges, of every prisoner against whom the grand jury failed to find a true bill, giving the jailer a sum from the county-rate in lieu of the abolished fees. The second bill required justices of the peace to see that the walls and ceilings of all prisons within their jurisdiction were scraped and whitewashed once a-year at least; that the rooms were regularly cleaned and ventilated; that infirmaries were provided for the sick, and proper care taken to get them medical advice; that the naked should be clothed; that underground dungeons should be used as little as could be; and generally that such courses should be taken as would tend to restore and preserve the health of the prisoners. That such simple provisions should have been denied in Christian England, and in the days of Addison and Johnson, is not easy to conceive, after the changes of eighty years, brought about through the exertions of one strong man. Yet the corroborative evidence of the state of prisons leaves no room for doubt. Defoe and Fielding have both left descriptions of jail life, which, though relieved by gross humour, and animated by studies of eccentric character, are not less revolting than the plain and tragic revelations of Howard. Men were callous to sufferings which seemed inevitable to misfortune, as well as to crime. Even horrible catastrophies, when they occurred, excited no more than a passing interest. The jail distemper always raged more or less in the county town, and especially during assizes. Judges and juries were sometimes swept away by the awful pest (Baker's *Chronicle*, 353); and yet no one cared to remove the causes of the jail distemper, until the Howard-Popham bill was carried on the 2d of June 1774.

It was one thing to have the bill carried in the House of Commons; it was another to have it carried into the jails. Most of the jailers were ignorant, rapacious fellows; and some of them were women—as a rule more ignorant and rapacious than the men. The new law struck at their interests, and cordial feeling towards it was not expected from human frailty. Howard resolved to see it executed with his own eyes; he caused the provisions of the act to be printed at his private cost, in large type, and he sent a copy to every jailer and warder in the three kingdoms, so that no one could be able to plead ignorance of the law, if detected in the flagrant violation of its provisions. He then recommenced his inspections—travelled into the west of England, into Ireland and Scotland. Beyond the special cause to which he had given up his time, he took little interest in political matters, though he entertained strong opinions about the unjust aggression of the government in America, and expressed these opinions in a way to render the possibility of his appearance in the House of Commons as an independent member extremely distasteful to ministers. When, therefore, an election took place for Bedford, and Howard's friends proposed him as a candidate, all the arts of corruption were used to keep him out. He was nevertheles elected. On the return being disputed, the election committee, which was completely under the ministers' hand allowed a number of pauper votes which had been bought up and recorded in favour of the opposition candidates, though these votes had been refused before—just enough to unseat Howard by a minority of four votes. "I was made a victim by the ministry," he writes to a friend; "most surely I should not have fallen in with their severe measures relative to the Americans; and my constant declaration that not one emolument of five shillings, were I in parliament, would I ever accept of, marked me out as an object of their aversion." It was a fortunate decision, as it left him to his own peculiar work. Set free from all other occupations, instead of embodying his observations on English prisons at once in a book, he thought it better to make a tour of France, the Austrian Netherlands, Holland, and Germany, to see the most famous and infamous prisons on the continent of Europe, collect their various laws and regulations, and compare their structure, their action, and results with those of our own. In Paris he was denied access to the prisons; but in looking over the old legislation on the subject, he found a provision in an act of 1717, that any person wishing to distribute alms to the prisoners was to be admitted to the interior, and allowed to dispense his bounty with his own hand. The law had fallen into disuse, and was unknown to the keepers. Howard appealed to higher authority, and the validity of the old act was allowed. At some expense in charities, he inspected the Bicetre, the Force l'Evêque, and other places of confinement: but neither money nor interest could open the Bastile to his inspection. He once stepped inside its gates at some personal risk. A suppressed pamphlet, describing the interior, written by a man who had suffered confinement, he obtained after much trouble, brought back to England, translated, and gave it to the world in his own book, an offence which the French government never forgot and never forgave. At Ghent he examined with deep interest the Great Reformatory Prison, a model for all Europe, combining the elements of industry and privation, which are still esteemed the most efficacious means of reformation. At Amsterdam he was struck with the slight amount of crime in the Dutch cities, contrasting as it did so fearfully with the crime in his own country. For 100 years then past the executions in Amsterdam, a city of 250,000 inhabitants, had averaged no more than one in twelve months. London, with its 750,000 inhabitants, had an average of 29½ executions a-year, or, reckoning population against population, ten in London to one in Amsterdam (Janssen's *Tables*, 1772). In the United Provinces he found that the industrial system penetrated the jail. In England we only thought of punishing offences; there they sought to reclaim offenders for society. We put them into dungeons; they put them into workshops. They made the criminals *work* their way back to freedom. Their professed maxim was—"Make them diligent and they will be honest." Howard did not forget the hint. In Germany he found little that was useful, much that was disgusting. In Hanover and Osnaburgh, under English rule, he found traces of torture. Hamburgh was less revolting, as were generally the commercial cities. He returned to England with his papers, plans, and rules, a voluminous and precious collection, as original in character as it was humane in purpose; but before putting his materials in the printer's hands, he undertook another comprehensive tour through England, revising his former observations, adding new notes to the record, relieving distress, liberating poor debtors, superintending the operation of the new jail act; and when these enormous labours were completed after seven months of daily toil, the gains from this careful revision seemed so important to his mind, that he resolved to give his continental experiences the benefit of a similar collation, and also extend his researches into some countries, the prisons of which he had not yet seen. He set out for Lyons, crossed to Geneva (where he was rejoiced as a republican to find only five persons in confinement), whence he passed on to Berne, through cantons in which there was not a single prisoner; he went on to Soleure and Basle, delighted with the cleanliness, the Christian discipline, and considerate government of all the jails of Switzerland, and struck into Germany and Holland, visiting or revisiting the most celebrated prisons. He returned to London, and published his remarkable book, *The State of Prisons in England and Wales*, in 1777. In collecting his materials he had spent between three and four years, travelling not less than 13,418 miles. He contrasted in its pages the condition of our own and of foreign prisons, very much to the disadvantage of the former. "The reader," he says, "will scarcely feel from my narrative the same emotion of shame and regret as the comparison excited in me on beholding the difference with my own eyes; but from the account I have given him of foreign prisons he may judge whether a design of reforming our own be merely visionary—whether idleness, debauchery, disease, and famine be the necessary attendants of a prison, or only connected with it in our ideas, for want of a more perfect knowledge and more enlarged views."

The book made a sensation. One of the first results was to give a new impulse to the question—What to do with our convicts? America refused to take them any longer; Australia had not yet offered itself as a receptacle for the rascality of England. Government was at its wit's end; and crotchety people were urging every kind of scheme on its attention. A hulk (the "Justitia") had been already stationed in the river, off the arsenal at Woolwich, for the reception of convicts, who were treated as in the worst prisons of the old school, so that every kind of disorder existed in the ship. Howard hoped for no success without a change of system; but his continental experience convinced him that home discipline was better for the criminal than deportation to a new country; and, after much consideration by ministers, his idea of trying *the discipline of hard work* was adopted, and Sir William Blackstone and Mr Eden were requested to make out the draft of a bill for the creation of a fitting establishment. A new prison was needed for the new plans; no jail in the country could answer for a trial; and Howard volunteered to go abroad and collect plans and other precise information.

He went to Amsterdam, and carefully examined the spin-houses and rasp-houses for which that city was famous. He passed into Prussia, Saxony, Bohemia, and Austria, through the lines of the German armies commanded by the Great Frederick and the Emperor Joseph II. His fame had gone before him, and he was received with the greatest distinction in Berlin and Vienna. He spent a morning with the Prince of Prussia, and dined with Maria Theresa. From Vienna he went to Italy, which he traversed from Venice to Naples, inspecting prisons, hospitals, and workhouses, and carefully hoarding up the peculiar merit or fault of each, for the use of Sir William Blackstone and his colleague. On his return from Naples towards Leghorn, he encountered a violent storm, which raged for three days with great fury. The little shallop, unmanageable, was driven on the Tuscan coast, but the inhabitants, fearful of plague, refused to allow the passengers to land. Driven back again upon the storm, they were carried by its force to the African shore, to be again driven off by the same fears. They had started from Civita Vecchia while the pest was raging there, and their foul bill of health alarmed Christian and Mohammedan alike. Howard suffered fearfully in health by this trial; and, after his prison labours were accomplished, and his health fully restored, he turned to the new and fearful enemy, and finally lost his life in an attempt to discover the cause and the remedy for plague.

During this rapid continental tour he travelled 4600 miles. While in France his attention was again drawn to his old subject—the infamous neglect and unchristian treatment of prisoners of war. He was told that these prisoners were treated worse in England than elsewhere; that their loyalty was tampered with; and that they were systematically ill-used in order to compel them to forswear their allegiance, and enter the English service. Burning with indignation, he went to the Commissioners of Sick and Wounded Seamen, who expressed their astonishment at such assertions; and, on his saying that he meant to look into this affair for himself, they offered to assist his inquiries. Our prisoners of war had reason to be grateful for his interference.

The information obtained during his foreign tour was placed at the service of the House of Commons. A bill was introduced and passed for building two penitentiary houses in Middlesex, Surrey, Kent, or Essex (as might be determined afterwards), in which to try the experiment of a discipline of work. Howard was appointed first supervisor of this Act; Mr Whatley, of the Foundling Hospital, second; and Howard was allowed to name the third, Dr Fothergill (stat. 19 Geo. III., cap. 74). The scheme, however, under official restraints, proceeded slowly; Howard felt that his life was being wasted in small quarrels and unimportant discussions with Mr Whatley as to the sites of the proposed penitentiaries; and both Sir William Blackstone and Dr Fothergill dying while Mr Whatley was disputing, he wrote to Lord Bathurst, president of the council, begging the king's permission to resign his office. An impulse, however, had been given. Howard's ideas were adopted in many places. In all the new prisons erected from that time provision was made for setting the criminals to work. He turned his face to the continent, with a view to collect whatever might be useful to his countrymen in those lands which he had not yet visited; and began a new and longer journey, which gradually embraced the whole circle of Europe, his route lying through Holland, Schleswig, Denmark, Norway, Sweden, Russia, Poland; thence back to London, and so on to Portugal, Spain, France, and the Austrian Netherlands. This journey was full of curious and romantic incidents. At its completion Howard gave his collections to the public in a new edition of his *State of Prisons*, with appendices.

Being now free from serious responsibility as regards the subject of prisons, and being determined not to enter parliament (as he was again requested to do), he reverted to the terrible idea of the Plague. English commerce with the Levant was rapidly extending, and serious thoughts were entertained in official circles of establishing a regular quarantine (as at Marseilles and Venice) against all vessels arriving from the East. But nothing was known in England about lazarettos and quarantine establishments; and the plague itself (from vague historical recollections of the London pests of 1603 and 1665, when the disease swept away each time one-fifth of the population) (Petty's *Political Arithmetic*, 1686) was regarded with a terror more superstitious than rational. Government desired information; Howard offered to procure it, and equipped himself for the journey. He proposed to begin his studies at Marseilles with the newest of the lazarettos; afterwards to visit those of Venice and Leghorn; and, having gained all preliminary information in these cities, to proceed to Smyrna and Constantinople, the proper homes of the plague, and there study its symptoms and modes of treatment. The French government, however, mindful of the Bastile pamphlet, refused him a passport; so that, instead of gaining facilities for inspecting the lazaretto at Marseilles, he was peremptorily forbidden to set foot in the territory of France. Lord Carmarthen, our ambassador in Paris, tried in vain to remove the bann; but, as Howard considered that his journey would lose much of its interest, and its chief use as regarded his own country, if he missed the fine lazaretto at Marseilles, he defied the threats held out, put himself into a good disguise, and entered France in the usual way among travellers in the diligence. A police agent attended him to Paris, for the French ambassador at the Hague had received intelligence from M. Le Noir, director of police in Paris, to keep watch over his movements; and it was by a miracle of rapid and courageous action that he escaped a dungeon in the Bastile. Sometimes as a French physician, sometimes as an exquisite of the Faubourg St Germain, he traversed France as far as Marseilles, obtained admission to the lazaretto, and shelter in the house of a Huguenot pastor, although the police were on the look-out for him, with a description of his person in their hands. His courage, his disguise, and his perfect manners, threw them off their guard; yet the risks he ran were very serious, and he breathed more freely when he had crossed the frontier. "I have now taken a final leave of France," he wrote to a friend from Leghorn; "I am sensible that I ran a great risk, but I accomplished my object. Happy was I to arrive at Nice, out of the country of a deceitful, jealous, and ungenerous people." He went to Florence, Rome (where he had an interview with Pope Pius), and Naples; and thence to Smyrna, where his skill as a doctor opened all the prisons and hospitals to his inspection. He remained at Smyrna, performing a few simple cures which rumour vastly magnified, until a fatal form of the plague broke out, and he had first-rate opportunities of studying it. He went on to Constantinople, whither the fame of his cures had gone before, and as soon as he arrived he was called in by a great pasha to treat the case of his daughter, who had been given over, it was said, by all the Italian doctors. She recovered; and of course Howard's fame rose with his wonderful work. He confined his visits, however, to the pest-houses, the prisons, and hospitals; he said he was only a physician to the poor. Our ambassador, Sir Robert Ainslie, aware of his patriotic and humane object, offered him a home at the embassy. This he declined, as being unwilling to expose another to the fearful risk of contagion, and took up his residence in the house of a physician, to whom he could communicate the course of his daily experience, as well to receive sound advice as to prepare his host for prompt action in case he brought the plague home. But he bore a charmed life. The smitten fell dead at his feet. He went into infected caravansaries and into pest-houses whither physician, guide, and dragoman, all refused to follow him. From these fearful visits he returned with a scorching pain across the temples, though an hour of fresh air and vigorous exercise served to carry it away. At length his researches were complete. With a trunk full of papers—plans of lazarettos, opinions of celebrated physicians living in the Levant, and copies of regulations and instructions—he prepared to return, and wrote to inform his friends of his intention to cross overland to Vienna. But while his preparations for departure were in progress, the idea flashed across his mind that all his acquired knowledge, various as it was, had been obtained from others—was second-hand, not original; that he had seen but not suffered the discipline of a European lazaretto; and that, possibly, something of material import to the practical working of the scheme (the want of which would be felt as soon as the system was commenced, if it ever were commenced, in England) had escaped his notice. The fear was enough. Altering his plan, he resolved to return; to find a foul ship, make the voyage in her to Venice, and there undergo the usual confinement of the suspected in the famous lazaretto of that city. Such a plan was full of peril. A late ambassador, Mr Murray, had died of the plague in that very lazaretto; but nothing would deter him from his purpose, and he departed. Plague broke out in the ship, and a strong man died in a few hours; yet he went on to Smyrna, deliberately sought out a foul vessel, took his berth, and started for Venice. On the way they were attacked by pirates, when Howard astonished the Venetian sailors by his courage and by a lesson which he gave them in the noble art of gunnery. They acknowledged that the English physician had saved them from the slave market of Tunis or Tripoli. On the sixtieth day of the voyage they arrived in Venice, and were all transferred to the lazaretto, where Howard's health suffered severely from the confinement, though he was supported with the thought that he was gaining precious experience. His minute account of the discipline of this famous lazaretto is most interesting (*Lazarettos of Europe*, pp. 10–22).

Howard came out of his confinement reduced to a skeleton and flushed with fever. However anxious to get home (for a dreadful domestic calamity had occurred; his only child, now a young man, had lost his reason, and was under the charge of a keeper), he was too weak to travel for some days. He went to Trieste and Vienna, where he held a long and exceedingly curious interview with the Emperor Joseph II., himself a reformer, or rather an innovator, during which the English gentleman told the German ruler some very unusual truths. He reached England in February 1787, having been absent on his extraordinary mission sixteen months.

As soon as his domestic concerns were put into such order as they admitted, and his great work on the *Lazarettos of Europe* was published, Howard begun a fresh and final review of the prisons of the three kingdoms. He visited all with care, and presented a bible to each of those in the county towns. Vast improvements had already taken place in the management and discipline of the prisons, in the food, clothing, work, and Christian teaching of the prisoners. Foremost among the magistrates who adopted the new system were those of Manchester. They built on the banks of the Irwell a large prison, with an express view to carrying Howard's ideas into effect; and on the foundation-stone of the edifice they set this inscription—"That their may remain to posterity a monument of the affection and gratitude of this country to that most excellent person, who has so fully proved the wisdom and humanity of the separate and solitary confinement of offenders, this prison is inscribed with the name of JOHN HOWARD." This final tour of the English jails occupied him for eighteen months; and the results of his inspection were recorded in a new edition of his *State of Prisons*.

While in the Levant he had enjoyed many opportunities of hearing the opinions of merchants and consular agents on the prospects of our trade with the East. It was said that were it not for fear of the plague that trade might be at once doubled. As we were without quarantine establishments, the people were afraid of any ship from infected districts; the consequence of which fear was, that the Dutch ran away with the traffic, without taking sufficient care about the plague. So we lost the profits without escaping the risks, as the Dutch ships might as easily introduce the pest at second hand as our own at first. This idea settled in Howard's mind, and helped to shape towards a more practical end those purposes which he pursued from purer and more romantic motives. In the postscript to his new book on *Lazarettos*, he told the public of his intention to follow up the new inquiries. "To my country," he said in a few noble and simple words, the last he addressed to it in print, "I commit the result of my past labours. It is my intention again to quit it for the purpose of revisiting Russia, Turkey, and some other countries, and extending my tour into the East. I am not insensible of the dangers that must attend such a journey. Should it please God to cut off my life in the prosecution of this design, let not my conduct be imputed to rashness or enthusiasm, but to a serious conviction that I am pursuing the path of duty." These words were prophetic.

From London he went to Riga, thence to St Petersburg and Moscow, from which place he proposed to travel to Warsaw, and through Vienna to Constantinople. But the war overruled his plans. Russia and Turkey were struggling fiercely on the Dnieper and the Pruth. Bender had just fallen, and the Muscovites were hurrying their forces to the south. Sad as had been his experiences, Howard had seen nothing to compare in atrocity with the reckless waste of life in Russia in time of war. The roads were almost choked with dead bodies. Raw recruits, most of them too young to bear privation, were hurled by forced marches, and at every sacrifice, towards the theatre of war. They dropped, and were left to die. Hunger, hardship, fever, thinned the ranks as they staggered on towards the Black Sea. Howard had no sympathy with military glory; and the sickening sights which he witnessed on the roads from Moscow to Kherson disgusted him with the hypocrisy of Russia's boast of having become a civilized power. Even the great question of the plague was laid aside for a while, in presence of all these horrors to be brought to light, all these miseries to be assuaged. In his portmanteau he had carried out, for the use of his expected plague patients, a quantity of James's powders, a medicine believed to possess all save miraculous powers; and he thought he should do wisely in placing these powders at the service of the poor Russian serfs who were falling in crowds around him, the victims of an infernal military system. So he went down to the coasts of the Black Sea, visited the hospitals of Crementschouk, Otschakow, St Nicholas, Kherson, and other places. His letters and his notes in his journals are heart-rending. "They are dreadfully neglected. A heart of stone would almost bleed! The abuses of office are glaring, and I want not courage to tell them so." Russian officials, with the cunning of an Asiatic race, so soon as they saw that Howard would expose their cruelties, and disabuse the western public of its false estimate of Russian civilization, an estimate drawn from the splendid misrepresentations of Voltaire and those French theorists who were willing to depose Providence in favour of the Czars—began to throw dust in his eyes. They prepared the hospitals for his reception, removed the more unsightly objects, pretended that he had inspected all where he had only seen a few prepared wards; but his experience defeated these attempts at imposition, and his conductor gained nothing save the dishonour attaching to a mean trick. Whoever wishes to see the military system of Russia in its true character, as conducted in the villages and cities of the Muscovite empire, must study the memorials of Howard's last visit to Russia.

He died in the midst of his labours. He caught the camp fever at Kherson, from a young lady whom he attended as a physician, and died in that city on the morning of January 20, 1790, and was buried on the road to St Nicholas. (H. D—N.)

HOWDEN, a market-town of England, East Riding of Yorkshire, 20 miles S.S.E. of York, and about a mile N. of the Ouse, where there is a ferry and a small harbour for boats. The church, formerly collegiate, is a spacious cruciform edifice, chiefly in the decorated English style, 255 feet long by 66 feet wide, with an elegant square embattled tower 135 feet high. The chapter-house is an octagonal building with 30 stalls. Near the town, and now used as a farm-house, are the remains of an ancient palace of the bishops of Durham. Market-day, Saturday. One of the greatest horse fairs in England is held here annually on 25th Sept., and 6 following days; and here most of the horses for the army are obtained. Pop. (1851) 2235.

HOWE, John, in some respects the greatest of the Puritan divines, was born at Loughborough, in Leicestershire, May 17, 1630. His father had been presented to the living of that parish by Archbishop Laud, but refusing to comply with the tyrannical edicts of that prelate, had been compelled to fly for safety to Ireland, along with his son, at that time hardly five years old. When the Irish Rebellion of 1641 broke out, the exiles returned to England. Fixing his abode in Lancashire, the elder Howe conducted in person the studies of his son, who in his seventeenth year entered Christ's College, Cambridge, as a sizar, and in the following year graduated as a bachelor of arts. During his residence at this university, he had the good fortune to make the acquaintance of the famous Cudworth, and the ingenious, though eccentric, Dr Henry More; from intercourse with whom, as Calamy suggests, his mind received that "Platonic tinge" which distinguishes his writings. Immediately after graduation, Howe removed to Oxford, where he took the same degree in the following year. Anthony Wood has traced his various remaining steps at Magdalen College, where he was first appointed a "demy" by the parliamentary visitors, soon afterwards raised to fellowship, and in 1652, when he was only twenty-two years of age, "proceeded" master of arts. On leaving Oxford, he returned to his father's retreat in Lancashire, and soon after received ordination at Winwick from the hands of Mr Herle, the clergyman, and the ministers of the neighbouring chapelries. In a little time "an unexpected conduct of divine Providence" bore him to Great Torrington, in Devonshire, where he was engaged as pastor. It was here that he preached those discourses which at a later period took shape in his treatises on *The Blessedness of the Righteous*, and on *Delighting in God*. It was here also that he married the daughter of his "inner friend," Mr George Hughes, a minister of great name and influence at that time in Plymouth.

In the beginning of 1657, a journey to London accidentally brought Howe under the notice of Cromwell, who, struck by his appearance and preaching, made him his domestic chaplain. It was in vain that Howe pleaded the interests of his people at Great Torrington; Cromwell would take no refusal; and the result was that Howe was soon installed in Whitehall.

His conduct in this high position was such as to extort the praises of even the warmest enemies of his party. Without overlooking the due claims of the Puritans, he omitted no opportunity of advancing pious and learned men of other denominations. Ward, the future bishop of Exeter, and Thomas Fuller, were in the number of those who profited by Howe's kindness, and were not ashamed subsequently to express their gratitude for it. Cromwell's charities were for his age munificent, and Howe was his frequent adviser and almoner; but he dispensed so liberally to others, and asked so little for himself, that the Protector could not help remarking upon his self-denial: "You have obtained many favours for others," said he, "I wonder when the time is to come that you are to ask anything for yourself or your family." Howe, in common with Dr Owen, appears to have believed in Cromwell's religious sincerity, but his conscience would not allow him to be silent when he saw the Protector countenancing doctrines that seemed to savour of fanaticism. It was at one period a pet idea at Whitehall that "the particular thing asked by Christians in prayer will be granted, whatever it be." Howe, convinced of its dangerous tendency, opposed it from the pulpit. Cromwell was observed to knit his brows as his unflinching censor proceeded; and his subsequent bearing towards him was colder. At the suggestion of Baxter, he embodied, in "a number of small volumes," his notes on the leading personages and events that illustrated the Protectorate. These volumes, which must of necessity have thrown much light on many of the dark passages of that period, were unfortunately consigned to the flames by Howe's son, in compliance with strict injunctions issued by himself shortly before his death.

After the Restoration, Howe returned to Great Torrington. Like all who had played a conspicuous part in the Commonwealth, he soon found himself an object of suspicion and hatred to the new government. Spies were set upon his track; his words were watched by base informers; he was even accused on one occasion of uttering seditious and treasonable language in his sermons; and tried before the quarter-sessions. His accusers, however, could prove nothing against him, and he was honourably acquitted. When the "Act of Uniformity" silenced more than two thousand of the best ministers in England, Howe was driven from his parish, and for several years led a wandering and uncertain life, preaching in secret, as occasion offered, to handfuls of faithful hearers. More than once his liberty was in imminent jeopardy, and it is understood that for some months in 1665 he was confined in the Isle of St Nicholas, in Plymouth Sound. On his liberation, he proceeded to meet the demands of pressing want by publishing his *Blessedness of the Righteous*, which, among other advantages, procured him an invitation from Lord Massarene of Antrim Castle, in Ireland, to become his domestic chaplain. Ecclesiastical espionage was not so rigorous in the sister island. And Howe, accepting the invitation, returned in 1671 to that Ireland which had already afforded him an asylum when a child.

During the five years which he spent in this peaceful and safe retreat, he frequently preached in public, with the approval of the bishop of the diocese, and also found time to produce the most eloquent of his shorter treatises, *The Vanity of Man as Mortal*, and his *Delighting in God;* the latter of which he dedicated to his Torrington parishioners. Here, too, he planned his largest and greatest work, *A Good Man the Living Temple of God*, which, in its metaphysical speculations, anticipated the profoundest reasonings of Samuel Clarke, and in sustained sublimity of thought is not surpassed in English theology.

In 1676 Howe returned to England, and became pastor of a Nonconformist congregation in Silver Street, London. His fame had by this time increased so much that the leading men of the national church, such as Stillingfleet, Tillotson, Kidder, and others, gladly courted his friendship. In the society of these men, and in miscellaneous literary work, Howe spent the troubled years that followed his settlement in London in tolerable peace and safety. The first part of his *Living Temple* appeared in 1676; the second part was delayed till 1702. In 1677 appeared his tractate *On the Reconcileableness of God's Prescience of the Sins of Men, with the wisdom and sincerity of His counsels, exhortations, and whatsoever means He uses to prevent them.* This latter work was attacked from various quarters. In the number of those who stepped forward in its defence was Andrew Marvel. His work *On Thoughtfulness for the Morrow* followed in 1681; those on *Self-Dedication* and *Union among Protestants*, in 1682. The execution in 1683 of that most virtuous patriot of his times, Lord William Russel, drew forth from Howe a letter of condolence to his lordship's widow, which James Montgomery has pronounced to be "one of the noblest and most pathetic pieces of epistolary composition in the language." In 1684 he gave to the world the most pathetic of his works, *The Redeemer's Tears Wept over Lost Souls.* Meanwhile, anxiety and over-work had undermined his health; and in 1685 he gladly accepted the invitation of Philip Lord Wharton to travel with him on the Continent. It affords a striking picture of the times that his departure from London needed to be managed with so much secrecy and suddenness that he first announced it to his people by a letter written from the other side of the Channel.

His journey extended over the greater part of a year, during which he visited the most celebrated cities on the Continent. At the end of that period, as matters still seemed hopeless in England, he determined to settle for a time at Utrecht. He secured an honourable maintenance by keeping a boarding school, officiating in the English chapel on Sundays, and by reading privately with English students at the university. In the number of his private friends was Burnet, the future bishop of Salisbury, by whose influence he obtained access several times to William Prince of Orange. The future king of England, as Calamy assures us, "conversed with Howe with the greatest freedom." Meanwhile, as Howe was looking wistfully for tidings from England, the news reached him of James II.'s "Declaration for Liberty of Conscience," and Howe took advantage of it to return to London, where his presence was keenly desired by his congregation. Another year brought William of Orange to the British throne, and placed liberty of worship on a stable basis, which was rendered still more secure by the passing of the Act of Toleration. Howe fitly headed the procession of Nonconformist divines who went to congratulate William on his accession to the English throne; nor did the monarch, amid his new cares and dignities, forget the confidential intercourse of Utrecht, but sent for Howe repeatedly to Kensington, and showed especial delight in asking questions about his "old master, Cromwell." To quell those troubles and divisions that broke out among the Nonconformists on disputed points of doctrine and church government, Howe published, in 1693, his three discourses, so full of Christian wisdom and charity, *On the Carnality of Religious Contention*, which, however able, as they confessedly were, remained for many years unheeded.

Some of the most acute writers of the age, such as Wallis, Sherlock, South, and Cudworth, had already given to the world dissertations on the subject of the Trinity; and in 1694 and 1695 Howe published various treatises on the same theme, the principal of which was entitled, *A Calm and Solemn Inquiry concerning the Possibility of a Trinity in the Godhead.* His aim in these essays is not so much to state the Scripture testimony on this doctrine, as to show what incompetent judges men must be of the nature of the Divine simplicity, and how presumptuous all *a priori* speculations must be on such a matter as the mode of the Divine existence. It had been Howe's aim throughout his long life to combine with the assertion of his individual convictions, a recognition of the essential unity and brotherhood of all true Christians; or, as Bacon expresses it, to see "charity moving on the poles of truth." In vindication of his right of private judgment, he had separated from the establishment; in expression of his charity, he had continued to practise occasional communion within its pale. The propriety of this conduct, in which Howe had many followers, was keenly agitated in the ecclesiastical world towards the beginning of the last century, and Howe led the van in defence of "occasional communion." Few may concur with him in every practical application which he made of his principles, but the principles themselves, which this controversy was the occasion of elucidating, are now generally admitted, and have been reproduced in some of the most splendid treatises of Robert Hall.

In his seventieth year, Howe, warned of his own approaching end by the death of his great contemporaries, Owen, Baxter, Bates, and Mead, produced one of his richest treatises, *The Redeemer's Dominion over the Invisible World.* As if to leave no important department of inspired theology untouched, he gave forth in 1701, *Discourses on Man's Enmity against God and Reconciliation to Him.* In the spring of 1705 appeared his last publication, entitled, *On Patience in Expectation of Future Blessedness.* The symptoms of failing strength now became apparent in "frequent languishments," aggravated by more than one painful malady. Multitudes now came to visit the death-bed of the great Puritan, and retired from the solemn interview

Howe, John.

feeling that there was something as uncommon in his death as in his life, and that his converse was "like that of an inhabitant returned from another world." Among the number was Richard Cromwell, now an old man. "There was a great deal of serious discourse between them," says Calamy, "tears were freely shed on both sides, and the parting was very solemn and affecting." Howe did not long survive this interview. He died April 2, 1706, in the 77th year of his age.

It was the rare achievement of this great man to pass through an age of social convulsion and tempest, and to occupy positions the most perilous for the trial of character, and to emerge from the ordeal unscathed. Baxter's impetuous temperament betrayed him at times into inconsistency. Owen was more than once too diplomatic for a divine; but even detractors, in their most bitter denunciations of the Puritans, have usually excepted Howe. That must indeed have been no common moral greatness which awed Cromwell into silence, moved Tillotson to tears, overcame the constitutional reserve of William, and "smoothed the raven-down" of the monkish Anthony-à-Wood, until he smiled and praised.

Considered intellectually, he may be affirmed to have combined many great qualities, the possession of any one of which, in an equal degree, would have been sufficient to raise him to eminence and fame. Excelled by Baxter in pulpit oratory, and by Owen in theological learning and exegetical tact, he was by far the most profound and philosophical thinker of all the Puritans, and perhaps produced a greater number of original and uncommon thoughts than any other theologian of his age. Scarcely surpassed by Edwards in logical acumen, or by Butler in ingenuity and depth, how far does he transcend both in pathos and imagination. And yet his imagination does not overlay his thoughts, as is sometimes the case with Jeremy Taylor; it is a trained faculty, the beautiful handmaid of reason, bearing it up into the sunlight "on wings of silver and feathers of yellow gold." His writings abound in sublimity, but are comparatively passionless. In this respect Baxter's style resembles the impetuous flow of the broad river, Howe's is that same river expanded into a calm lake, whose quiet depths are the mirror of innumerable stars. One characteristic effect of his writings is to tranquillize and elevate the soul. You feel yourself seated on some lofty mountain, in a serene air, and looking down upon clouds and storms far beneath your feet. As we read him, he brings up Milton's picture of contemplation to our thoughts,—

> "With even step, and musing gait,
> And looks commercing with the skies."

Yet, as a writer, Howe is not without the characteristic faults of the Puritan divines. The tendency to dilate on what should only have been touched, and to check the continuous flow of thought and style by minute and perplexing subdivisions, has seriously diminished his popularity as a writer. Often his diction is not equal to his thoughts, and we almost wish, after he has brought out and shaped the marble, that he had invited Bates or Tillotson to add the tracery; though in some of his greatest passages, such as his immortal comparison of the soul of man to a temple in ruins, the flight is nobly sustained, and his words come with all the opulence of Jeremy Taylor's finest passages, and take their place, as if guided by a magician's wand. But when all these deductions are made, John Howe must be recognised as one of the primary stars in the firmament of English divines, shining with a serene lustre peculiarly his own; and if Jeremy Taylor has been styled the Spenser, Howe may with equal justice be styled the Milton of English theology. (A. T.)

Howe, Richard.

Howe, *Richard* (*Viscount Howe*), the first naval officer of his day, was born in 1725. His father was Emanuel Scrope Howe, governor of Barbadoes, and his mother was a daughter of Baron Kielmansegge, master of the horse to George I. when elector of Hanover. Leaving Eton at the age of fourteen, he entered the navy, and joined the fleet which the English were then sending out under Anson to carry on the war against Spain in the Pacific. In this expedition he distinguished himself so much that in his twentieth year he rose to the rank of lieutenant. After some minor exploits, he signalized himself by gallantly defeating, off the Scottish coast, two French vessels of greatly superior size and strength to his own which were carrying supplies and reinforcements to the Pretender. For this exploit he was made a captain on his arrival in England. The next seven years of his life were spent in miscellaneous service in the West Indies, Africa, the Mediterranean, and the Northern Atlantic. When the Seven Years' War broke out, Howe was chiefly engaged in watching the southern and western coasts of France, and besides many minor exploits, defeated the French squadron under De Conflans, and took two of the enemies' ships. His brilliant career attracted the notice of the king (George II.) himself, who expressed the sentiment of the nation when he told Howe on his return home that his life had been an unbroken series of services to his country. Shortly before the close of the war Howe had married, and on the death of his elder brother, had inherited the title and estates of the Viscounts of Howe. On the proclamation of peace, he was made treasurer of the navy, with a seat at the Admiralty Board, and afterwards sat in parliament for Dartmouth. In 1770 he was made rear-admiral of the blue, and commander-in-chief of the Mediterranean fleet. Six years later, in the war of the American independence, he maintained his high character by the dashing success of his attack on the French fleet, which was cruising off Rhode Island under the Count d'Estaing with the view of aiding the revolted colonists against the mother country. On returning home he took command of the English fleet, which sailed to relieve Gibraltar, and in the teeth of many difficulties was completely successful. The remark made upon him some eight years before, by Lord Hawke in the House of Peers, continued to the last to hold as true as when it was first uttered, "I have tried my Lord Howe on many important occasions; he never asked me how he was to execute any service, but always went and performed it." On his arrival in England after this exploit, he was created Earl Howe, and succeeded Lord Keppel as first lord of the admiralty. When the war of the French Revolution began, Howe was chosen commander of the Channel fleet, and on June 1, 1794, gained the greatest of all his victories—that in which he defeated the French fleet off the western coast of France, dismasting ten of the enemy's ships, and taking seven, of which he brought off six in safety into Portsmouth harbour. The seventh, the Vengeur—about whose glorious resistance the French, on the lying report of Bertrand Barrère, sang so many Io Pæans—was so much shattered that she sank in the attempt to tow her away. (See Carlyle's Essay on the "Vengeur," in his *Miscellanies.*) Less brilliant, but not less useful, was the service which Lord Howe next rendered to his country,—by his suppression of the terrible mutiny of the British fleet at Portsmouth and Spithead. The means he took to recal the sailors to their duty, such as his dismissal of the obnoxious officers, &c., were a good deal canvassed at the time, but they certainly had the desired effect. Age and long service now began to make rapid inroads upon the old admiral's constitution, and he found himself compelled to retire from the service which he had graced with so many triumphs. He did not live long to enjoy the repose he had so dearly earned, dying under a violent attack of the gout, Aug. 5, 1799.

Lord Howe was the ablest British seaman of his day, and his ability and technical skill had endeared him above all his brother officers to the sailors, among whom, from the darkness of his complexion, he was familiarly known as Black Dick. He used no mean arts to gain this popularity, for he was extremely reserved in manner, and a most rigid disciplinarian. But his cool courage and presence of mind in the midst of danger, the strength and soundness of his judgment, and his strict impartiality, fully compensated the want of those graces which sometimes gain for their possessor a temporary and factitious repute. In person he was tall, strong, and well-made, and capable of enduring almost any amount of fatigue. His features, until lighted up by his smile, were harsh even to grimness.

HOWITZER, a short piece of ordnance. See GUNNERY.

HOWTH, a small town of Ireland, county of Dublin, 8 miles N.N.E. of the capital, with which it is connected by railway. It stands on a peninsula of the same name, rising 567 feet above the sea, and forming the northern boundary of Dublin Bay. An artificial harbour, formed here at an expense of above one-third of a million sterling, is now almost choked up with sand, and is accessible only to vessels of small burden. Pop. (1851) 829, chiefly engaged in fishing.

HOY. See ORKNEY ISLANDS.

HUAMANGA, a town of Peru. See GUAMANGA.

HUBELY, a town of Hindustan, in the British collectorate of Dharwar, presidency of Bombay. It is large and populous, defended by a mud rampart and ditch, and has for many years carried on an extensive trade, particularly with Goa, to which are sent sandalwood and elephants' teeth, and in return raw silk, cottons, woollens, and rice are received. There are also manufactures of raw silk and cotton, great quantities of which are sold for the dresses of the country people. It is a wealthy place, the residence of many rich bankers, who, by means of their agents, extend their commercial intercourse to Surat, Hyderabad, Seringapatam, and even to more distant places on which bills of exchange can be negotiated, and who regulate the standard of the currency in all the adjoining countries. The East India Company formerly had a factory here, which was plundered by the Mahrattas in 1673, when the company sustained a great loss. In 1685 it was taken by the Mogul troops of Aurungzebe, and soon after the death of that monarch in 1707 it was again taken by the Mahrattas, with whom it continued until 1818, when, on the overthrow of the Peishwa, it lapsed to the British, together with the rest of that prince's dominions. E. Long. 75. 13., N. Lat. 15. 20.

HUBER, FRANCOIS, author of the *Nouvelles Observations sur les Abeilles*, belonged to a family of which several members had already distinguished themselves in various walks of science, and was born at Geneva in 1750. At the age of fifteen he lost his eye-sight from the intensity with which he had applied himself to his studies; but the means he inherited from his father placed him beyond the reach of want, and enabled him to follow his bent for natural history. The devotion of his wife and of an attached secretary compensated to him in some measure the loss of his sight; and having selected the bee as the subject of his special studies, he, with their assistance, wrote on that theme the most accurate and comprehensive work that has yet appeared. (See BEE.) Huber died at Lausanne in 1831. An interesting account of his methods of study is given in Dr Kitto's *Lost Senses*.

HUDDERSFIELD, a parliamentary borough, and large manufacturing town of England, in the West Riding of Yorkshire, on the Colne, a tributary of the Calder, 14 miles S.W. of Leeds. The town is situated on the slope and summit of an eminence, and is traversed by regular and well-paved streets. The market-place is spacious, and surrounded by handsome buildings. The parish church, an elegant edifice in the perpendicular style, was rebuilt in 1837 at a cost of about L.9000. Trinity Church, erected in 1819 at a cost of L.12,000, is in the pointed Gothic style, and has an embattled tower at its W. end. St Pauls' Church, built by the parliamentary commissioners in 1831, is in the early English style, and has a tower surmounted by a light spire. The Cloth Hall is a commodious circular building two storeys in height, erected in 1765 by Sir John Ramsden, the proprietor of the town, and enlarged by his son in 1780. The lower storey is bisected by an arcade, the one half being occupied by shops, the other by rows of stalls. The average attendance of manufacturers every market-day (Tuesday) is upwards of 600. There is a proprietary college, founded in 1838, in connection with London University; also a collegiate school. The Philosophical Hall is an elegant Grecian building, belonging to the Philosophical Society, and used for lectures and public meetings. The infirmary is a large and elegant stone edifice of the Doric order, with wings and a portico supported by four fluted columns. The town is well supplied with water from reservoirs four miles to the W. of it. About half a mile from the town is a sulphureous spa, with warm, cold, vapour, and shower baths. Huddersfield is one of the principal seats of the woollen manufacture in England. Its importance is chiefly owing to its extensive canal and railway communication, and its plentiful supply of water and coal. The Ramsden Canal, 4 miles in length, communicates with the Calder; while another $19\frac{3}{4}$ miles long, passing Marsden and Stayleybridge, joins the Ashton-Under-Lyne Canal. The latter passes through a tunnel $3\frac{1}{2}$ miles long, cut through Standedge Hill. Huddersfield is connected by railway with Manchester, Leeds, Sheffield, &c. It was created a parliamentary borough by the Reform Act, and returns one member to parliament. Its rapid progress may be inferred from the fact that its population has been more than quadrupled during 50 years;—in 1801 it contained 7268 inhabitants, and in 1851, 30,880.

HUDSON, HENRY, a distinguished and ill-fated navigator of the seventeenth century. His early history is quite unknown, and he did not emerge from obscurity till the year 1607, when he was sent out by a company of rich London merchants in quest of a shorter passage to China than that by the Cape of Good Hope. In that year he penetrated as far as the 82d degree, beyond which his passage was barred by the ice. In the following year, altering his course, he sailed eastwards, and, coasting along Spitzbergen, reached the straits of Waygatz. Unable to force his way any further in that direction, he again returned home without effecting his purpose. In 1609 a company of Dutch merchants supplied him with the means of again attempting the N.E. passage. Again the ice stopped his progress, and Hudson abandoning his original plan sailed away to America, where he discovered the great river which now bears his name, and at the mouth of which New York is situated. Scarcity of provisions drove him once more to England, which he reached on the 7th November. In the following year (1610) he sailed from London on the forlorn quest of the N.W. passage. In the end of May his sailors mutinied, and the revolt was only quelled with great difficulty. In June he entered the strait and bay now called by his name, and was in high hopes that he had at last solved the mystery that had baffled so many enquirers. Stricter investigation, however, showed him that he had been caught in a cul-de-sac, and as summer was now drawing to a close, he found himself compelled to winter on these inhospitable shores with a mutinous crew, and a very scanty stock of provisions. Commander and sailors were alike out of temper at the bad success of the whole expedition, and heart-burnings and dissensions embittered the winter bivouac. On the way home in the summer of 1611, the crew again mutinied, and taking possession of the ship, they turned adrift Hudson and such of the crew as remained faithful to him, in an open boat and with a very scanty supply of provisions. What was the fate of the boat and her crew is unknown; neither was ever heard of. The details of Hudson's voyages are given at length in Purchas' *Pilgrims*, and in Harris's *Voyages*.

Hudson, *John*, a distinguished classical scholar, was born at Widehope, near Cockermouth, in Cumberland, in 1662. He was educated at Queen's College, Oxford, but after graduating as M.A. in 1684, he removed to University College, of which he became a fellow and tutor. In 1701 he was made principal keeper of the Bodleian Library, and in 1712 principal of St Mary's Hall, both of which offices he retained till his death in 1719.

Hudson obtained considerable repute both at home and abroad in consequence of his critical editions of some of the classics, of which may be mentioned his *Velleius Paterculus*, Oxford, 1693; *Thucydides*, 1696; *Dionysius Halicarnassensis*, 1704; *Geographiæ veteris Scriptores Græci minores*, with Dodwell's notes and comments, 1698, 1703, 1712; *Longinus*, 1710; *Mœris Atticista*, 1712; *Fabularum Æsopicarum Collectio*, 1718; *Josephus*, 1720. These editions are now for the most part superseded, with the exception of the last, upon the texts and notes of which he bestowed very great pains. He did not live to see it through the press, but his friend Hall charged himself with that duty, and prefixed to the edition, when complete, a biographical sketch of the deceased critic. (*Biog. Brit.*)

HUDSON, a city of North America, Columbia county, state of New York, on the left bank of the Hudson River, at the head of its ship navigation, and on the Hudson River railroad, 116 miles N. of New York city. It stands on an elevation, called Prospect Hill, which rises behind the city to the height of 200 feet. The river bank, 60 feet high, projects into the river in the form of a bold promontory, affording a delightful promenade, and having on either side a fine bay with depth of water sufficient for the largest ships. Along the margins of these bays, and at the foot of the promontory, are the wharves. The town is for the most part regularly built, with streets crossing each other at right angles. The court-house is a handsome edifice constructed of marble and limestone, and surmounted by a dome. Hudson was formerly extensively engaged in the West India trade, but of late this has mostly given place to the whale-fisheries. Its river trade is important, great quantities of produce being brought to its markets from the interior. It also carries on various manufactures, for which the streams in the vicinity afford good water-power. Pop. (1850) 6289.

HUDSON'S BAY, a large sea of North America, lying between 51 and 69 degrees of N. Lat., discovered in 1610 by Henry Hudson. (See Hudson, *Henry*; and Polar Regions.) A charter for a company, incorporated under the name of the *Hudson's Bay Company*, was obtained in the year 1670. See Fur Trade.

Hudson's Bay Territory. The first internal explorers of the vast region surrounding Hudson's Bay were traders from Canada while it was yet in the possession of France. Canadian traders had, previous to the conquest, ascended the St Laurence and Ottawa Rivers to their sources, and had formed establishments on the great Lakes. From the north-western end of Lake Superior, they threaded the intricate communication which leads by lakes, streams, and portages to Lake Winipeg, and thence penetrated some distance up the Saskatchewan River, where their most distant establishment was situated, in N. Lat. 53., W. Long. 103. These enterprises were in a great measure suspended by the struggles which ended in the conquest of Canada by Great Britain. In 1767 a party headed by a British subject again penetrated to the Saskatchewan. The Missinipi, or Churchill River, was visited by Mr Joseph Frobisher in 1775, and Lake Isle-a-la-Crosse in 1776. In the year 1781 the fur trade had reached the limits of Lake Athabasca, nearly 1000 miles beyond the most distant point attained by the French. These explorations were greatly extended by the establishment in 1783 of the North-West Company of Montreal—an association formed of the leading individuals engaged in this traffic—who, in the energetic pursuit of the fur trade, extended their establishments to the Arctic Circle and the Pacific Ocean. The charter of the Hudson's Bay Company, conferring the exclusive right of trade with the Indians, having been granted without the sanction of parliament, has generally been held invalid; and it was probably the dread, owing to this defect, of attracting public observation to their proceedings that induced the Company for many years to confine their trading stations almost entirely to the coast. In 1769, a century after the date of their charter, their farthest advance was but 400 miles inland. In that year, however, being desirous of obtaining information regarding some mines of copper described by the natives as existing near a river flowing into the sea to the northward, called the Coppermine River, they directed Mr Hearne, a gentleman in their service, to proceed overland for that river, which he had orders to survey, if possible, down to its embouchure—an enterprise in which, after two unsuccessful attempts, he succeeded, reaching the sea at the mouth of the Coppermine River on the 13th July 1771, having been thus the first to establish the existence of a great Northern Ocean washing the shores of North America. Mr Hearne's journals and charts were, however, withheld from the public for nearly twenty years after the date of his journey. On the capture of Fort Churchill by the French these documents fell into the hands of La Perouse, who commanded the French squadron, and were restored to the Company only on condition of their being published. It was doubtless owing to this circumstance that Hearne's claims to this important discovery were for many years discredited; and although the existence of a Northern Ocean was confirmed by Sir Alexander M'Kenzie, who in 1789 descended the river issuing from Great Slave Lake, which bears his name, it was not until the overland expeditions of Franklin and Richardson in 1820 and 1825 that Hearne's merits as a discoverer were fully recognised. To the expeditions last named we owe the first accurate geographical delineation of this extensive region, from the shores of Hudson's Bay as far as M'Kenzie's River. Of the country west of this stream, and extending as far as Russian America, a careful survey has been more recently executed by Professor A. K. Isbister of London, and published in the journal of the Royal Geographical Society for 1846. To this gentleman we owe also an elaborate geological map of the entire region, published in 1856 by the Geological Society of London.

The circumstances which led to the union of the North-West and Hudson's Bay Companies have been stated in the article on the Fur Trade. The new association, which retained the name of the Hudson's Bay Company, obtained in 1821 a license of exclusive trade for twenty-one years, renewed in 1842 for a similar period, over the territories W. of the Rocky Mountains—the country on the E. side being considered sufficiently protected from rival traders by the establishments of the two companies already formed there, and such vague rights as might be claimed under the charter of 1670. Grave doubts existing as to the validity of this charter, and numerous complaints having arisen from the arbitrary exercise of the powers claimed under it by the Company, an address to the Crown has been recently moved by the House of Commons for an inquiry (which is now pending) into the legality of the very wide and anomalous powers at present exercised by the Company.

The territory embraced within the present operations of the Hudson's Bay Company may be roughly estimated at nearly 4,000,000 of square miles, or somewhat greater than the entire extent of Europe. This vast area, which is covered

Hudson's Bay Territory.

by a net-work of about a hundred trading-posts scattered at distances of about three or four hundred miles apart, is divided into four large departments—1*st*, The Montreal department, which includes all the establishments situated between the River St Lawrence and the great lakes of Canada, and along the N. shore of the Gulf of St Lawrence and the coast of Labrador ; 2*d*, The Southern department, which includes the country along the N. shores of Lake Superior and the southern shores of Hudson's Bay ; 3*d*, The Northern department, which comprehends all the establishments N. of this as far as the shores of the Polar Sea ; and, 4*th*, The Columbia department, including the territory watered by the Columbia and other rivers W. of the Rocky Mountains. The departments are divided into a number of districts, each under the direction of a superior officer ; and these again are subdivided into numerous factories, forts, posts, and outposts.

In a geographical view the Hudson's Bay territories may be divided into four great natural regions—1. The Columbia or Oregon territory, a country of varied features, extending from the Rocky Mountains to the Pacific ; 2. The wooded region, occupying the country from Canada northwards along the shores of Hudson's Bay, and extending along the valley of the M'Kenzie and Peace Rivers nearly to the Arctic Ocean ; 3. The prairie region, situated between the forementioned divisions, and occupying the valley of the Saskatchewan and Red Rivers and the upper waters of the Missouri and Mississippi ; 4. The strip of sterile country along the northern shores of Hudson's Bay and the coast of the Polar Sea, familiarly known as the Barren Grounds. Of these divisions the wooded region is the most extensive and the most valuable for the purposes of the fur trade ; all the finer skins which find their way to the London market being obtained from it. It has, in consequence, been long occupied and thoroughly worked by the trading-posts and agencies of the company. The Indians inhabiting it are in general a mild, inoffensive race. Long familiarity with the whites, and the habits of trade, have produced a friendly feeling among them towards Europeans ; and their desire to supply them with the commodities of trade renders them by far the most valuable and industrious class of the population of the Hudson's Bay territories. The relation of the Company towards them is an extremely simple one : the Indians hunt and trap for the furs which the Company receive, giving in exchange such articles as are suited to the simple wants and tastes of the natives. Trade is carried on by means of a standard valuation, based on the market price of a beaver-skin, and hence denominated a *made beaver*. This is to obviate the necessity of circulating money, which is quite unknown in any part of the Indian country. A beaver-skin is considered, in the Indian trade, equivalent to two, three, or more skins of inferior value. The rates at which the skins can be obtained under the complete monopoly enjoyed by the Company render the fur trade probably one of the most lucrative species of traffic in the world.

It is difficult to form an estimate approaching to accuracy of the population of the Hudson's Bay territories. From forty to fifty different tribes, speaking distinct dialects, have been enumerated ; but the discordant estimates even of the oldest and most experienced residents in the Indian country forbid all idea of arriving at any accurate estimate of their numbers. They probably do not exceed 150,000. Their numbers are, by the most trustworthy accounts, rapidly diminishing. Through the benevolent exertions of the Church Missionary and other societies, missions and schools have been established in various parts of the country E. of the Rocky Mountains. These missions, supported entirely from the funds of benevolent bodies in England and Canada, afford the only means of education hitherto available to the inhabitants of those remote regions.

Hudson River || Huelva.

The climate and soil of the Hudson's Bay territories, except in the extreme northern districts, differ little from those of Canada, and are equally adapted for colonization. On the banks of the Red River, flowing into Lake Winipeg, a small settlement has been formed, consisting chiefly of retired servants of the Company, with their families. The colony now numbers a population of about 10,000 souls ; but from its isolated position, the bulky nature of such exports as could be furnished, and the long and dangerous navigation to Hudson's Bay, there is but little probability of its rising to commercial importance. (A. K. I.)

HUDSON RIVER, the principal river in the State of New York, North America. It rises in the Adirondack Mountains, in two streams, which unite in Warren county about 40 miles from their sources. Its course is irregular to Sandy Hill, being first S. by E. then E., after which it flows almost in a straight line nearly due S., and falls into New York Bay, in N. Lat. 40. 42., W. Long. 7. 1. 30. Its entire length is rather more than 300 miles ; its breadth below Albany varies from 300 to 900 yards. Between Haverstraw and Piermont, for 10 or 12 miles, it expands into a broad basin 4 or 5 miles wide. It has few tributaries : the Mohawk flowing into it near Troy, and the Walkill at Kingston are the principal. The scenery is in the highest degree picturesque, its elevated banks not unfrequently rising in lofty and precipitous eminences. The largest ships ascend to Hudson about 117 miles, and schooners sail as far as Troy, 166 miles.

HUE AND CRY, a custom of ancient origin for spreading an alarm. When a cry was raised by one it was caught by a second, and passed by him to a third till the whole country was roused. It was thus the ancient Britons summoned their warriors to battle. Amongst the Highlanders a half-burnt stick, dipped in the blood of a goat slain by the chieftain himself, was carried by the messenger as a threat of fire and sword to all who did not obey the summons. In 1745 this cross tarric, or fiery cross, was carried 32 miles in three hours. Cæsar speaks of a case in which an alarm was carried 160 miles in sixteen or seventeen hours.

The *hue and cry* (*putesium et clamor*) is also a legal method of procuring arrests. By 13th Edw. I., c. 3, the hundred in which the offence was committed was held responsible unless the felon was caught ; by 27th Eliz., c. 13, the hue and cry required to be made by both horsemen and footmen ; and by 8th Geo. II., c. 16, the officer neglecting or refusing to make the hue and cry is liable to a penalty of L.5. When the hue and cry is raised, all parties are obliged to join in pursuit of the criminal. A printed hue and cry is issued three times a week at Bow Street, and contains descriptions of stolen property and deserters.

HUELVA, or HUELVAS, a province of Andalucia, Spain. It has ranked as a province only since 1833, and is bounded on the N. by Badajoz, S. by the ocean, E. by Sevilla, S.E. by Cadiz, and W. by Portugal, from which it is separated to some extent by the rivers Guadiana and the Chanza. Its area is 4130 square miles, which is intersected in a S.W. direction by the western part of the Sierra Morena, locally called the Sierra Arrocha. The Odiel and the Zinto are the principal streams that drain its surface, and both fall into the Atlantic, the one at the Puerto de Polos whence Columbus set sail on his first voyage to the West. On the opposite slope of the mountains are the basins of the Guadiana and its tributaries, the Chauza, Malagon, and Albagarilla. The E. parts of the province of Huelva are composed to a large extent of vast sterile plains ; but in other portions the surface presents a pleasing variety. The highest peak is San Cristobal, at whose base are the copper mines of Rio Zinto. The soil possesses great fertility, and produces excellent pasturage, as well as oranges, lemons, citrons, grain of various kinds, and wine. The mountains are clothed with pine, oak, beech, holly, and chestnut forests, affording excellent timber. Pop. 153,462.

Huelva (ancient *Onoba*), a seaport-town of Spain, capital of the above province, on a bay formed by the mouth of the Odiel and Tinto, 50 miles W.S.W. of Seville. It carries on a considerable trade in fruit and floor-mattings, and some tunny fishing. The vestiges of a Roman aqueduct are fast disappearing. Huelva was the birthplace of José Isidoro Morales, and of Alonso Sanchez de Huelva, who discovered Española Island. Pop. 7173.

HUERTA, Vicente Garcia de la, an eminent Spanish poet of the last century, was born at Zafra, in Estremadura, in 1729. His name marks an era in Spanish literature. The eighteenth century had introduced into Spain, along with a French dynasty, a French fashion in literary matters which had completely supplanted the old national tastes, and been naturalized in the country by the genius of Luzan. Huerta was the first to rise in open rebellion against the canons of the Gallic school, and the reaction which he created and impelled was finally successful. His best work was his tragedy of *La Raquel.* The fame of this piece speedily spread far and wide, and it was soon translated into the tongues and acted in the theatres of nearly all the nations of Europe. His other tragedy of *Agamemnon Vengado* fell far short of the merit of *La Raquel.* Huerta's other works were his *Obras Poeticas*, in 2 vols. To vindicate Spanish literature more completely from the attacks of Voltaire and the French critics, Huerta made a collection of the best specimens of the national drama, in 16 vols. 8vo, which he edited with great care. His only prose work was his *Vocabulario Militar Español*, a kind of biographical dictionary of the most illustrious warriors of Spain. Huerta died at Madrid in 1797.

HUESCA, a province of Aragon, Spain, bounded N. by France, S. and S.W. by Saragossa, E. by Lérida, and W. and N.W. by Navarre. It is one of the three provinces into which Aragon was divided in 1833, and has an area of 7530 square miles, occupied by a population of 247,105. Huesca is drained by the rivers Arva, Aragon, Galego, Alcanadre, Cinca, Essera, and Noguera-Ribargoranza, and belongs entirely to the basin of the Ebro. The offshoots of the Pyrenees render the northern portion of the province mountainous; and some of the loftier summits are covered with perpetual snow. The mountainous portions are well wooded, but being generally precipitous possess little capability of culture. The more level districts are fertile and productive wherever water is sufficiently plentiful. The chief products of the soil are hemp, flax, fruits, legumes, wine, and cereals. The mountain pastures are excellent, and afford grazing for large numbers of mules, of superior quality, and cattle. Though hitherto little wrought, iron, copper, and other metals exist in great abundance throughout the mountainous districts of the province. The chief manufactures are linens, cloths, earthenware, glass, soap, and leather, and *alpargatas*, a kind of sandal peculiar to the locality.

Huesca, a very ancient town of Spain, capital of a cognominal province in Aragon. It stands on the slope of a hill in the centre of an extensive plain near the right bank of the Isuela, 35 miles from Saragossa, and 70 from Lérida. The houses are generally two storeys in height, and built with considerable uniformity; and there are several public squares; but the walls which anciently surrounded the city are now almost altogether in ruins. The principal public buildings are the cathedral, four parish churches, the royal College of Santiago founded by Charles V., and those of St Vincent, Santa Orosia, and Santa Cruz; the "Sertorio" University founded in 1354 by Pedro IV.; and the town-hall. There are also a foundling hospital, and numerous convents; two public granaries and two cavalry barracks. The industry of Huesca is chiefly confined to articles of domestic use, common coarse cloths, and leather. The annual fair held in Huesca is well frequented.

This city is so ancient that no account of its foundation was known at the birth of Christ. Strabo gives its name Ileosca (iii. 224), as the capital of the Vascitani, when it was chosen by Sertorius as the seat of the university, which he founded 77 B.C. Julius Cæsar names it Vencedora; and in the time of Augustus it was known by the name of *Urbs victrix Osca* which was stamped on its coins, and has been preserved on its arms. In 1096 A.D., Pedro I. of Aragon conquered this city after having gained in its immediate neighbourhood the battle of Alcoraz, where he slew 4000 Saracens and four Moorish kings or sheiks. This battle was fought Nov. 25, after a siege of two years. From this date it has borne for its arms the heads of the four Moorish kings, with the addition of a cross which appeared miraculously in the heavens. Pop. 9200.

HUESCAR, a town of Spain, province of Granada, in an elevated plain, between two mountain chains, 70 miles N.E. of Granada. It contains three convents, an hospital, and three churches. Its chief manufactures are cloth, linens, woollen coverlets, and damasks. Pop. 5640. At a short distance from Huescar are the ruins of a very ancient city said to have been founded by the Carthaginians, and now called Huescar la Vieja or Old Huescar.

HUET, Pierre Daniel, one of the most versatile *savans* of his own, or, indeed, of any age. Born at Caen in 1630, he was brought up in the Roman Catholic faith, to which his parents were attached. Huet's was one of those minds (so common in French literary history) which attain to a moderate proficiency in every branch of inquiry; and without being *naturalized* (so to speak) in any department, may become *acclimated* to all. Of this inquisitive temperament he gave ample evidence at the university of his native town, where his studies were prosecuted with an ardour which communicated itself to his instructors; and to the Jesuit Mambrun, the professor of philosophy, he always considered himself under peculiar obligations for a degree of attention which was all the more acceptable as the early loss of his parents had rendered it the more necessary. On attaining his majority he succeeded to an independence, which allowed him to satisfy, though not to satiate, his passion for knowledge. It was about this time that Bochart, then a fellow-townsman of Huet's, had received an invitation to Stockholm from Queen Christina, and prevailed on the young scholar to accompany him. This was an important event in the life of Huet, as he obtained access, in the great public library of the Swedish capital, to an excellent manuscript of *Origen on St Matthew*, which perhaps suggested his well-known edition of that father. On returning to his native town, after a brief stay at Stockholm, he devoted the next twenty years of his life to a diversified but systematic and profound course of study, comprising many of the exact sciences, and, above all, to the preparation of his great edition of *Origen.* He relieved the severity of his literary labours by cultivating the acquaintance of distinguished contemporary *savans*, and in this way his reputation spread so widely as to place his name on Colbert's list of literary pensions. In poetry also he found an agreeable source of relaxation, and his natural love for scenery developed itself in many a copy of verses Latin and French. The vast number of novels which he would seem to have read, may be inferred from his elaborate essay on the *Origin of Romance*, prefixed to the Contesse La Fayette's celebrated *Zaïde.* Local antiquities always occupied much of his attention; and his work entitled *Les Origines de la Ville de Caen*, written in his declining period, reached in 1706 a second edition, which, however, is a great improvement on its predecessor. But in spite of these frequent side-glances to other subjects of inquiry his attention was mainly fixed on his edition of *Origen's Exegetical Works*, which was finally published in 2 vols. folio, in 1669. The biographical and historical portions of his annotations far outweigh the value of his textual labours; and even yet no critical edition of Origen is reckoned complete which does not contain Huet's *Origeniana*. Shortly after the accomplishment of this great work, his love for the sequestered life of the cloister induced him to retire to the Jesuit's College of La Flèche, but he was not suffered long to enjoy his literary seclusion. In 1670 he was appointed sub-preceptor to the Dauphin who was then only nine years of age, and in superintending the education of that prince, he was detained at court for the next ten years. During this period he completed his most considerable work—his *Demonstratio Evangelica*, which was published in 1679. This laid the foundation of his theological fame. During the preparation of this colossal work he superintended the well-known series of the *Delphin Classics*, of which he was partly the originator. On the marriage of the Dauphin in 1679, the publication of the *Delphin Classics* ceased, and Huet was allowed to retire from court. The king presented him with an abbey at Aulnai, 12 miles to the south of Caen, and he was thus enabled to resume his former and favourite pursuits. For ten years he continued to spend his summers in this delightful retreat, and his winters at Paris or Caen; but though his literary zeal never flagged, his special subjects of study had not been sufficiently well chosen, for nothing which he has written after his fiftieth year has done much for his reputation. In 1685, however, he was appointed by the king to the see of Soissons, which he shortly afterwards exchanged for that of Avranches, in the neighbourhood of Caen. He was bishop of this see for not more than seven years, and he resigned its arduous duties for that literary ease of which he was so enamoured. The residue of his long life was spent at the Abbey of Fontenai, near Caen, where in spite of his increasing infirmities he devoted his leisure mainly to literary studies; and after an illness in 1712, so severe that his life was despaired of, he was busily engaged in compiling his *Mémoires* of himself, and those miscellaneous memoranda which were published after his death, under the name of *Huetiana*. But the care of his medical advisers and the baths of Bourbon, though they had long kept death at a distance, were unable to avert it, and in the Jesuit House in Paris, on the 26th of January 1721, he expired in his 91st year as happily as he had lived. Ever since his retirement from court, Cartesianism had been gradually advancing to importance, and its adherents, among whom were numbered the most influential men of the time, were devoting all their energies to its propagation. The main object of their attack was Aristotle, or more properly Aristotelianism; and as the Stagirite embraces or discusses in his works nearly every department of ancient literature, the entire remains of antiquity were included in their denunciations, which were promulgated in French to the neglect of Latin. All this was viewed by the Jesuits with intense dislike. Huet warmly espoused the cause of his order, and with reasoning and raillery he did his utmost to discomfit his opponents. In his *Censura philosophiæ Cartesianæ*, however, which was published in 1689, he shows an utter incompetency to meet the *Cartesians* on philosophical grounds, and cannot discriminate between the leading doctrine of their master and Pyrrhonism. His ridicule was equally ineffective; and the *Nouveaux Mémoires pour servir à l'Histoire du Cartesianisme* did as little for his cause or his reputation as his *Censura*. The most notable of his later works was his *Traité Philosophique de la Foiblesse de l'Esprit Humain*, published posthumously in 1723, which caused more excitement than all his other works put together. It contains little more than the foreshadowings of that doctrine which Berkeley and Hume carried to its utmost limit; and probably it was from the undeveloped state of his views that Huet's work was regarded with such horror at the time. He was considered a thorough sceptic for harbouring opinions which the pious bishop of Cloyne has shown to be quite compatible with a belief in the great truths of Christianity. Huet's is a name familiar in our day only to scholars as deeply read as he was in his own. Few scholars have lived with so much pleasure to themselves or have had their lot cast in easier circumstances. His long day was hardly visited by a cloud; it seems to have had all the felicity of one unbroken lucid interval; and perhaps it is for this reason that the pleasure he himself enjoyed in his literary labours has not been shared by posterity. (*Quarterly Review*, No. 194.)

HUGUENOTS, a name derisively applied to the French Protestants in the sixteenth century. It is probably a corruption of the word *eidgenossen*, or confederates, as the Genevese were called who entered into a league with the other cantons to oppose the tyranny of Charles III., Duke of Savoy. The doctrines of the Reformation in France were first publicly taught at Meaux by Lefevre and Farel in 1521. The flames of persecution were soon kindled by Francis I., and raged with increased fury after the decree against the Vaudois of Provence in 1540. The Reformed doctrines increased rapidly; and under Henry II. several whole provinces and considerable towns, numbering about a sixth of the population of France, were adherents to these doctrines. In 1559 a synod was held at Paris, consisting of members from thirteen churches. Under Francis II. they became involved in political quarrels. The conference at Poissy between Beza and Lorraine, as the representatives of the Reformers and the Papists respectively, showed the difficulty of effecting a compromise between the two parties. Under Charles IX. the opposition of the two parties assumed the aspect of a civil war. A peace was brought about by Catherine de Medicis; but when the Protestants had disbanded their forces, the old maxim was revived, that faith need not be kept with heretics. The larger Protestant towns now became scenes of butchery and bloodshed. For the massacre of St Bartholomew, at which Admiral Coligny of the noble house of Chatillon, was assassinated, see France. The edict of toleration passed in 1577 was renewed by Henry IV. in 1591, and is known as the Edict of Nantes. The oppression of the Calvinists, however, led to a religious war during the reign of Louis XIII. The *dragonnades* of Louis XIV. were a systematic attempt to compel the Calvinists, by all sorts of torture short of death, to abjure. These prepared the way for the revocation of the Edict of Nantes, which took place on the 18th October 1685. Hundreds of thousands of the most industrious population of France were reduced to ruin, and sought an asylum in surrounding countries. Still more stringent edicts were passed against the Calvinists, and their condition became worse and worse till 1760. In 1787, under Louis XVI. an act of toleration was passed in their favour. See France.

HULL, or Kingston-upon-Hull, one of the principal commercial towns of England, is situated on the north bank of the Humber, at the mouth of the River Hull, 35 miles S.E. of York. It is a municipal and parliamentary borough, and though locally in the East Riding of Yorkshire, is a county in itself. The ancient name of this town was Wyke or Wyke-upon-Hull. For more than a century previous to 1296 it was a place of considerable mercantile importance, and possessed from the Abbot of Meaux, who was lord of the manor, the privilege of holding a weekly market and a yearly fair. The natural advantages of its position for trade as well as for defence, attracted the attention of Edward I., who prevailed upon the Abbot and the other proprietors to sell him the lordship of Myton with the town of Wyke. The name of the town he changed to Kingstown-upon-Hull, and constituted it a separate and independent manor under the government of a warden and bailiffs. He afterwards, upon the petition of the inhabitants, made it a royal burgh. During his reign the duties on exports collected here amounted to nearly one-seventh of the duties collected throughout the kingdom. In the twenty-eighth year of this monarch's reign, it was appointed one of the places for the erection of furnaces for the use of the mint; and by his orders the roads leading to the town were improved, the streets paved, ferries established across the Humber, and embankments erected on the river. In the reign of the following Edward the town was regularly fortified by walls, bastions, and ditches; and these were afterwards strengthened in the reign of Richard II. When Edward III. invaded France in 1359, Hull contributed 16 ships and 470 mariners for the expedition. During the Civil War it was held for the parliament, and was twice unsuccessfully besieged by the royalists.

The town of Hull stands on a level plain, so low as to render embankments necessary to protect it from inundation. It has been greatly enlarged and improved of late years. The streets in the older part of the town are irregular and narrow, but in the more recent portions they are generally wide and regular, and lined with handsome buildings. The houses are almost all of brick. The public buildings are numerous, but are not generally remarkable for beauty. Among the principal are the custom-house, dock-office, pilot-office, excise office, stamp office, post-office, exchange, infirmary, two theatres, concert-hall, colleges, mansion-house, and gaol. The church of the Holy Trinity is a handsome cruciform edifice in the florid Gothic style, with a highly ornamented pinnacled tower rising from the point of intersection to the height of 140 feet. In the market-place is an equestrian statue of William III. A handsome Doric column, surmounted by a colossal statue, has been erected to Wilberforce, who was a native of this town. The educational institutions comprise two proprietary colleges, furnishing instruction on a plan similar to that pursued at the University and King's Colleges, London, a medical school, grammar school, Cogan's charity school for forty girls, Trinity-house school affording a nautical education for thirty-six boys, and the vicar's school for sixty boys. The charter-house is an hospital for the maintenance of fifty-seven poor persons. The Trinity-house was founded in 1369 for the support of decayed seamen and their widows. The citadel stands on the triangular piece of ground between the Humber and the Hull.

The town of Hull is admirably situated for trade. Vessels of the largest size can come up to the town; while the Hull, Ouse, and Trent, affluents of the Humber, with their tributary streams and canals, afford facilities for trade with a large extent of country. (See NAVIGATION, *Inland*.) It is also connected by railways with all parts of the kingdom. These advantages have been improved by the activity of the inhabitants, so that Hull ranks as the third port in the kingdom, the value of its exports being inferior only to those from Liverpool and London. The site of the old fortifications is occupied by docks, and thus the old town is surrounded with water from the Hull to the Humber. The old harbour was that part of the River Hull which faced the old town; but, as it was found to be inconvenient for the shipping, an act was passed in 1774 for forming a dock, now called the old dock, which has its entrance at the upper end of the old harbour. It is 1703 feet in length, 254 in breadth, and 24 in depth. Between 1805 and 1809 another dock was erected called the Humber dock. It communicates with the Humber by a lock, and is 914 feet in length, 342 in breadth, and 31 in depth. The accommodation becoming insufficient for the increasing trade, another dock was constructed between 1826 and 1829, called the Junction dock, from being formed on the land that intervened between the old and the Humber docks, and thus forming a connection between them. It is 914 feet in length, 342 in breadth, and 31 in depth. The locks are 120 feet long, 36 broad, and 25 deep. The two bridges across the locks are of cast iron, and 24 feet wide. The Railway dock, near the terminus of the Hull and Selby railway, and the Victoria, to the east of the citadel, are of recent construction. The following table exhibits the area and cost of the different docks :—

Docks.	Area. a.	r.	p.	Cost.
Old dock	10	1	11	L.73,330
Humber dock	9	3	24	233,086
Junction dock	6	0	5	165,033
Railway dock	2	3	9	115,000
Victoria dock	20	1	3	470,000
Total	49	1	12	L.1,056,449

A considerable quantity of shipping is also accommodated within the old harbour, which may be computed at 10 acres of tidal water. A timber pond of 9 acres was constructed in 1853. The quays around the docks are spacious, and are entirely surrounded with warehouses and deal yards. Hull has of late years become a principal steam-packet station. Steamers sail regularly to and from London, Leith, Aberdeen, Newcastle, Yarmouth, Hamburg, Rotterdam, Copenhagen, Antwerp, &c. Hull is the principal entrepôt of the Baltic timber trade on the E. coast of Britain. The staple imports are timber, deals, grain, and seeds, sheep's wool, tallow, hemp, flax, hides, iron bars, green fruit, bones, madder, bark, turpentine, cattle, sugar, &c. The chief articles of export are cotton stuffs and twist; woollen goods and woollen yarn; iron and hardware; linens and linen yarn; earthenware; machinery and mill work; coal, salt, and more recently raw cotton, brought from Liverpool and Manchester. The whale fishery was formerly extensively carried on. In 1819 it employed 64 vessels, but from that period it rapidly declined to 1837, and in that and the seven subsequent years employed only one vessel annually. More recently, however, a reaction has taken place, and from 1846 to 1852, inclusive, from 12 to 14 vessels have annually set out for this fishery. The number and tonnage of vessels registered at the port on 31st December 1854 were as follows :—Sailing vessels,—under 50 tons, 238, tonnage, 8822; above 50 tons, 195, tonnage, 42,861. Steam vesssels,—under 50 tons, 10, tonnage, 324; above 50 tons, 36, tonnage, 9924. The following table gives the ships and tonnage (including both sailing and steam vessels) employed in the colonial and foreign trade for 1854 and the three preceding years :—

Years.	INWARD.				OUTWARD.			
	British.		Foreign.		British.		Foreign.	
	hips.	Tonnage.	Ships.	Tonnage.	Ships.	Tonnage.	Ships.	Tonnage.
1851	1185	295,859	1433	212,709	843	235,781	1081	173,363
1852	1087	285,957	1220	175,755	758	223,260	950	139,193
1853	1107	285,641	1753	269,212	776	217,411	1285	190,591
1854	1042	256,721	1747	247,627	705	197,850	1179	177,009

The number and tonnage of vessels that entered and cleared coastwise during 1854 were :—Entered, sailing vessels, 716, tonnage, 52,414; steam vessels, 424, tonnage, 76,406: cleared, sailing vessels, 1162, tonnage, 117,279; steam vessels, 468, tonnage, 84,072. In 1852 the amount of dock duties paid was L.34,961; the amount of customs revenue, L.324,819; and the value of British manufactured goods exported, L.9,915,414. The staple articles of import being subject to low duties, or altogether free, the customs revenue is smaller than that of less important ports. The port charges of Hull have been reduced in the aggregate about L.18,000 per annum. The industrial establishments of Hull are chiefly connected with the building and equipment of ships, comprising shipbuilding yards, rope walks, and manufactories of canvas, chains, chain cables, and steam machinery. Hull is divided into 7 wards, and governed by a mayor, 14 aldermen, and 42 councillors. It returns 2 members to parliament. Pop. (1851) 84,690.

HUMBER, a large river or rather estuary of England, formed by the junction of the Ouse and Trent, and separating Yorkshire from Lincolnshire. It flows first E. for about 18 miles to Hull, and then S.E. for 22 miles to its mouth between the Spurn-head on the N., and the opposite coast of Lincoln on the S. Its average breadth is from 2 to 3 miles, but near its mouth it widens to 6 or 7. By means of its numerous tributaries it drains about 10,000 square miles, comprising some of the most fertile and populous districts of England. Vessels of considerable burden can ascend to its head, and those of the largest size to Hull.

HUMBOLDT, Karl Wilhelm von, a distinguished statesman and philologer, and the elder brother of the illustrious traveller and naturalist, was born at Potsdam, June 22, 1767. His father, who at the time of his birth, was chamberlain to the Princess Elizabeth of Prussia, was a man of wealth, and was thus able to give his sons the best education that money could procure. He trained them at home until they were of age to begin independent study; he then sent them to the university of Frankfort-on-the-Oder, which they soon exchanged for that of Göttingen. It was now that the path of the brothers began to diverge. The younger devoted himself to the study of nature; the elder found his sphere in law, the philosophy of language, and ancient literature. In the number of his friends Wilhelm von Humboldt began at this time to reckon the illustrious men who have created the literature of modern Germany. To Schiller he was especially attracted, and their correspondence from 1793 to 1803 (published at Stuttgart in 1830) shows on what terms of esteem and affection the friendship was maintained on both sides. His intimacy with Goethe gave birth to his famous critique on the *Hermann and Dorothea* of that poet, in which he gave to the world his profound discussions on the laws of epic poetry in general. Marrying in 1791, Humboldt spent the early years of his wedded life in the strictest seclusion, contributing occasional essays to the periodicals, chiefly on his contemporaries. These were reprinted in a collective form at Berlin in 1799. In the following year he was made Prussian minister at the Papal Court, and his residence at Rome gave a strong impulse to the classical bent of his tastes and studies. On his return home in 1808 he was made minister of public instruction. Unable to give effect to his views in this capacity, he retired altogether from public life for two years, and it was with some difficulty that at the end of that time he could be persuaded to go as ambassador to Vienna. For the next few years he was engaged in all the great diplomatic transactions consequent on the wars of Napoleon—at Prague, Châtillon (where, along with the chancellor, Hardenberg, he signed the capitulation of Paris), Vienna, and Frankfort. It was he too who in 1815 signed the treaty by which Saxony was compelled to abandon to Prussia a large portion of her territory. When the great European war came to an end, he was sent as ambassador-extraordinary to London; in 1818 he took part in the deliberations of the congress of Aix-la-Chapelle. On his return to Berlin he found the tone of political feeling so little consonant to his ideas and his hopes that he retired from public life altogether, and, dividing his time between his estate of Tegel and the town of Berlin, lived entirely for literature. He died April 8, 1835. His works, which are very numerous, range over a wide field, and display the rich endowments and versatility of his mind. But his best chances of fame rest on his philological works, and especially on his researches into the Basque, Sanscrit, and Malay tongues. At the time of his death he had nearly finished two important treatises; one on the languages of the Eastern Archipelago, derived from the Sanscrit, and the other on the philosophy of language. All the works essential to his fame have been recently collected by his brother Alexander, assisted by the famous Brandes.

END OF VOLUME ELEVENTH.

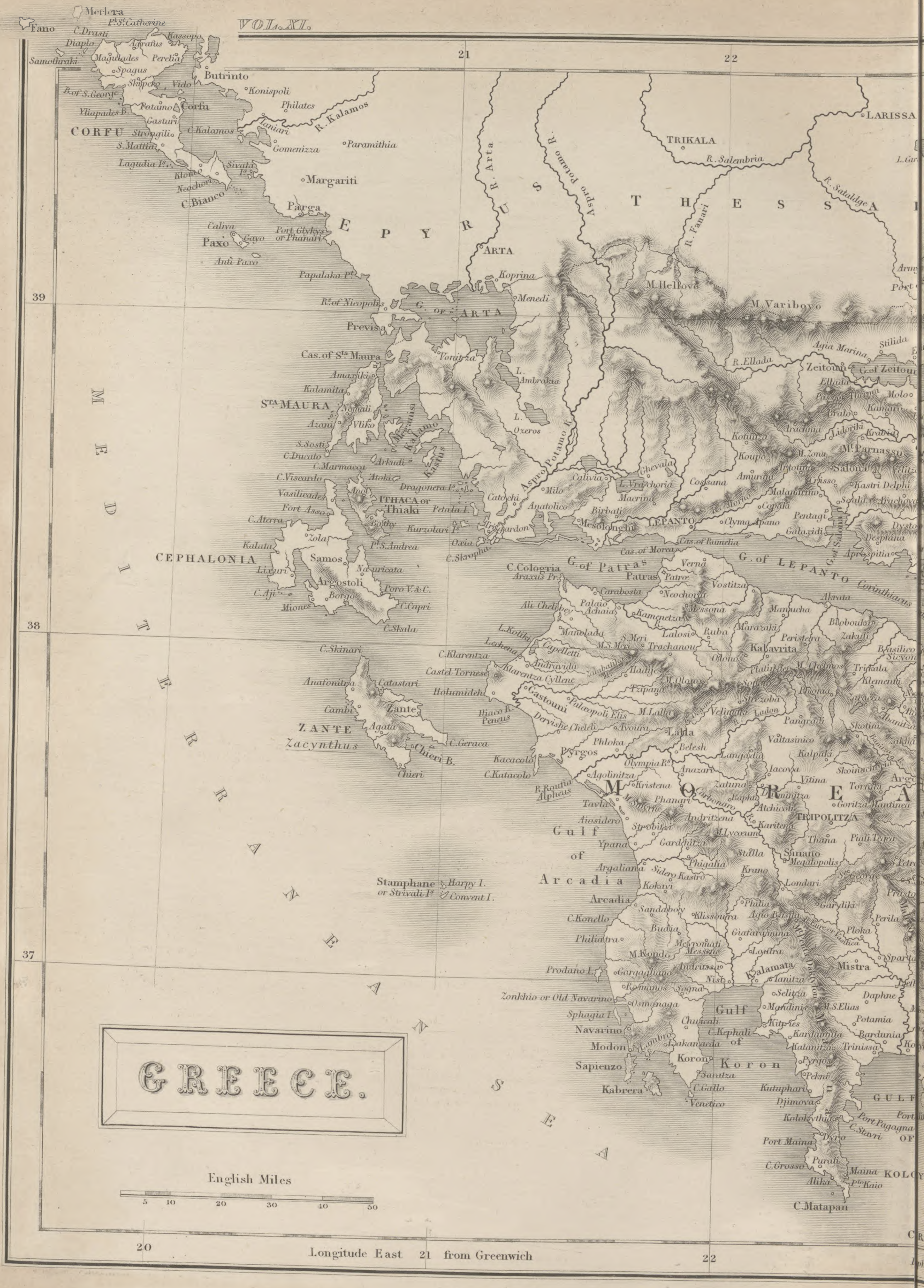
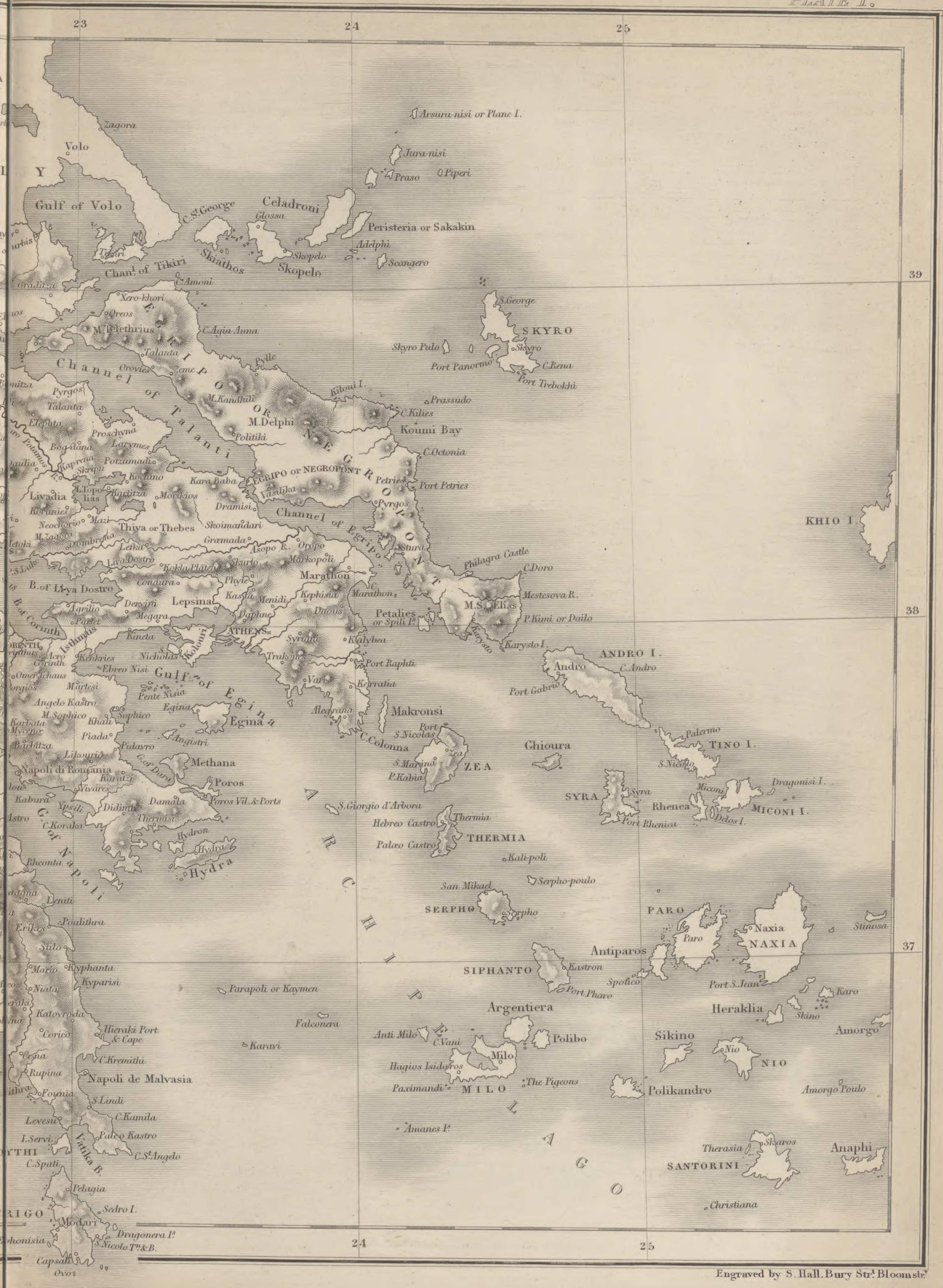

GREECE.
English Miles
5
10
20
30
40
50
Longitude East 21 from Greenwich
20
21
22
39
38
37
Fano
Merlera
Pt. St. Catherine
C. Drasti
Diaplo
Kassopo
Samothraki
Magulades
Agrafus
Perelia
Spagus
Skipero
Vido
Butrinto
Konispoli
B. of S. George
Potamo
Corfu
Philates
Yliapades B.
Gasturi
R. Kalamos
Ianiari
CORFU
Strongili
C. Kalamos
S. Mattia
Gomenizza
Paramithia
Lagudia Is.
Sivota Is.
Klomo
Neochori
C. Bianco
Margariti
Parga
Caliva
Paxo
Gayo
Port Glykys or Phanari
Anti Paxo
E P Y R U S
Papalaka Pt.
ARTA
Koprina
R. Arta
Aspro Potamo R.
R. Fanari
TRIKALA
R. Salembria
LARISSA
R. Sataldge
THESSA
Menedi
M. Hellovo
M. Varibovo
Rs. of Nicopolis
G. of ARTA
Previsa
Cas. of Sta. Maura
Vonitza
L. Ambrakia
Amaxiki
Kalamita
Sta. MAURA
Nomali
Meganisi
Azani
Vliko
Kalamo
L. Ozeros
S. Sosti
Kastus
C. Ducato
Arkudi
C. Marmacca
Atoki
C. Viscardo
Dragonera Is.
Vasilicades
Anoi
ITHACA or Thiaki
Petala I.
Fort Asso
Bathy
C. Aterra
Kurzolari Is.
Zola
Pt. S. Andrea
Kalata
CEPHALONIA
Samos
Oxia
C. Skropha
Lixuri
Naaricata
Argostoli
C. Aji
Borgo
Poro V. & C.
Miones
C. Capri
C. Skala
Aspro Potamo R.
Calivia
Milo
L. Vrachoria
Ghevala
Macrina
Catochi
Anatolico
Birbati
Mesolonghi
Trigardon
LEPANTO
Clyma Apano
Cossana
R. Mornos
Amurani
Agia Marina
Stilida
R. Ellada
Zeitoun
G. of Zeitoun
Ellada
Pass of Thermopylae
Molo
Kamari
Kotilitza
Arachova
Lidoriki
Kraviri
Koupo
M. Zona
Artotina
Mt. Parnassus
Salona
Vetiza
Grisso
Kastri Delphi
Malandrino
Copala
Pentagi
Galaxidi
G. of Salona
Dystos
Desphana
Aprospitia
Cas. of Morea
Cas. of Rumelia
C. Cologria Araxus Pr.
G. of Patras
Patras
Patro
Verna
G. of LEPANTO Corinthiacus
Vostitza
Carabosta
Neochoria
Ali Chelebey
Palaio Achaia
Messona
Kamenetza R.
Mamucha
Akrata
Manolada
Lalosi
Ruba
Marazaki
Bobouka
Zakuli
L. Kotiki
S. Meri
Leshena
M. S. Meri
Trachanou
Kalavrita
Peristera
Basilico Sicyon
C. Klarentza
Capelletti
Oltonos
Platiniza
M. Chelmos
Trikala
Klarentza Cyllene
Andravida
Ladjes
M. Olonos
Klemendi
Castel Tornese
Holumideh
Gastouni
Tupana
Sopoto
Phonia
Zaraca
Paleopoli Elis
M. Lalla
Strezoba
Velinaki
R. Ladon
Iliaco R. Peneus
Darvishe Chelebi
Avoura
Lalla
Pangradi
Skotini
C. Skinari
Anafonitria
Catastari
Cambi
Zante
ZANTE Zacynthus
Agatha
C. Geraca
Chieri B.
Chieri
Phloka
Belesh
Valtasinico
Pyrgos
Langadia
Kalpaki
Kacacolo
C. Katacolo
Olympia Rs.
Anazari
Jacovsa
Skoinochoria
Agolinitza
R. Roufia Alpheus
Kristena
Zatuna
Vitina
Torniki
Tavla
M. Minthe
Phanari
Carbonaro
Rapha
Dimitza
Aiosidero
Andritzena
Atchicolo
TRIPOLITZA
Goritza
Mantinea
Strobitzi
R. Karitena
Karitena
M. Lycaeum
Gulf of Arcadia
Ypana
Gardhitza
Stilla
Sinano
Megalopolis
Thana
Piali Tegea
Argaliana
Sidero Kastro
Phigalia
Krano
Kokayi
Londari
St. George
Stamphane or Strivali Is.
Harpy I.
Convent I.
Arcadia
Sandaboy
Philia
Agio Basili
Klissoura
Gardiki
Perila
C. Konello
Budja
Giafaramaina
Leuca Pia
Ploka
Philiatra
Mavromati Messene
Loutra
M. Kondo
Androussa
Kalamata
Mistra
Sparta
Prodano I.
Gargagliano
Nisi
Tanitza
Romanos
Sogna
Selitza
Zonkhio or Old Navarino
Osmanaga
Mandini
M. S. Elias
Daphne
Sphagia I.
Gulf of Koron
Chumali
Kitaries
Potamia
Navarino
C. Kephali
Kardamula
Bardunia
Modon
Lumbro
Lakanada
Katanitza
Trinissa
Koron
Pyrgos
Sapienzo
Sanitza
Pekni
Kabrera
C. Gallo
Kutuphari
Venetico
Djimova
GULF OF
Kolokythias
Port Pagagna
C. Stavri
Port Maina
Dyro
C. Grosso
Purali
Alika
Maina
Pto. Kaio
KOLO
C. Matapan
M O R E A
M E D I T E R R A N E A N   S E A

PLATE I.



Engraved by S. Hall, Bury Str. Bloomsb.

GUNNERY

PLATE II.

GENERAL CONSTRUCTION OF GUNS, HOWITZERS, &c.

Fig. 1.
68 Pounder Iron Gun

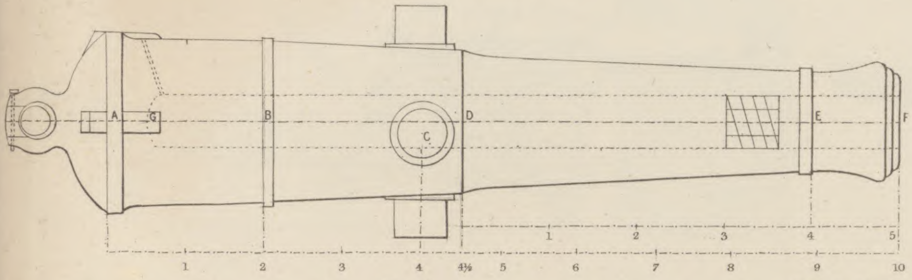


Fig. 5.
68 Pounder Carronade

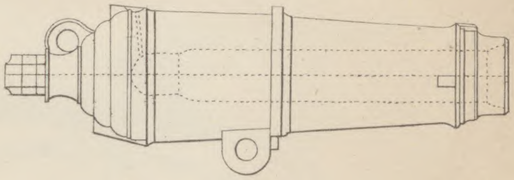
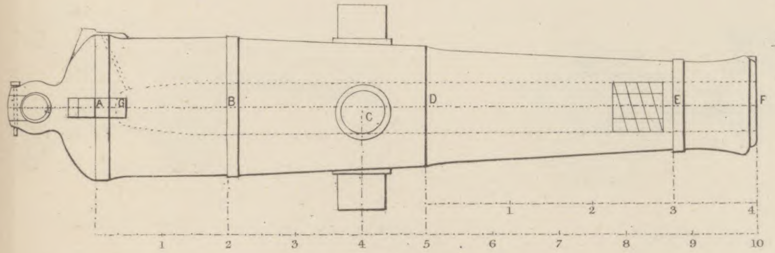
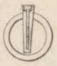


Fig. 2.
8 Inch Iron Gun



8 Inch Shell
Fig. 15.



13 Inch Shell

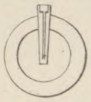


Fig. 16.

Fig. 17.
24 Inch Shell
used at Antwerp

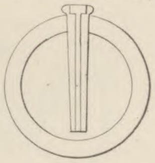


Fig. 6
10 Inch Iron Howitzer

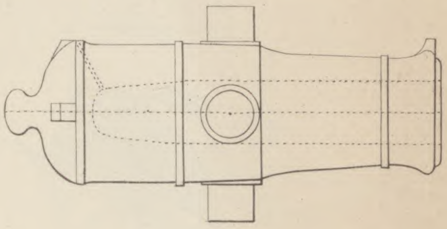


Fig. 3.
Monk's 32 Pounder Iron Gun

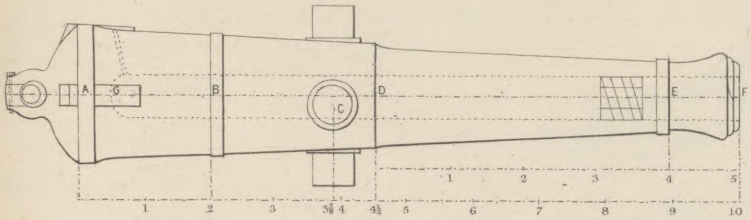


Fig. 7.
24 Pounder Brass Howitzer

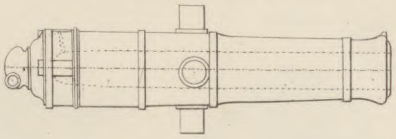


Fig. 8.
Coehorn Howitzer

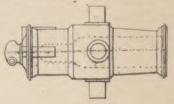


Fig. 9.
13 Inch Iron Mortar

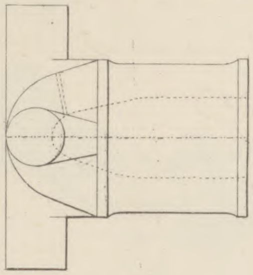


Fig. 10.
24 Inch Mortar used at Antwerp 1832.

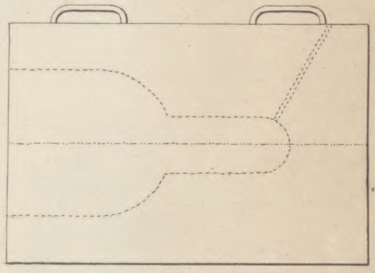


Fig. 4.
9 Pounder Brass Gun

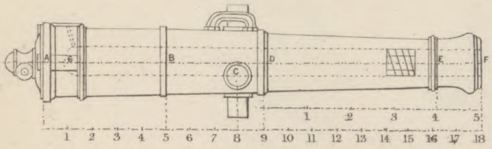


Fig. 11.
Coehorn Mortar

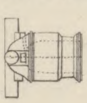


Fig. 12.
24 Pounder Carronade & Slide

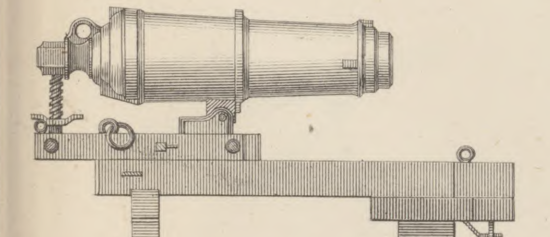


Fig. 13.
Capt^n Roberts' Slung Mortar

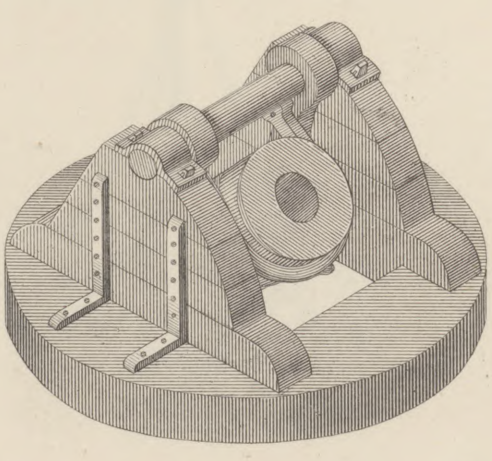


Fig. 14.
13 Inch Mortar and Bed

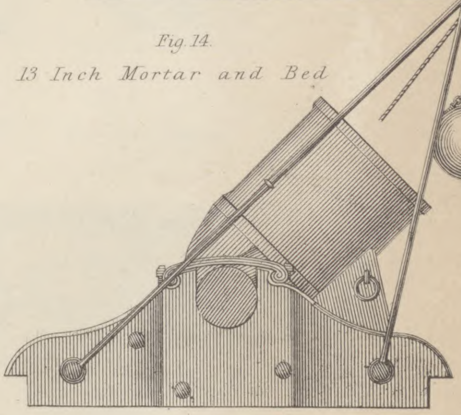


Fig. 18.
Lancaster Shell

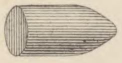
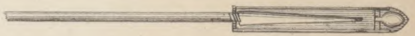


Fig. 19.
24 Pounder Rocket



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GUNNERY.

Fig. 1.
Dwarf Traversing Platform with 8 Inch Gun & Carriage.

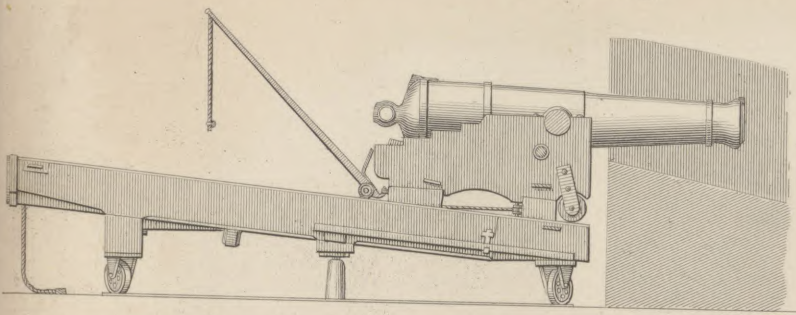


Fig. 2.
Common Iron Traversing Platform, 32 P^{r} & Iron Carriage.

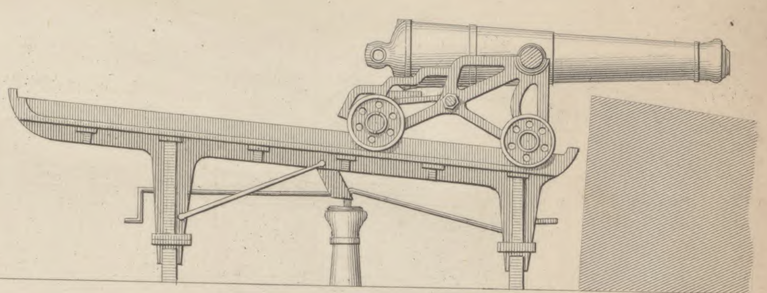


Fig. 3.
32 Pounder Garrison, Carriage Wood.

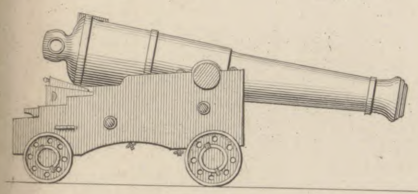


Fig. 4.
8 Inch Iron Howitzer, Travelling Carriage.

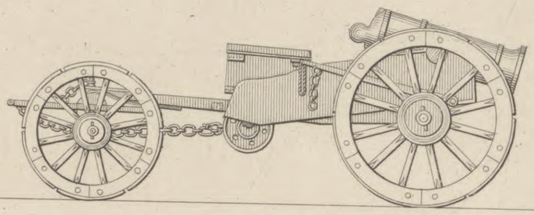


Fig. 5.
Ammunition Wagon Body.

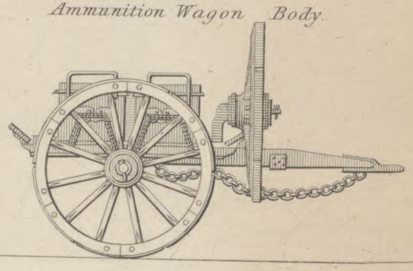


Fig. 6.
32 P^{r} Gun & Siege Carriage.

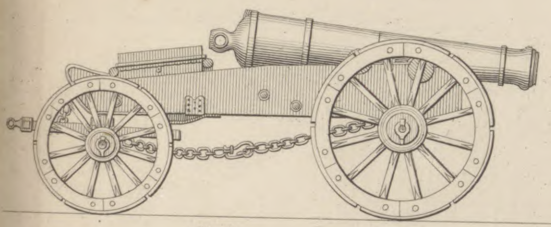


Fig. 7.
9 P^{r} Field Gun, Brass.

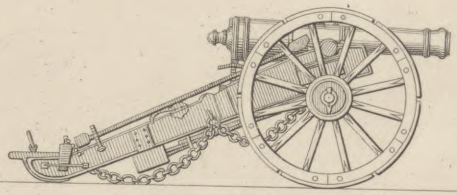


Fig. 8.
Limber for Field Guns.

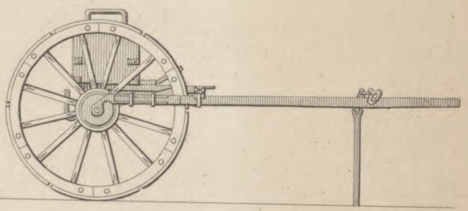


Fig. 9.
Platform Wagon with 10 Inch Mortar and Bed.

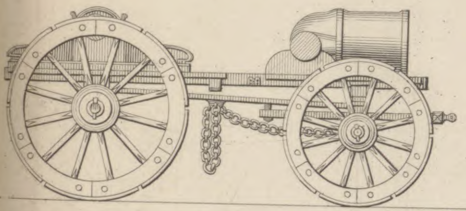


Fig. 10.
Sling Wagon with Gun & Carriage.

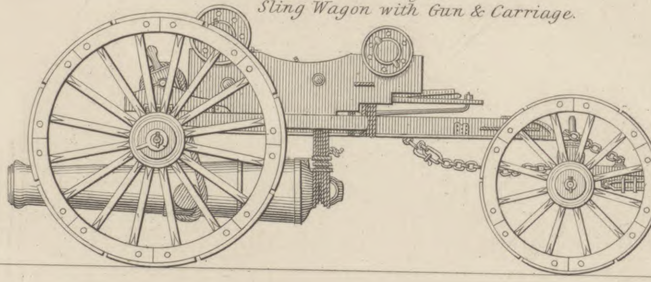


Fig. 11.
Sling Cart.

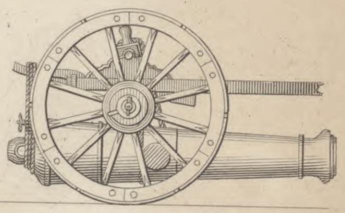


Fig. 13.
12 P^{r} Rocket Tube.

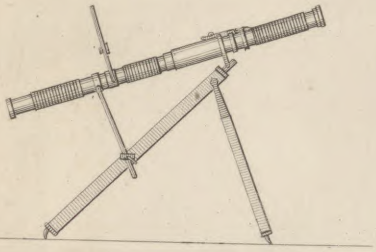


Fig. 12.
Triangle Gyn

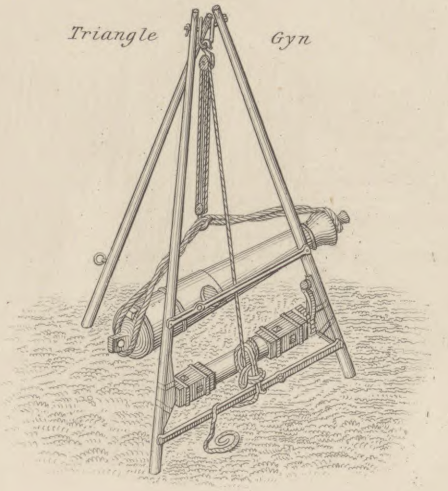
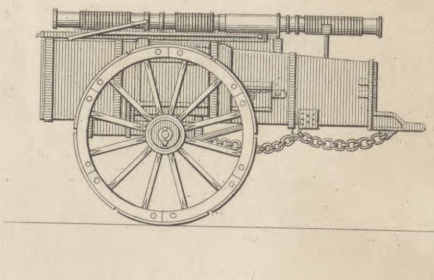


Fig. 14.
12 P^{r} Rocket Wagon.



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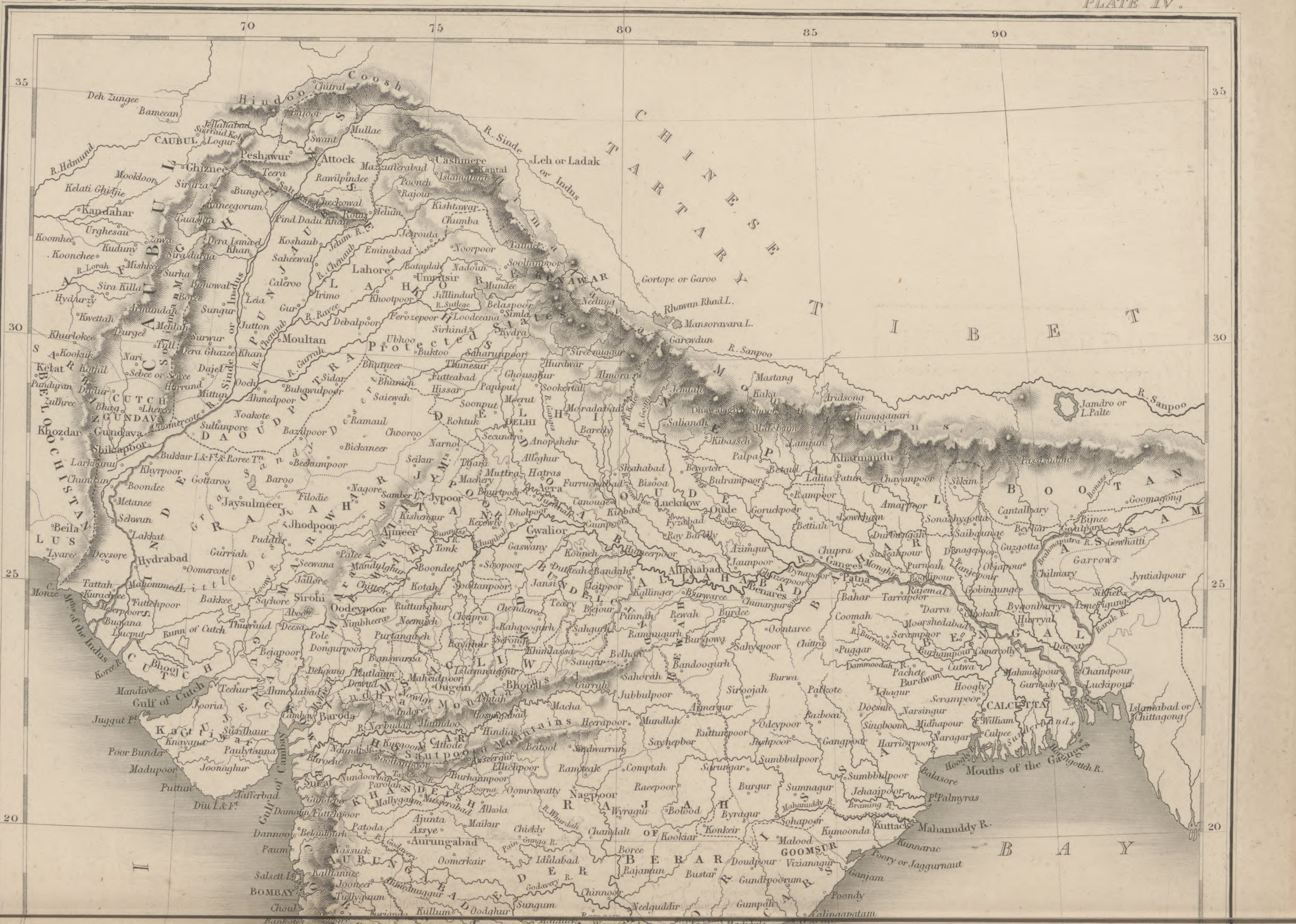
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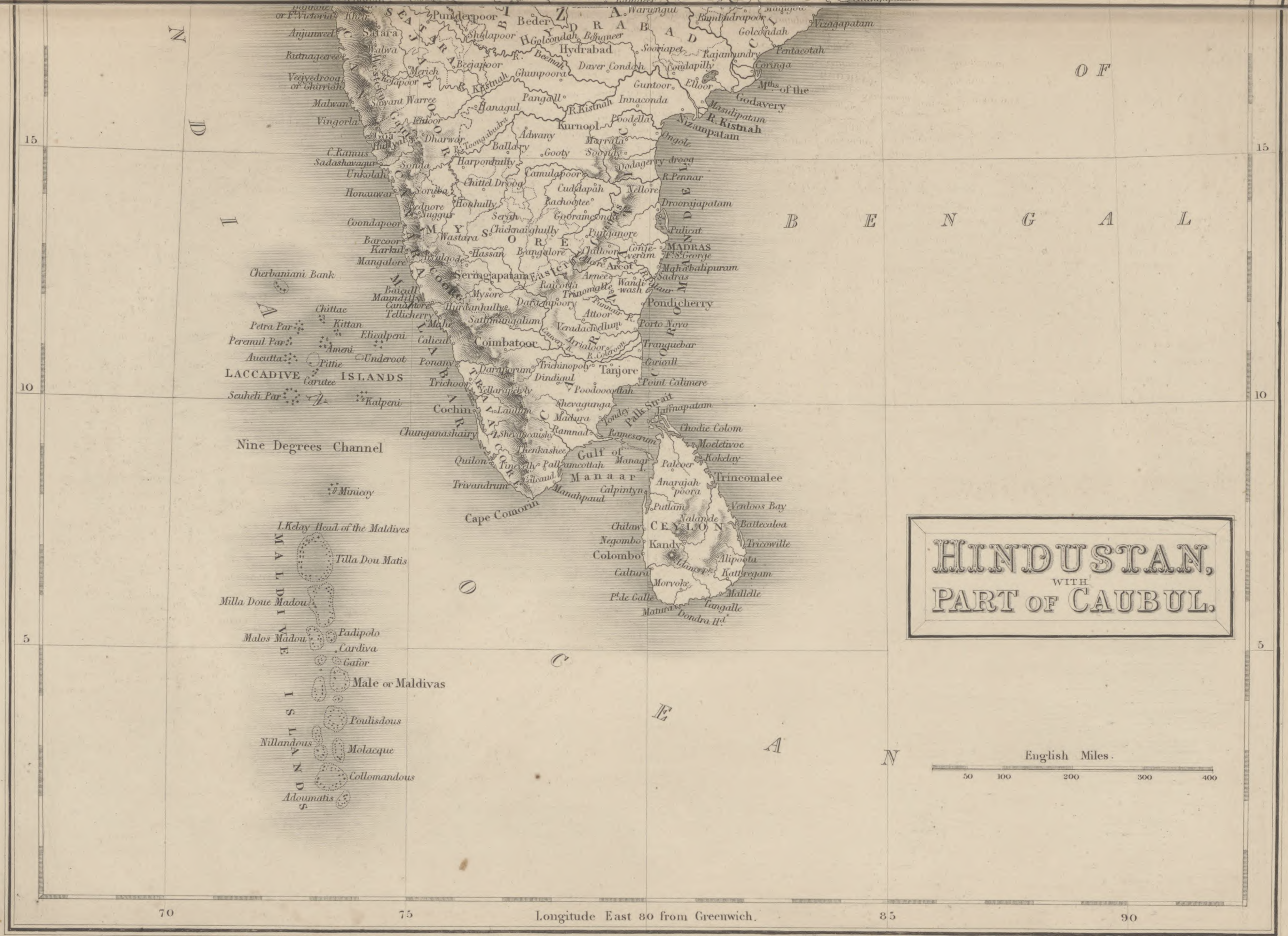

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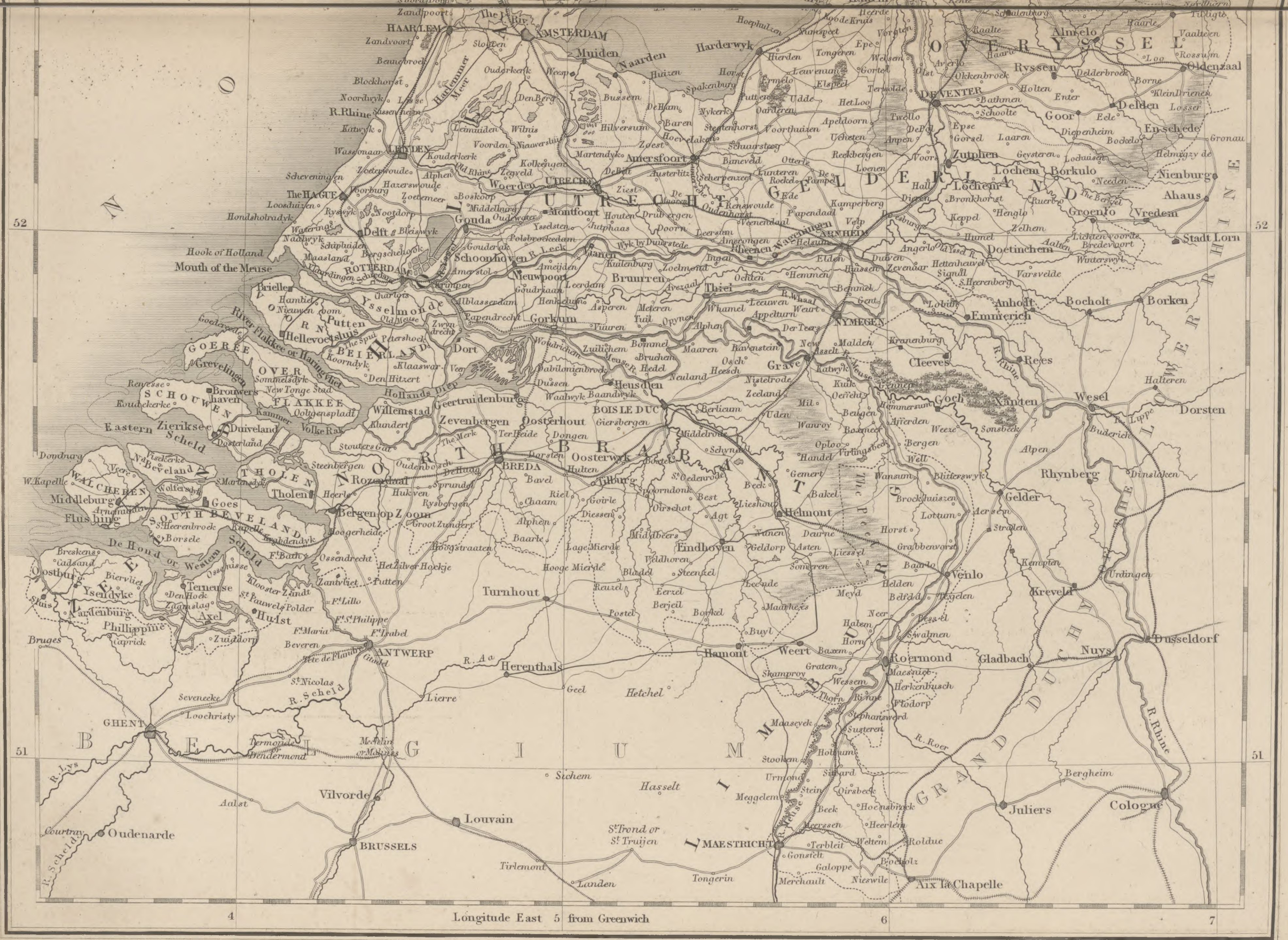

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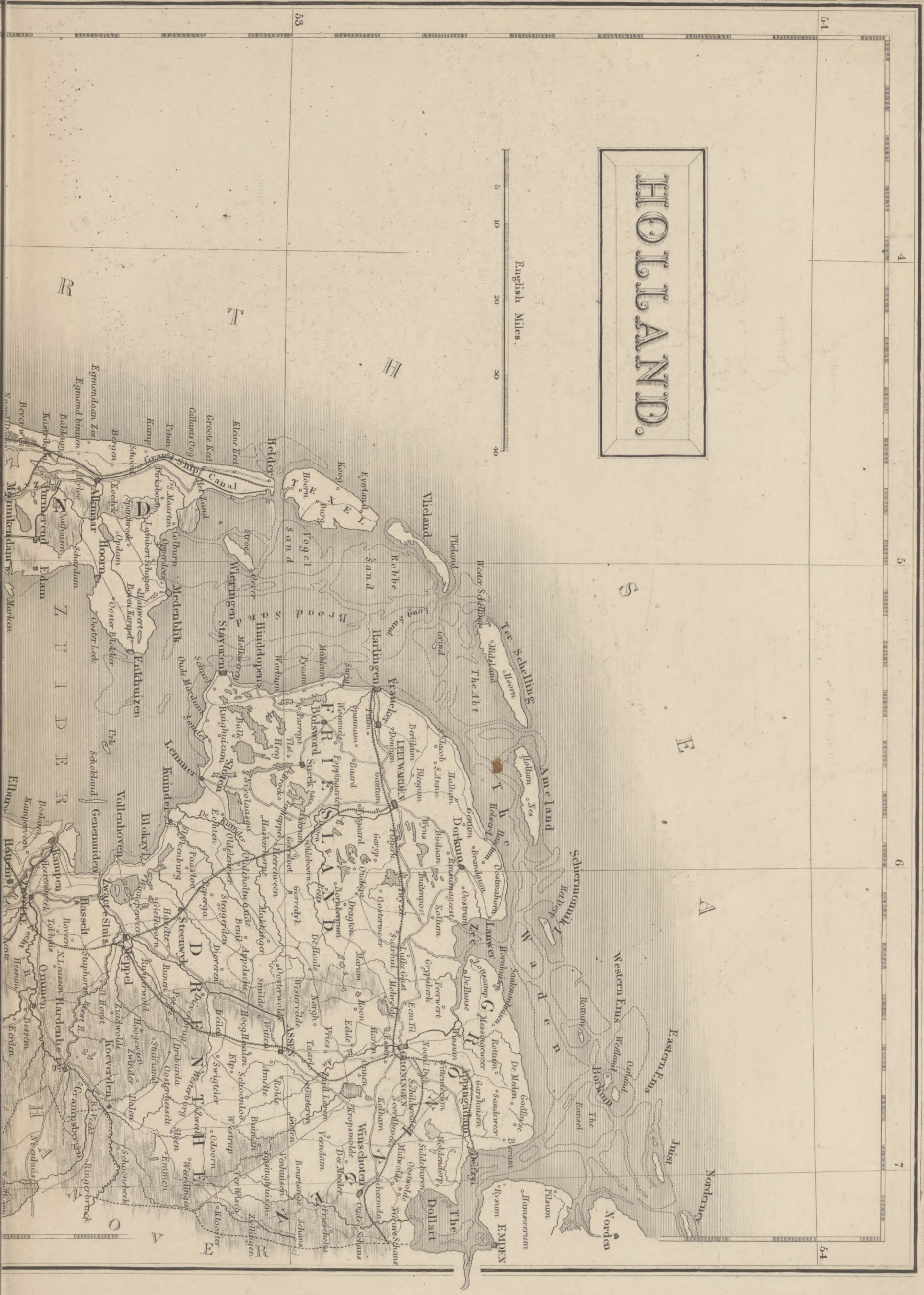
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